

400

Agricultural Innovative Technologies



Ministry of Agriculture
Republic of Indonesia



400

**Agricultural
Innovative
Technologies**

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Foreword



Indonesia, like many other developing countries, is facing a great challenge in agricultural development. Providing sufficient food for more than 240 million people, for example, has been challenged by the shrinking of agricultural land due to other development purposes such as housing, roads, and industry. In addition, global warming as well as biotic and a-biotic stresses have also threatened the agricultural production which require special attention.

During the last decade Indonesia has been successful in reducing poverty from 14.5% to 8.8% in the urban areas and from 21.1% to 15.1% in the rural areas. We still have to work harder in reducing the poverty, especially in the rural areas where farmers are the major population. Small land holding and lack of capital are among the major problems faced by the farmers. Therefore, the government has put high priority in improving farmer's welfare through various policies such as effective research and extension activities.

For more than four decades, the agricultural research and development represented by IAARD (the Indonesian Agency for Agricultural Research and Development) has contributed significantly to developing innovative technologies. Its contribution is not only related to the effort to increase agricultural production but also to reduce poverty of the rural population where most of them are farmers. Improved variety of rice, for example, has enabled farmers to increase the crop intensity and productivity. I am pleased with the initiative to publish 400 Agricultural Innovative Technologies as the outputs of IAARD research activities during the last few years. I noticed that some of the technologies are quite relevant to the current situation related to the increasing food crops production as well as improving the export opportunity of some agricultural production.

During the last decade, the surplus of our international food trade increased from US\$ 401 million in 2000 to US\$ 16, 6930 million in 2012 contributed mostly by domestic oil palm production. To maintain the surplus trade we have to continue exploring, developing, and commercializing of other agricultural commodities for export. In addition to export, there will be an increasing demand of agricultural product for domestic market. Wide adoption of the better quality and appearance of some agricultural products like fruits and ornamental plants would be able to meet this expectation. I am also pleased with the various innovations on bio-fertilizers, bio-control, and farm machineries. All of these innovations need to be communicated to the stakeholders and users. I believe that the private sector would play an important role in the production and promotion of this innovation to the users. I hope this important publication would be made available to local government through each Office of Agricultural Services (Dinas Pertanian) and Extension Services in the province and district level as well as to our partners and collaborators within the country and abroad.

I appreciate IAARD for all of the achievements and hope this publication is useful to the readers.

Minister of Agriculture,

A handwritten signature in black ink, appearing to be 'Suswono', written over a horizontal line.

Suswono

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FOOD CROPS



Inpari 7 Lanrang Rice Variety

Inventor : Aani Andang Daradjat, Nafisah, and Bambang Suprihatno
Indonesian Center For Rice Research

IPR Protection Status :
Variety Registration No. 115/PPVHP/2009

The Inpari 7 Lanrang is a high yielding variety derived from a crossing between S3054-2D- 12-2 line with Ultri Merah-2 and is designed for lowland at low elevation up to 600 m above sea level.

This variety is moderately resistant to bacterial leaf blight (BLB) strains III and tungro virus variants 013. With an average plant height 104 cm and 16 productive tillers per hill, Inpari 7 Lanrang can be harvested at 110-115 days.

This variety has long and clean yellow grains with a weight of 27.4 grams per 1,000 grains. The rice texture is soft with the amylose content of 20.78%. Its yield potential is 8.7 tons of dry grains per hectare.

Inpari 8 Rice Variety

Inventor : Aan Andang Daradjat, Nafisah, and Bambang Suprihatno
Indonesian Center For Rice Research

IPR Protection Status :
Variety Registration No. 116/PPVHP/2009

The Inpari 8 Variety is derived from a cross between IR65469 -161- 2-2- 2-3- 2-2 and IR61979 -136-1-3-22 lines. It is suitable for lowland areas up to 600 m above sea level and can be harvested at 125 days after sowing with a potential yield of 9.3 tons dry grain per hectare.

The average plant height is 113 cm with 19 productive tillers per hill. It has a long and slender grain, with an average weight of 27.4 grams per 1,000 grains. Inpari 8 is moderately resistant to bacterial leaf blight strain III, resistant to tungro virus inoculums 013 and 031, and moderately resistant to inoculums 073.

The texture of Inpari 8 is categorized as soft with amylose content of 21% which is preferred by most of the population.





Inpari 9 Elo Rice Variety

Inventor : Aan Andang Daradjat, Nafisah, and Bambang Suprihatno
Indonesian Center For Rice Research

IPR Protection Status :
Variety Registration No. 117/PPVHP/2009

The Inpari 9 Elo variety is derived from a cross between IR 68064-18-1-1-2-2 and IR 61979-136-1-3-2-2 lines. It has a yield potential of 9.0 tons per hectare and can be harvested at 125 days after sowing. The average plant height is 113 cm and the number of productive tillers is 18 per hill. It has long and slender grain shape, clean yellow in color. The grain weight is 22.8 g per 1000 grains.

Inpari 9 Elo is moderately resistant to bacterial leaf blight strain III and tungro inoculums III 073, 031, and 013. This high yielding variety is suitable to be grown on lowland areas up to 600 m above sea level.



Inpari 10 Laeya Rice Variety

Inventor : Aan Andang Daradjat, Nafisah, and Bambang Suprihatno
Indonesian Center For Rice Research

IPR Protection Status :
Variety Registration No. 118/PPVHP/2009

The Inpari 10 Laeya is generated from a crossing between S4876b-75 and IR 19661 and IR 64. The specific characteristic of this variety is relatively drought tolerant. In rainfed lowland areas, Inpari 10 Laeya can yield up to 9.0 tons of dry grain per hectare.

It matures early, ranging from 108-116 days after sowing and has a plant height of 100-120 cm. The shape of the grain is long slender and weight 27.4 g per 1000 grains. The average number of productive tillers is 16 per hill.

This variety is moderately resistant to brown planthopper biotypes 1 and 2 and moderately resistant to bacterial leaf blight strain III. The grain quality of Inpari 10 Laeya is relatively similar to Ciherang which is generally favored by consumers.





Inpari 11 Rice Variety

Inventor : Aan A. Daradjat, Bambang S., Nafisah, Cucu G.
Trias S., M. Yamin S., Bachaki, Riny S. K., Suprihanto,
Tri Hadi W., Anggiani N., Rina D. AA Kamandatu,
Akmal, Ali Imron, and Zairin
Indonesian Center For Rice Research

The Inpari 11 variety is derived from crossing between Cisadane variety and IR54742-1-19-11-8 line. Cisadane variety is generally preferred by many consumers because its taste is good.

This variety matures early, about 108 days after sowing and could yield 8.8 tons of dry grain per hectare. In average it has 18 productive tillers per hill and plant height of 106 cm. The rice texture is soft with amylose content 21.4 %.

Another important trait of this variety is its resistance to blast race 133 and resistance to bacterial leaf blight strain III.

Inpari 12 Rice Variety

Inventor : Aan A. Daradjat, Bambang S., Nafisah, Cucu G. Trias S., M. Yamin S.,
Bachaki S. E., Riny S. K., Suprihanto, Tri Hadi W., Anggiani N.,
Rina D. A. A. Kaniandahu, Akmal, Ali Imron, and Zairin
Indonesian Center For Rice Research

IPR Protection Status :
Variety Registration No. 109/PVHP/2011

The Inpari 12 variety is derived from a crossing between TNI variety and IR63356-sell line, introduced from Vietnam. The specific trait of this variety is its very early maturing which can be harvested at 103 days after sowing. It has resistance to blast disease race 033 besides resistance to brown planthopper biotypes 1 and 2.

It yields up to 8 tons dry grain per hectare with the slender grain shape and not easily shedding. This variety is well adapted to the rainfed lowland areas lying up to 600 m above sea level. The plant posture is erect, about 99 cm height, with an average of 18 productive tillers per hill. The rice texture is hard with 26.4 % amylose content.





Inpari 13 Rice Variety

Inventor : Nafisah, Cucu Gunarsih, Bambang Suprihatno, Aan A. Daradjat,
Trias Sitaresmi, and M. Yamin Samaullah
Indonesian Center For Rice Research

IPR Protection Status:
Variety Registration No. 110/PVHP/2011

Introduced from Vietnam, Inpari 13 variety is derived from a crossing between OM 606 and IR 18348-36-3-3 lines. It belongs to a very early maturing variety, 103 days after sowing or seed to seed with yield potential of 8 tons dry grain per hectare. Inpari 13 is resistant to blast disease and brown planthopper biotypes 1, 2, and 3.

The Inpari 13 is suitable for lowland areas up to 600 m above sea level. The average plant height is 101 cm, erect, and the average number of productive tillers is 17 per hill. The rice texture is soft.

This variety has been quite popular in some rice production centers, especially in the brown plant hopper endemic areas.

Inpari Blast Rice Variety

Inventor : Ida Hmarida Somantri, Dwinita W. Utami,
Dinar Ambarwati, Triny S. Kadir,
Aniversari Aprianan, and Amriti Sisarnini
Indonesian Center for Agricultural Biotechnology
and Genetic Resources Research and Development



Through anther culture technology, IAARD has generated this lowland rice variety resistant to blast disease which currently infects lowland rice in addition to upland rice. This improved variety is derived from a promising line Bio111 - BC - Pir7.



Besides resistance to blast disease, the variety is also resistant to the brown planthopper which is derived from the traits of wild rice species *Oryza rufipogon*. Based on field trials in some locations, Inpari Blast yielded slightly higher than Ciherang, the current most widely planted variety grown by farmers. Another characteristic of Inpari Blast is its early maturity, ranging from 80-85 days after transplanting. The rice taste is good and soft. In addition to the irrigated lowland, the variety can also be grown in the rainfed lowland areas up to 500 m above sea level.

Inpari HDB Rice Variety

Inventor : Ida Hanarida Somantri, Dwinita W. Utami,
Dinar Ambarwati, Triny S. Kadir,
Aniversari Aprianan, and Atmitri Sisharmini
Indonesian Center for Agricultural Biotechnology
and Genetic Resources Research and Development

Bacterial leaf blight (BLB) is an important disease of the rice crop. Inpari HDB, resistant to this disease, is also generated through anther culture technology by utilizing the wild rice species *Oryza rufipogon* as a source of resistance to plant pests.

In addition to BLB resistance, Inpari HDB is also resistant to the brown plant hopper which is also a major pest of rice crop. The resistance genes possessed by Inpari HDB are different from the ones in the previous variety. Testing at several locations indicated that Inpari HDB yield is slightly higher than that of Ciherang, the current most popular rice variety.





Inventor : Z. A. Simanulang,
Aan A. Daradjat, and Bambang Suprihatno
Indonesian Center For Rice Research

IPR Protection Status :
Variety Registration No. Variety 107/PPVHP/2009



Aek Sibundong Rice Variety

The Aek Sibundong variety is generated through crosses among the varieties Sitali, Way Apo Buru, and Widas. It yields up to 8,0 tons of dry grain per hectare and is characterized by red color of the milled rice which is rich in vitamin B3. The Aek Sibundong is suitable to be grown in medium elevation areas, approximately 700 m above sea level.

This variety is resistant to brown planthopper biotypes 2 and 3, and moderately resistant to bacterial leaf blight strain IV. The average plant height is 116 cm and it matures in 108-125 days after sowing. It has a slender grain shape, weighing 27 grams per 1,000 grains, and 16-20 productive tillers per hill. The Aek Sibundong variety is developed as a potential functional food.

HIPAJava 1 Hybrid Rice Variety

Inventor : Satoto, Murdhani Direja, Sudibyo T.
W Utomo, Yuni Widyastuti, and Indrastuti A. R.
Indonesian Center For Rice Research

IPR Protection Status :
1 / Peng / 01/2012

The yield of hybrid rice is generally higher than that of inbred rice. HIPAJava 1 variety is a hybrid rice variety generated by IAARD with productivity of 10 tons per hectare during the dry season and 9.7 tons in the wet season, or 11% higher than the most popular inbred variety Ciherang.

This variety has a physical white and shiny grain, the rice texture is rather soft with amylose content of 17%. It can be harvested at 119 days after sowing with an average plant height of 117 cm and the number of productive tillers of 16 per hill.





HIPA Java 2 Hybrid Rice Variety

Inventor : Satoto, Murdhani Direja, Sudibyo T. W Utomo,
Yuni Widyastuti, and Indrastuti A. R.
Indonesian Center for Rice Research

IPR Protection Status:
66 / Peng / 12/2012

The HIPA Java 2 variety yields relatively higher than HIPA Java 1, up to 10.9 tons dry grain per hectare during the dry season and 10.7 tons in rainy season. It also has white and shiny milled rice grains with a texture of soft and amylose content of 21.5%.

HIPA Java 2 is relatively early maturing and can be harvested at 119 days after sowing. The average plant height is 116 cm and the number of productive tillers is 16 per hill.



HIPA Java 3 Hybrid Rice Variety

Inventor : Satoto, Murchiani Diraja, Sudibyo T, W Utomo, Yuni Widyastuti,
and Indrastuti A. R.
Indonesian Center for Rice Research

IPR Protection Status :
2 / Peng / 01/2012

The HIPA Java 3 variety yields up to 10.7 tons dry grain per hectare during dry season and 10.0 tons in rainy season. The physical appearance of milled rice of this variety is white rather shiny, and soft with amylose content of 20%.

The maturity of HIPA Java 3 is similar to that of Java HIPA 1, about 117 days, plant height 109 cm, and 16 productive tillers per hill on average. The development of hybrid rice requires support from various parties, especially the seed producers, and is expected to contribute to the increasing national rice production.



HIPA 5 Ceva Hybrid Rice Variety

Inventor : Satoto, Mardani Direja, Yudistira Nugraha, and Sudibyo T. W. Utomo
Indonesian Center for Rice Research

IPR Protection Status :
Variety Registration No. Variety 27/PPVHP/2008

Introduced hybrid rice varieties are generally susceptible to major pests in Indonesia. Therefore, IAARD has paid more attention to this aspect in addition to high productivity. By using male sterile parents from IRRI, and in collaboration with the local government of Central Java, IAARD generated HIPA 5 Ceva variety which has proven to be resistant to brown planthoppers and moderately resistant to tungro virus disease. Another specific characteristic is that this variety is also aromatic with amylose content of 23.5 %.

The average productivity is 8.4 tons dry grain per hectare and the physical appearance of the milled rice is white and rather shiny. In some specific locations this variety was able to show the maximum heterosis symptom which was expressed by its higher productivity. For further development, the derivative F1 of this hybrid may soon be licensed by seed producers.



A photograph of a rice field with a blue sign that reads "HIPA 6". The rice plants are green and growing in rows. The sign is a small blue rectangle with white text, mounted on a blue post. The background is a dense field of rice plants.

HIPA 6

Inventor : Satoto, Murdani Direja, Yudistira Nugraha, and Sudibyo T. W. Utomo
Indonesian Center for Rice Research

IPR Protection Status :
Variety Registration No. 28/PPVHIP/2008

HIPA 6 Jete Hybrid Rice Variety

HIPA 6 Jete is generated by utilizing introduced male and female parents. In multilocation testing, HIPA 6 Jete variety is able to yield 10.6 tons per hectare. Similar to HIPA 5 Ceva variety, HIPA 6 Jete is also developed to be suitable for the agro-climatic regions of Central Java.

The texture of this variety is soft with 21.7% amylose content. Hybrid rice seed production is expected to play a role in the development of the HIPA 6 Jete variety after going through the licensing process.

HIPA 7 Hybrid Rice Variety

Inventor : Satoto, Soedibyo, TWU, Mudhani D., Yudhistira N., Agus G., and Yuni W.
Indonesian Center For Rice Research

HIPA 7 hybrid variety is also generated by utilizing introduced male and female parents. It can be harvested at 115-120 days and yields up to 11.4 tons dry grain per hectare. In most of multilocation tests, HIPA 7 yielded 10% higher than Ciherang inbred variety.

The plant height is about 110-118 cm with 15-22 productive tillers per hill. The texture of the rice is soft with amylose content of 22.4%. It is moderately resistant to tungro disease, and does not easily lodge or shed. It can also adapt well to wider ecosystems of lowlands.





Inventor : Satoto, Murdhani Direja, Sudibyo T. W. Utomo,
Yuni Widyastuti, and Indrastuti A. R.
Indonesian Center for Rice Research

IPR Protection Status :
Variety Registration No. 214/PVHP/2010

HIPA 10 Hybrid Rice Variety

HIPA 10 hybrid rice variety is generated from utilizing an introduced male parent, and yields up to 10.4 tons dry grain per hectare. It matures at about 114 days and has relatively similar characteristics to HIPA 9. The plant height is about 96 cm and average number of productive tillers is 15 per hill.

HIPA 10 variety's taste is categorized as good with 19.3% amylose content. HIPA 10 hybrid rice is licensed to PT. Petro Kimia Gresik with a 10-year agreement period, 2010-20.

HIPA 11 Hybrid Rice Variety



Inventor : Satoto, Mardhani Direja, Sudibyo T. W Utomo, Yuni Widyastuti,
and Indrastuti A. R.
Indonesian Center for Rice Research

IPR Protection Status :
Variety Registration No. 15/PVHP/2010

Hipa 11 hybrid rice variety is derived by utilizing introduced male and female parents. It yields up to 10.6 tons dry grain per hectare in 114 days. The average plant height is 96 cm with 15 productive tillers per hill. The grain shape is slender and texture of the rice is soft with amylose content of 19.3%. HIPA 11 is resistant to bacterial leaf blight.

HIPA 11 hybrid rice is licensed to PT Petro Kimia Gresik with a 10-year agreement period, 2010-20.



HIPA 12 SBU Hybrid Rice Variety

Inventor : Satoto, Mardiani Direja, Sudibyo T. W. Utomo,
Yuni Widyastuti, and Indrastuti A. R.
Indonesian Center for Rice Research

IPR Protection Status :
Variety Registration No. 61/Peng/10/2011

Hipa 12 SBU is derived by utilizing male and female parents from the LAARD collection. In dry seasons HIPA 12 SBU yields 10.5 tons dry grain per hectare and in wet seasons 8.9 tons per hectare. In the multilocation tests its productivity is 17% higher than the inbred rice Ciherang.

SBU HIPA 12 variety has an aroma which is generally preferred by consumers and has a higher resale value. Another advantage of this hybrid rice is that it can be harvested at 105 days with the average plant height of 104 cm.

SBU HIPA 12 variety is moderately resistant to brown planthopper biotypes 2 and 3. The color of the milled rice is glossy white with a soft taste and amylose content of 23.2 %. This variety has been licensed to PT Saprotan Benih Utama, for a 20-year agreement period, 2011-31.





HIPA 13 Hybrid Rice Variety

Inventor : Satoto, Murchani Direja, Sudibyo T. W. Utomo,
Yuni Widyastuti, and Indrastuti A. R.
Indonesian Center For Rice Research

HIPA 13 variety is generated by utilizing the IAARD collection of male and female parents. Its productivity is 10.5 tons dry grain per hectare in dry season and 9.4 tons in rainy season. It has a shiny white grain and head rice having a percentage of 83.9%. The taste is categorized as good characterized by a soft in texture, aromatic, with amylose content of 24.7%.

HIPA 13 can be harvested in 105 days, is moderately resistant to the brown planthopper. Similar to the other hybrid rice varieties, the development of HIPA 13 also requires the support of seed producers and industry.





HIPA 14 SBU Hybrid Rice Variety

Inventor : Satoio, Murtiani Direja, Sudibyo T. W. Utomo, Yuni Widyastuti,
and Indrastuti A. R.

Indonesian Center for Rice Research

IPR Protection Status :

Variety Registration No. 62/Peng/10/2011

HIPA 14 SBU variety has a stand out characteristic of its higher yield potential compared to the other hybrid rice varieties released earlier. It yields up to 12.1 tons per hectare in the dry season and 11.8 tons per hectare in the wet season. The average plant height is 112 cm, and the number of productive tillers is 16 per hill with an average of 185 grains per panicle.

HIPA 14 SBU has a slender grain and the color of the milled rice is shiny white. The rice texture is rather soft, aromatic, with amylose content of 24.7%. It also is resistant to the brown planthopper. This variety has been licensed to PT. Saprota Benih Utama through a 20-year period agreement, 2011-31.



HIPA 8 Pioneer Hybrid Rice Variety

Inventor : Satoto, Sudibyo T. W. Utomo, Murdhani Direja, Yudhisira Nugraha,
Agus Guswara, and Yuni Widyastuti
Indonesian Center For Rice Research

HIPA 8 Pioneer is characterized by its good taste and soft rather sticky texture with amylose content of 22.7 % besides being moderately resistant to bacterial leaf blight strain IV. It is able to produce 10.4 tons of dry grain per hectare in 110-122 days with an average plant height 124 cm, and 14-18 productive tillers per hill.

HIPA 8 Pioneer has been licensed to PT Dupont Indonesia, with seed production of 2.77 tons in 2011, 14 tons in 2012. Around 2.13 tons of the seeds was distributed in 2011 and 14 tons in 2012. The license agreement is for a 10 years period, 2010-20.



HIPA 9 Hybrid Rice Variety

Inventor : Satoto, Sudibyo T. W. Utomo, Murdhani Direja, Yuni Widyastuti, Indrastuti A. R., and Yudhistira Nugraha
Indonesian Center for Rice Research

HIPA 9 variety is generated by utilizing an introduced male parent and yields 10.4 tons dry grain per hectare. The texture of the rice is soft which is preferred by many consumers.



HIPA 9 variety is moderately resistant to bacterial leaf blight strains III, it has an average of 14 productive tillers per hill, 103 cm plant height, and can be harvested in 115 days. Like other hybrid rice varieties, the development of HIPA 9 variety requires the support of seed industry. HIPA 9 is licensed to PT. Metahelik Life Science, for a 5-year period, 2010-15.



Inpara 4 Rice Variety

Inventor : Aris Hairmansis, Bambang Kustianto, Supartopo, and Suwarno
Indonesian Center for Rice Research

Inpara 4 is an introduced inbred rice variety from IRRI. It is a submergence tolerant variety up to 14 days during the vegetative stage. In accordance with the nature of tolerance to submergence, this variety is suitable for shallow wetlands and flood-prone lowland.

Inpara 4 is moderately resistant to brown planthopper biotype 3. The average plant height is 94 cm, and grain weight is 19 grams per 1000 grains. In multilocation trials, this variety yielded 7.6 tons dry grain per hectare in 135 days. The rice texture is hard with amylose content of 29%.

Future development of submergence-tolerant varieties requires large quantities of seed and seed producers are expected to contribute to the wide scale adoption of Inpara 4 variety.



Inpara 5 Rice Variety

Inventor : Aris Hartmansis, Bambang Kustianto, Supartopo, and Suwarno
Indonesian Center for Rice Research

Inpara 5 is derived from an introduce line from IRRI. This variety is also tolerant to submergence up to 14 days during the vegetative stage. The average plant height is 92 cm and can be harvested in 115 days after sowing. Inpara 5 has a slender grain, 25 grams per 1,000 grains weight, and 18 productive tillers per hill.

This variety is also moderately resistant to brown planthopper biotype 3. It yields up to 7.2 tons dry grain per hectare. The texture of the rice is soft with 25% amylose content.

Inpago 4 Rice Variety

Inventor : Kustianto, S. Suharsono, Suwarno, Santoso, Anggiani N., and Husin M. Toha
Indonesian Center for Rice Research

Inpago 4 is an upland rice variety derived from crosses between Batuteji/Cigeulis/Ciherang. It is resistant to blast disease, a major disease in upland rice and yields up to 6.0 tons per hectare, equivalent to lowland rice yields.

This variety matures in 124 days with average plant height 134 cm and number of productive tillers 11 per hill. The rice texture is soft with amylose content of 21%. Other important characteristics of Inpago 4 are its tolerance to aluminum (Al) and relatively good grain quality.



Inpago 5 Rice Variety

Inventor : Erwina Lubis, Suwarno, Aris Hermansis, Kustianto, S. Suharsono, Santoso, Anggiani N., and Husin M. Toha
Indonesian Center for Rice Research

Inpago 5 is derived from crossing several lines originating from the Bogor, Tamanbogo, and Kuningan experimental farms and IRRI. It matures about one week earlier than Inpago 4 or at 118 days after sowing with an average plant height 132 cm, and 14 productive tillers per hill. With proper cultivation, on fertile land, it can yield 6,2 tons per hectare, similar to that of lowland rice.

Other important characteristics of the Inpago variety are blast resistance, drought tolerance, and Al toxicity (60 ppm) tolerance. It can also grow quite well on Red Yellow Podzolic soils.

The grain is slender, rice texture is soft with amylose content of 18%. The development of this high yielding variety on a large scale is expected to increase the contribution of upland rice to national rice production.





Inpago 6 Rice Variety

Inventor : B. Kustianto, Erwina Lubis, Aris Haimansis, Supartopo, and Suwarno
Indonesian Center for Rice Research

Inpago 6 is an introduced upland rice variety originating from IRRI line 30176-13 IR-2-MR-1. It has several characteristics such as high yield, up to 5.81 tons of dry grain per hectare, blast resistance, good quality rice and rice texture is soft with amylose content of 22.0%.

This variety can be harvested in 113 days, the average plant height 117 cm, 11 productive tillers per hill, and slender grain in shape.

Situ Patenggang Rice Variety

Inventor : Ismail B. P., Jamin S., Z. A. Simanullang, and A. A. Daradjat,
Indonesian Center for Rice Research

IPR Protection Status:
Variety Registration No. 129/PPVHP/2009

Situ Patenggang is an upland rice variety generated by crossing local variety Kortuna and TB 7H-MR-10 line. It can be harvested at 110-120 days, is suitable for upland during rainy season besides can also be grown as lowland rice which makes it called an 'amphibious rice variety'. Rather oval grain shape, weighs 27 grams per 1,000 grains, and number of productive tillers 10-11 per hill, this variety can yield 6.0 tons dry grain per hectare.

Situ Patenggang is also resistant in upland to blast disease, the rice texture is medium, aromatic, with 24% amylose content. The Situ Patenggang rice variety is suitable for podsollic and alluvial drylands as well as for lowland less than 300 m above sea level.



Situ Bagendit Upland Rice Variety

Inventor : Z. A. Simanung
Indonesian Center for Rice Research

IPR Protection Status:
Variety Registration No.130/PVHP/2008

Situ Bagendit is derived from crosses between Batur variety and S2823 - 7D -8 -1- A line. Field trials in various locations showed this variety can yield an average of 4.0 tons per hectare when it was grown as upland rice and 5.5 to 6.0 tons per hectare when it was grown as lowland rice.

This variety is drought tolerant, moderately resistant to blast disease, resistant to tungro and bacterial leaf blight. The plant height is 99-105 cm, matures at 110-120 days, and produces 12-13 productive tillers per hill. Grain shape is slender with 27.5 grams weight per 1,000 grains.

Situ Bagendit has been planted by farmers in some regions, both as upland and lowland rice. Several seed growers have contributed to the spread of this variety.





Bima 1 Hybrid Corn Variety

Inventor : Marsum M. Dahlan, Sriwidodo, Mustari Basir, Made J. Mejaya, Nedy Iriani, and Wasmo Wakman
Indonesian Cereal Research Institute

IPR Protection Status :
Varietal Registration No. 11/Purm/TS/2007

Bima 1 Hybrid corn variety is derived from crosses between pure line Mr-4 with pure line Mr-14. Mr-4 was developed from an MSJ1 population, while Mr-14 was developed from a Suwan 3 population. The average plant height is 215 cm, matures at 97 days, and silking at 54 days after sowing. Its rooting is well, with uniform plant growth.

The average cob length is 18 cm, seed color is yellow, seed weight 310 grams per 1,000 seeds, the number of grain rows on cob is 12-14. Yield potential is 9.0 tons per hectare of dry grain.

Bima 1 is well adapted in low elevations up to 1,200 m above sea level. It is moderately resistant to downy mildew, leaf spot, and rust. This variety has commercial potential to support sustainable self-sufficiency in maize.

Bima 2 Bantimurung Hybrid Corn Variety

Inventor : Andi Takdir M, R. Neni Iriany, Made Jana Mejaya, Muzdalifah Isnaini, Achmad Muliadi, Nuning A Subekti, M. Yasin H. G., and Marsum Dahlan.
Indonesian Cereal Research Institute

IPR Protection Status :
Variety Registration NO. 17/Pmm/TS/07

Bima 2 Bantimurung variety is generated from a single cross between B11-209 (introduced line from CYMMIT Thailand) and Mr-14 line. This variety is moderately resistant to downy mildew, a major disease on corn. Its leaves are still green at harvest so it can be used for animal feed. It can yield up to 11 tons per hectare, and adapts well to suboptimal land.

The license of this variety was given to PT Saprotan Benih Utama for a five-year agreement, 2007-2012. In 2012, the company produced 50 tons of seed of this variety which was named as MW-2. About 16.5 tons was distributed to some provinces such as West Sulawesi, South Sulawesi, East Nusatenggara, and Central Java.





Bima 3 Bantimurung Hybrid Corn Variety

Inventor : Made Jana Mejaya, R. Neni Iriany, Andi M Fate, Muzdalifah Isnaini,
Achmad Muliadi, and Amrizal Nasar
Indonesian Cereal Research Institute

IPR Protection Status:
Varietal Registration No. PVT 18/Purm/TS/2007



Bima 3 Bantimurung variety is derived from a single cross between Nei-9008 line and Mr-14. Nei-9008 is an introduced line from Thailand, while Mr-14 is an IAARD collection line.

Bima 3 Bantimurung is an early maturing variety, ± 100 days, and is downy mildew resistant. Its yield potential is 10 tons per hectare, grain color is orange to red and it can be grown in less fertile soils. Bima 3 Bantimurung has been licensed to PT Golden Indonesian Seed for a 5-year period, 2012-17.

Bima 4 Corn Hybrid Variety

Inventor : R. Neni Iriany, Andi Fate, M. Azrai, Sigit Budisantoso, Muzdalifah Isnami, M. Yasin HG, and Marcia Bunga Pabendon
Indonesian Cereal Research Institute

IPR Protection Status:

Variety Registration No. PVT 17/PVHP/2008

Bima 4 hybrid corn is derived from crosses between G-180 and Mr- 14 lines, with an average plant height 212 cm, resistant to lodging, and uniform growth. The cob length ± 20 cm, orange to red seeds, average grain weight 266 grams per 1,000 seeds, with 12-14 rows per ear.

It can be harvested at 102 days with a yield potential of 11.7 tons per hectare. It is resistant to rust and leaf spot diseases. Stems and leaves of the plant stay green at harvest which makes it available as animal feed. Bima 4 hybrid corn variety is licensed to PT Bintang Makmur Pasifik for a 5-year agreement period, 2009-14.





Bima 5 Corn Hybrid Variety

Inventor : R. Neni Iriani, Andi Fate M. M Azrai,
Musdalifah Isaeni, and Sigit Budi Santoso
Indonesian Cereal Research Institute

IPR Protection Status:
Variety Registration No. 18/PVHP/2008

Bima 5 Maize variety is derived from crosses between Mr G 193 and Mr-14 lines with an average plant height of 204 cm. It can be harvested in 103 days, has a good rooting, and uniform growth. The ear length $\pm$ 18.2 cm, orange to red seeds, and 12-14 grain rows per ear.

This variety has a yield potential of 11.4 tons per hectare, uniform cobs, resistant to rust and leaf spot diseases, stem and leaves stay green at harvest so it can be used for animal feed. Bima 5 hybrid corn variety is licensed to PT Sumber Alam Sutera, for a 5-year period, 2009-14.



Bima 6 Corn Hybrid Variety

Inventor : Andi Takdir M., R. Neni Iriani,
M. Azrai, Musdalifah I., Sigit Budi S.,
Nuning A. Subekti, and Amin Nur
Indonesian Cereal Crops Research Institute

IPR Protection Status:
Variety Registration No. 19/PVHP/2008



Bima 6 variety is derived from crosses between Mr 14 and N 150 lines with an average plant height of 202 cm, physiologically matures at 104 days, very good rooting, and uniform growth. The ear length ± 17.1 cm, orange to red seeds, 12-14 rows of grain per ear.

The yield potential of this variety is 10.6 tons per hectare. It can be grown in less fertile soils and has green leaves at harvest time, so it can be used for animal feed. Bima 6 variety is licensed to PT Makmur Sejahtera Utama with a 5-year agreement period, 2009-14.





Bima 7 Corn Hybrid Variety

Inventor : M. Azrai, Sri Sunarti,
Muzdalifah Isnaini, and Andi Takdir Makkulawu
Indonesian Cereal Research Institute

IPR Protection Status :
Variety Registration No. 20/Peng/03/2010

It is moderately resistant to downy mildew, and resistant to rust and leaf spot disease. Bima 7 also stays green at harvest which makes it useful for feed. Under favorable condition it can yield up to 12.1 tons per hectare. Bima 7 hybrid corn variety has been licensed to PT Biogene Plantation for a 5-year period, 2010-16.

Bima 7 is derived from a cross between GJ 11 (introduced line from CIMMYT) as the male parent and GJ 15 line as the female parent. This variety is able to produce high yield in less fertile soils or suboptimal land, and can be harvested in 89 days.



Bima 8 Hybrid Corn Variety

Inventor : Muhammad Azrai, Sri Sunarti, Aviv Andraini,
Amin Nur, and Andi Takdir Makkulawu
Indonesian Cereal Research Institute

IPR Protection Status :
Variety Registration No. 131/PVHP/2010

The Bima 8 variety is derived from crosses between MCL 252 (an introduced line from CIMMYT) as the female parent and GJ 15 as the male parent. It can be harvested in 88 days with large and sturdy stems, 187 cm plant height, long and cylindrical cobs, straight and dense grain rows numbering 14-16 per ear. The color of grain is orange with a weight of 316 g per 1000 grains at 15 % moisture content.

High yield potential, up to 11.7 tons per hectare, carbohydrate content 73.2 %, protein 8.6 %, and fat 5.1%. Bima 8 is lodging resistant, and stays green at harvest, is resistant to downy mildew, rust, and leaf spot (*Helminthosporium maydis*) diseases.



Bima 9 Hybrid Corn Variety

Inventor : Andi Fate Makkulawu, Neny Iriany M, Muzdalifah Isnaini, Sri Sumarti, and Muhammad Azrai
Indonesian Cereal Research Institute

IPR Protection Status:
Variety Registration No. 20/Peng/11/2010

Bima 9 variety is derived from crosses between CML 161 and Nei strain 9008 with Mr 15. It matures in about 95 days, 199 cm height, with cylindrical shape of ear and length $\pm$ 24 cm. The plant growth is uniform, has large and sturdy stems which makes it lodging resistant. It has high yield potential, up to 13.4 tons per hectare, is resistant to downy mildew, and moderately resistant to rust and leaf spot diseases.

Bima 9 has 74.2% carbohydrate, 11.9% protein and 6.6% fat. This high yielding corn has been licensed to PT Tosa Agro with a 5-year agreement period, 2010-15. Bima 9 variety's seed production was 1.65 tons in 2011 and 0.6 tons in 2012. The hybrid seed has been distributed as 1.38 tons in 2011 and 0.66 tons in 2012.

Bima 12 Q Hybrid Corn Variety

Inventor : M. Yasin HG, Firdaus Kasim, Made Jana Mejaya,
Abd. Rahman, Marcia B. Pabendon, and AT Dewi
Indonesian Cereal Research Institute

IPR Protection status:
Variety Registration No. 67/Peng/12/2011

Bima 12Q is generated from a cross between Mr 4 Q and Mr 14 Q. It can be harvested in 90-95 days with yield potential of 9.3 tons per hectare. It has 8.1% protein content and amino acids lysine and tryptophan are two times higher than other common corn, 0.52% and 0.11% respectively. Bima 12 Q can be grown at altitudes up to 800 m above sea level.

Bima 12 Q variety can be used as alternative to overcome nutritional deficiency and malnutrition, prospectively developed in eastern Indonesia and can be processed into corn milk. This hybrid corn has been licensed to PT Berdikari (Persero) with a 5-year agreement period, 2011-16.





Bima 13 Q Hybrid Corn Variety

Inventor : M. Yasin HG, Fatimahwati, Rahman Haeruddin, and AT. Dewi
Indonesian Cereal Research Institute

Bima 13 Q variety is derived from a cross between CML 16 and CML 165, introduced lines from CIMMYT. It matures in 103 days and yields up to 9.8 tons per hectare. The amino acids lysine and tryptophan content of this variety are 0.460% and 0.09% respectively, two times higher than in common corn. It adapts well in elevations up to 800 m above sea level.

Bima 13 Q may be used as an alternative to overcome malnutrition and famine, prospectively to be developed in eastern Indonesia, and can be processed into corn milk as well as nutritious animal feed.





Bima 16 Hybrid Corn Variety

Inventor : Muli. Azrai, Andriani Aviv,
A. Takdir M. and M. Idris
Indonesian Cereal Research Institute

Bima 16 variety is derived from a cross between pure line GC10279 as the female parent and Mr-14 line as the male parent. It can be harvested in about 99 days. The plant height is 220 cm, stems are upright and vigorous, uniform growth, and strong roots. The cob is long and cylindrical, cornhusks tightly cover the cob, and grain color is orange-yellow.

Bima 16 has a high yield potential, reaching 12.4 tons per hectare and it is resistant to downy mildew, rust, and leaf spot diseases.

Bima Putih 1 Hybrid Corn Variety

Inventor : M. Yasin H. G., Fatmawati, Rahman Haerudin,
Sigit B. Santoso, and A. T. Dewi
Indonesian Cereal Research Institute.



Bima Putih 1 variety is a single-cross maize hybrid from a cross between CML140 as the female parent and CML264Q as the male parent. It has strong roots which make it resistant to lodging, long and cylindrical cob located in the middle of the plant, and comhusks properly cover the cob.

This variety can be harvested in 108 days and yields up to 10.3 tons per hectare. The stem and leaves above the cob are still green during harvest time. Bima Putih 1 can be cooked as corn rice to substitute for rice for diabetics. The content of lysine and tryptophan are 0.23% and 0.06% respectively. This white corn hybrid is expected to spread faster, both as a functional food and in the corn flour industry that can substitute wheat flour.



Bima Putih 2 Hybrid Corn Variety

Inventor : M. Yasin HG, Fatmawati,
Sigit Budi Santoso, Jamaluddin,
and A. T. Dewi
Indonesian Cereal Research Institute



Bima Putih 2 is derived from crosses between the CML 143 line as the female parent with the CML 246Q line as the male parent. This improved variety has strong roots that retard lodging, a long and cylindrical cob, and comhusks cover the cob properly.

It yields about 10.4 tons per hectare in about 100 days, with stem and leaves above the cobs remain green at harvest time. The lysine and tryptophan contents are 0.29% and 0.07% respectively. Bima Putih 2 can be used as a staple food for some people in East Nusatenggara, Gorontalo, Central Sulawesi, Central Java, and East Java province.





Detam 1 Soybean Variety

Inventor : M. Muchlis Adic, Gatut Wahyu A. S., Suyanto, and Arifin
Indonesian Legume and Tuber Crops Research Institute

IPR Protection Status:
Variety Registration No. 153/PVHP/2010

The black seeded Detam 1 soybean variety is selected from a cross of introduced line 9837 and the Kawi variety. Detam 1 has a potential yield of 3.45 tons per hectare, protein content 35.4%, and can be harvested in 85 days. It has a relatively large seed size and weighs 14.8 grams per 100 seeds.

Detam 1 has the potential to commercially support the soy sauce industry.





Detam 2 Soybean Variety

Inventor : M. Muchlis Adie, Gatut Wahyu A. S., Suyanto, and Arifin
Indonesian Legumes and Tuber Crops Research Institute

IPR Protection Status:
Variety Registration No. 153/PVHP/2010



The black seed Detam 2 soybean variety is selected from a cross of introduced line 9837 and the popular Wilis variety. It yields up to 2.96 tons per hectare in 82 days. The average plant height is 57 cm and the grain weight is 13.6 grams per 100 grains.

In addition to high yield potential, Detam 2 contains 45.6% protein, 14.8% fat, and is suitable for soy sauce. This improved variety is moderately resistant to pod-sucking pests. Detam 2 has potential to meet the demand of the ketchup industry.



Gema Soybean Variety

Inventor : Muchlis Adie, Gatut Wahyu A.S, Ayda Krismawati, Suyanto, and Arifin
Indonesian Legumes and Tuber Crops Research Institute

Gema variety is selected from a cross between introduced line Shirome and Wilis variety. It is an early maturing soybean variety which can be harvested in 73 days, is relatively tolerant to drought which make it suitable for areas with limited rainfall or as the third crop in rice-rice-soybean cropping pattern. Its grain weight is 11.9 grams per 100 grains.

It is able to yield up to 3.06 tons per hectare and the grain contains 39% protein, suitable for raw materials of tofu or soybean cake.





Tanggamus Soybean Variety

Inventor : : M. Darman Arsyad, M. Muchlis Adie, Heru Kuswantoro, and Purwantoro
Indonesian Legumes and Tuber Crops Research Institute

IPR Protection Status:
Variety Registration No. 122/PVHP/2009

Tanggamus variety is generated from a cross between Kerinci variety with No.3911 line. It yields up to 2.5 tons per hectare in 88 days. The plant height is 67 cm, and the grain weight is 11 grams per 100 grains.

This variety is moderately resistant to rust disease, pods are not easily shattered, and it contains 44% protein. Tanggamus is tolerant to soil acidity which makes it suitable to grow in the acid soils of upland areas.



Seulawah Soybean Variety

Inventor : Darman M. Arsyad, Heru Kuswantoro, M. Muchlis Adie, Purwantoro,
Amin Nur, Sri Hardaningsih, and E. Yusnawan
Indonesian Legumes and Tuber Crops Research Institute

IPR Protection Status:
Variety Registration No. 126/PVHP/2009

Tanggamus variety is generated from a cross between Kerinci variety with No.3911 line. It yields up to 2.5 tons per hectare in 88 days. The plant height is 67 cm, and the grain weight is 11 grams per 100 grains.

This variety is moderately resistant to rust disease, pods are not easily shattered, and it contains 44% protein. Tanggamus is tolerant to soil acidity which makes it suitable to grow in the acid soils of upland areas.





Dering 1 Soybean Variety

Inventor : Suhartina, Purwantoro, Novita Nugraheni,
Suyanto, Arifin, and M. Adie Muchlish
Indonesian Legumes and Tuber Crops Research Institute



Dering 1 is a drought tolerant variety during the reproductive phase at 0-20 cm soil depth. During testing, Dering 1 was able to yield 2.83 tons per hectare under relatively droughty conditions. It can be harvested in 81 days, grain weight is 10.7 grams per 100 grams, and it is resistant to pod borer and rust disease.

This variety is suitable to be grown in the first and second dry season of lowland areas as well as in the dry season of upland or rainfed lowland areas.



Talam 1 Peanut Variety

Inventor : Astanto Kasno, Trustinah, Joko Purnomo, and Novita N.
Indonesian Legumes and Tuber Crops Research Institute

Talam 1 variety is derived from a cross between the Giraffe variety and the ICGV 91283 line which can be harvested in 90 days. It yields up to 3.2 tons per hectare. The protein content is 26.3%, fat content is 45.4%, is resistant to bacterial wilt and *A. flavus*, and moderately resistant to rust.





Hypoma 1 Peanut Variety

Inventor :Joko Purdomo, Novita Nugrahani, and Astanto Kasno
Indonesian Legumes and Tuber Crops Research Institute

Hypoma 1 variety can be harvested in 91 days and yields up to 3.70 tons per hectare of dry pods. It is resistant to leaf spot and rust diseases, and moderately resistant to bacterial wilt.



Hypoma 2 Peanut Variety

Inventor : Joko Purnomo, Novita Nugrahani, and Astanto Kasno
Indonesian Legumes and Tuber Crops Research Institute



Hypoma 2 variety is generated from a single cross between local varieties Lamongan Tuban. This improved variety has a wide adaptability, especially in environments with limited rainfall or drought conditions in the generative stage.

Hypoma 2 yields up to 3.50 tons per hectare dry pods and can be harvested in 90 days. It is moderately resistant to leaf spot and rust diseases and can be grown in areas with a climate type D.





Bison Peanut Variety

Inventor : Astanto Kasno, Joko Purnomo, Novita Nugrahaeni, Trustinah, Mujiono, and Paidi
Indonesian Legumes and Tuber Crops Research Institute

IPR Protection Status:
Variety Registration No. 22/PVHP/2010

Bison variety is derived from a single cross between the Kelinci variety and a mutant of the Gajah variety. It yields up to 3.6 tons per hectare and can be harvested in 90-95 days. It contains 24% protein and 44.8% fat. The plant height is 72 cm, shade tolerance up to 25% intensity, tolerant to iron toxicity, adaptive to alkaline soils, moderately resistant to rust, leaf spot, and *A. flavus*.





Takar 1 Peanut Variety

Inventor : Novita Nugrahaeni, Trustinah, Astanto Kasno, Joko Purnomo,
Bambang Suwasono, Sumartini, and A. A. Rahmiana
Indonesian Legumes and Tuber Crops Research Institute



Takar 1 variety is resistant to wilt disease and has a broad adaptation, with a yield potential of 4.25 tons per hectare. It has large seed size, suitable for a wide range of food products. Value of O/L is relatively higher, which is an indication that the grains of Takar 1 are suitable for a storage food product.

It is resistant to rust disease and whitefly which is now becoming an important pest of peanuts in several production centers.



Takar 2 Peanut Variety

Inventor : Sumartini and A. A. Rahmiana
 Indonesian Legumes and Tuber Crops Research Institute

Takar 2 variety is generated from a cross between the Muneng local variety and a rust-resistant variety. The characteristics of this variety are upright growth, the average plant height 54 cm, round shape pink beans. Two seeds/pod white color of the young pods and dark white of the mature ones. Yield potential is 3.8 tons per hectare of dry pods. This variety is also adaptive to acidic soil (pH 4.5 to 5.6) with medium Al saturation.





Vima 1 Mung Bean Variety



Inventor : M. Anwari, Rudi Iswanto, Rudi Soehendi,
Hadi Purnomo and Agus Supeno
Indonesian Legumes and Tuber Crops Research Institute

IPR Protection Status:
Variety Registration No, 24/PVHP/2010

Vima 1 mungbean variety (*Vigna sinensis* - Malang) has a soft seed coat which makes the flesh quickly tender when it is boiled, the bean's texture is in accordance with the consumer's preference for local food products (green bean porridge, *bakpia*, and *onde-onde*).

Vima 1 yields up to 1.76 tons per hectare, is early maturing and can be harvested at 57 days. It is resistant to powdery mildew disease. It contains protein of 28.0%, fat of 0.4%, and starch of 67.6%.

Vima 1 is prospective to be developed to support the food diversification.



Litbang UK 2 Cassava Variety

Inventor : Sholihin, Titik Sundari, Erliana Ginting,
Muji Rahayu, and Sri Wahyuni Indriati
Indonesian Legumes and Tuber Crops Research Institute

Cassava is not only used as a food but also as a biofuel known as bioethanol. From an economic perspective, a viable cassava for bioethanol is one which has a high starch content with high levels of bio-ethanol as well. Litbang UK 2 contains bioethanol 96% or 14 472 liters per hectare.

This variety can be harvested at 9-10 months after planting with a potential yield of 60 tons per hectare. Litbang UK 2 is moderately resistant to mites and root rot diseases.





Beta 1 Sweet Potato Variety

Inventor : M. Jusuf, St. A. Rahayuningsih, Timuk S.W,
Joko Restuono, Gatot Santoso, and Erliana Ginting
Indonesian Legumes and Tuber Crops Research Institute



Beta 1 is derived from a cross between the Kidal variety and the BB-16 9728i line. The improved variety has a high beta-carotene content, 12 032 ug per 100 grams of root, higher than the beta-carotene of carrots. Total sugar content is 8.2% so that it can be used as raw material for jam and juice.

Beta 1 yields up to 35.7 tons per hectare and can be harvested in 4.0-4.5 months. The development of this variety is expected to contribute to the increasing intake of pro-vitamin A in the community.



Beta 2 Sweet Potato Variety

Inventor : M. Jusuf, Timuk S.W, Joko Restuono, and Gatot Santoso
Indonesian Legume and Tuber Crops Research Institute

Beta 2 variety is generated from crosses between the Kidal variety and the BB-16 9728i line with beta-carotene content 4,629 ug per 100 grams of root. The total sugar content is 5% so that it can be used as raw material for noodles, sauce, and flour.

The yield potential is 35 tons per hectare. The Beta 2 variety has been grown by some farmers in the Malang and Lumajang districts, of East Java.



Antin 1 Sweet Potato Variety

Inventor : M. Jusuf, Tinuk S. W., Joko Restuono, and Gatot Santoso
Indonesian Legume and Tuber Crops Research Institute

The Antin 1 variety is derived from crosses between the local variety Samarinda from Blitar and the local variety Kinta from Papua. This improved variety is tolerant to drought, containing 33.89 mg of anthocyanins per 100 grams of root and has attractive root color of flesh, purple and white mixed.

Antin 1 variety contains anthocyanins as antioxidants necessary to ward off free radicals that cause aging, cancer, and other degenerative diseases. Anthocyanins also have the ability as antimutagenic and anticarcinogenic against mutagens and carcinogens contained in food and processed food materials, to prevent interference with the function of the liver, anti hypertensive and lower blood sugar levels.

Yield potential of this variety reached 33.2 tons per hectare and can be harvested in 4-4.5 months. Variety Antin 1 is expected to be commercially developed, both to meet the needs of food and pharmaceutical industries.





Sukung Sweet Potato Variety

Inventor : M.Jusuf, I Gin Mok, Lisna Ningsih, Tjintokohadi, Suluh Pambudi,
Khusnul Makhin, and Joko Restuono
Indonesian Legume and Tuber Crops Research Institute

IPR Protection Status:
Variety Registration No. 28/PVHP/2010

Sukung variety yields about 30 tons per hectare in 4-4.5 months. It has a good taste, high dry matter, and white root flesh color which make it suitable as a raw material for sweet potato flour. This improved variety can be grown in dry land as well as lowland paddy fields.

Sukung contains beta-carotene 36.59 meg per 100 grams of tubers, moderately resistant to sweet potato weevils and leaf folder, moderately resistant to scab and leaf spot diseases.



HORTICULTURE CROPS



Prabu Bestari Grape Variety

Inventor : Anis Andrini, Emi Budiati, and Sri Widyaningsih
Indonesian Citrus and Subtropical Fruits Research Institute

IPR Protection Status : Registered No. 29/PPVHP/2008

The Prabu variety was selected and introduced from an Australian grape. Fruits are large, weight per fruit from 2.57 to 9.90 g, and number of fruits per bunch is 44-121. The color of the fruit is attractive red with creamy and slightly transparent flesh. High yield (10-30 kg per harvest per vine) with sugar and acid contents of 20° Brix and 1.9% respectively, Prabu Bestari contains 47.77% juice and 23.23 mg per 100 grams vitamin C.

This improved variety can be harvested 120 days after pruning with yields ranging from 5-15 tons per hectare. Fruit can be stored from 7-14 days at room temperature. The Prabu Bestari variety is well adapted to low elevations of 0-300 meters above sea level which make it worthy to be licensed to the private sector or business corporation.





Jestro AG 60 Grape Variety

Inventor : Anis Andriani and Emi Mudiarti
Indonesian Citrus and Subtropical Fruits Research Institute

IPR Protection Status : Registered No. 216/PPHVP/2009



The Jestro AG 60 variety has a potential to be commercially developed by agro-business corporations. This variety is adaptable to soil with high porosity and low elevation with low rainfall and humidity.

Jestro AG 60 is similar to the Bali grape but it is bigger, and has a different taste. The variety has a sweet flavor with a 27° brix reading (above the standard level of 20° brix), it is seedless, and has a yield potential of 25 kg per vine.

Jestro AG 86 Grape Variety

Inventor : Amis Andriani and Eni Mudiarti
Indonesian Citrus and Subtropical Fruits Research Institute

IPR Protection Status : Registered No. 217/PPHVP/2009



This variety is similar to the Kediri Kuning grape. However, this variety has a wider adaptability and more even level of fruit maturity in the bunches. It has a larger fruit size, and sharper fruit aroma. Jestro AG 86 can produce 9-16 kg fruit per vine, both in wet and dry seasons.

This variety is preferred by many consumers which gives it a potential to be developed on a large scale, especially in soil with high porosity and at low elevations with low rainfall and humidity.



Batu 55 Tangerine Variety

Inventor : Hardiyanto and Arry Suprianto
Indonesian Citrus and Subtropical Fruits Research Institute

IPR Protection Status : Registered No. 39/PVHP/2010



The Batu 55 variety has an oblate-shaped fruit, with greenish skin tone and a rough, rather bumpy, surface. The number of fruits per bunch is 2-5 with an average fruit weight of 110.6 grams.

The productivity of this variety is 15-25 kg per tree per year with an average height of 2.25 m at 15 year old plant with a spheroid shape, it has upright dense branches, and an upper trunk diameter of around 8.5 cm. Batu 55 maintains green leaves throughout the year with a singular type and oval-shape.

Number of flowers per cluster is 2-6 and the seed shape is oval. It adapts well in the altitude of 700-1200 m above sea level and has a potential to be developed commercially as a pot plant or grown in the ground. Batu 55 is preferred by many farmers and consumers because of its flesh tastes sweet, slightly sour and fresh.



Ken Layung Mango Variety

Inventor : Sudarmadi P., Rebin, Saiful Hossni, A.R., and Effendy
Indonesian Tropical Fruits Research Institute

IPR Protection Status : Registered No. 30/PPVHP/2008



The Ken Layung variety has several superiorities such as high productivity (76 kg/tree with relatively uniform fruit with smooth surface, and moderate size. The fruit skin color of bright shades of red, yellow, and green has attracted many consumers.

Another exceptional characteristic of this variety is the sweet and fresh taste of the fruit. Ken Layung can grow well in low elevation up to 700 m above sea level with climate type of D, E, and F according to Schmidt and Ferguson, with distinct dry months.

Ken Layung was developed to supply the international market preference of red mango. The high commercial value of this variety is anticipated to be worth license.

Marifta 01 Mango Variety

Inventor : Sudarmadi P., Rebin, Saiful Hosni, A.R. and Effendy
Indonesian Tropical Fruits Research Institute

IPR Protection Status : Registered No. 31/PPVHP/2008

The Marifta 01 variety was generated from an artificial mutation of the Irwin clone. Its productivity is 89.4 kg per tree with moderate fruit size and relatively uniform weight of 319 grams per fruit on average. The fruit shape is oval with a smooth surface while color of the fruit skin is tinged with the color degradation is red dominant, yellow, and green.

Similar to the Ken Layung variety, Marifta 01 can be grown in lowland elevation areas up to 700 m above sea level, with climate types D, E, and F according to Schmidt and Ferguson, and distinct dry months.

Its attractive performance is expected to attract consumers interest.





Keraton 119 Mango Variety

Inventor : Sudarmadi P., Rebin, Saiful Hosni A.R., and Effendy
Indonesian Tropical Fruits Research Institute

IPR Protection Status : Registered No. 32/PPVHP/2008



The Keraton 119 variety has a lower stem with a xylem/phloem ratio of > 1 . The bottom stem has a 'dwarfing' effect against the upper stem scion varieties of Marifta 01, Gayam 315, Manggasari 243, and Dugur 141.



Like the Ken Layung and Marifta 01 varieties, Keraton 119 can grow well in low elevation areas up to 700 m above sea level, with climate types D, E, and F according to Schmidt and Ferguson, and with distinct dry months. It has a wide adaptability and can be planted with the concept of high-density planting (HDP).

Keraton 119 mango has a commercial value and is worthy to be grown extensively.

Garifta Merah Mango Variety

Inventor : Rebin, Lukitarnati S., Nur Hadi, Mizu I., Endriyanto, Samad, and Ucu R
Indonesian Tropical Fruits Research Institute

IPR Protection Status : Registered No. 13/PVHP/2010

The Garifta Merah variety has an attractive appearance with reddish skin color. It yields 62 kg per tree per year. The color of the fruit flesh is reddish yellow and the fruit shape is oblong with a length of 14 to 16.5 cm. The surface of the fruit skin is smooth and the texture of the flesh is soft with a rather subtle fiber content. The taste of the flesh is sweet combined with a quite strong aroma. The fruit weight ranges between 220-320 grams.

This superior mango can adapt well in the low elevation areas up to 400 m asl. The fruit has a water content of 83-86%, 45.5 mg per 100 grams vitamin C, 15.5° brix sugar, and 0.21% acid.

This improved variety has a potential to be grown commercially because of its exotic fruits and fresh sweet taste.



Garifta Kuning Mango Variety

Inventor : Rebin, Lukitariati S., Nur Hadi, Miza I., Endriyanto, Samad, and Ucu R
Indonesian Tropical Fruits Research Institute

IPR Protection Status : No. 14/PVHP/2010



This Garifta Kuning variety has a golden brown skin color. With an average yield of 77 kg per tree per year, this variety has an oblong-shaped fruit weighing 320-400 grams per fruit. The flesh texture is rather soft with a coarse fiber content and is rich in taste and aroma. Number of fruits per cluster is 1-5.

Garifta Kuning can be stored for 6-10 days after picking at room temperature conditions and maintains its taste and aroma. The mango grows well in low elevation areas up to 300 m asl.

This variety has a potential to be commercially developed, both for domestic consumption and export.



Garifta Gading Mango Variety

Inventor : Rebin, Lukitariati S., Nur Hadi, Mizu I., Endriyanto, Samad, and Ucu R.
Indonesian Tropical Fruits Research Institute

IPR Protection Status : No. 15/PVHP/2010

The improved variety Garifta Gading gives an average yield of 64 kg per tree per year. Fruit shape is round and weighs 190-230 grams per fruit. The flesh texture is rather soft with a coarse fiber content and is rich in taste and aroma. Number of fruits per cluster is 1-4.

Garifta Gading can be stored as long as 7-10 days at room temperature and maintains its sweet taste and aroma with the charming shape and color. It grows well in low elevation areas up to 300 m above sea level.

This improved variety has a potential to be developed commercially, both for domestic consumption and export.



Carindo Hybrid Papaya Variety



Inventor : Sudarmadi P., Saiful Hosni, Sunyoto, Makhful, Dedy Djatmiadi, and Hamidi
Indonesian Tropical Fruits Research Institute

IPR Protection Status : No. 33/PPVHP/2008

This hybrid papaya has a unique fruit shape because it resembles a bird's nest. The fruit taste is sweet and the uniformity levels of the fruit is stable with a short log phase, ranging between 3-5 pieces.

Carindo hybrid adapts well at low altitudes of up to 700 m above sea level with the type of climatic A, B and C according to Schmidt and Ferguson. This variety is worthy of commercial development by the private sector through licensing.





Carmina Papaya Variety

Inventor : Sunyoto and Tri Budiyanti
Indonesian Tropical Fruits Research Institute

IPR Protection Status : No. 127/PVHP/2010

Carmina is an early maturing papaya variety with the first harvest about 1 year after planting. Number of fruits is relatively abundant, ranging from 45-60 pieces per season.

The fruit size is small which makes it suitable for one person (one person one fruit). Fruit weight is 500-1500 g, 17-24 cm long, 25-40 cm circumference, 2.0 to 4.2 cm thickness, aromatic, and the texture of the ripe fruit is medium. The hardness of the ripe fruit skin ranges between 0.7 to 0.8 kg per cm².



Carmina can be perceived as an alternative for one-time consumption for papaya consumers which makes it a prospective development for the horticultural seed industry.

Carmida Papaya Variety

Inventor : Sunyoto, Tri Budiyaniti, and
Noflindawati
Indonesian Tropical Fruits Research Institute
IPR Protection Status : No. 125/PVHP/2010

The Carmida papaya variety can be planted with a population of 1200-1500 plants per hectare and yields 40-60 fruits per tree per season. The first harvest is at 7 months after planting, fruit length is 17-24 cm with 25-40 cm circumference with elongate/oval shape.



The productivity of this papaya is high, reaching 60-75 tons per hectare. The fruit size is ideal for a meal consumed by one person (one person one fruit), the flesh color of this aromatic papaya is bright red and contains 75-80 mg of vitamin C per 100 grams.

This high yielding papaya variety has a potential to be developed by the horticulture seed industry.



Inventor : Sunyoto and Tri Budiyantri
Indonesian Tropical Fruits
Research Institute

IPR Protection Status :
No. 127/PVHP/2010

Solinda Papaya Variety

The Solinda variety is suitable for a dense growing population of 1200-1500 trees per hectare. It has bright yellow flesh color, length 20-28 cm, 22-33 cm circumference, flesh thickness of 1.3 to 3.5 cm, and weighs 500-1050 grams. Cross-section of the internal part of the fruit reveals a five-pointed star-shape.

Its productivity reaches 66-88 fruits per tree. Ripe flesh texture is rather chewy and aromatic.

This high yielding variety of papaya can be perceived as an alternative for consumers and has a potential to be further developed by the horticulture seed industry.





Inventor : Sudarmadi P., Saiful Hosni, Sunyoto, Makhful, Dedy Djatniadi, and Hamidi
Indonesian Tropical Fruits Research Institute

IPR Protection Status : No. 34/PPVHP/2008



Kanaya Hybrid Melon Variety

This hybrid melon has a round shape and orange color, weighing around 1.5-1.8 kg per fruit. The flesh mesh thickness is 91-93%, triangular and pentagonal shape regular mesh, 4.5 cm flesh thickness. The flesh is sweet (17.0° Brix) with a crisp, aromatic flavor and a shelf life as long as 18-20 days after harvest.

Kanaya hybrid melon variety is able to adapt well in low to medium elevations (0-700 m above sea level). Kanaya has a potential to be developed further by the horticulture seed industry.



Galuh Hybrid Melon Variety

Inventor : Sudarnadi P., Saiful Hosni, Sunyoto, Makful, Dedi Diatmiadi, and Hamidi
Indonesian Tropical Fruits Research Institute

IPR Protection Status : No. 35/PPVHP/2008



The Galuh hybrid melon variety weighs 2-2.5 kg per fruit, 93-94% thickness skin mesh, mesh-shaped triangles and pentagons, 5.2 cm thick flesh, has a strong aroma, sweet taste of fruit (17.5° Brix) and can be stored up to 17-20 days after harvest at room temperature.

Galuh can be grown in the low to medium elevations up to 700 m asl. This melon is worth commercialized through the horticulture seed industry.



Indorif Hybrid Melon Variety

Inventor : Sudarmadi P., Saiful Hosni, Sunyoto, Makful, Dedi Djatniadi, and Sahlan
Indonesian Tropical Fruits Research Institute

IPR Protection Status : No. 37/PPVHP/2008

The Indorif hybrid variety has an oval shape, white-green color with a weight of 1.6 to 2 kg per fruit. The thickness of the fruit skin mesh is moderate (88-90%), 4.3 cm thick flesh with soft texture , very strong fruit aroma, sweet taste (16.5°Brix), and can be stored for 14-16 days after harvest. Melon-shaped nets straight longitudinal and transverse intersect.

The Indorif hybrid melon variety can be grown in the low to medium altitudes of 700 m asl. Support from horticultural seed industry is required for further development of this variety.





**Inventor : Makful, Sunyoto, Kuswandi,
Hendri, Sahlan, and Yemi Meldia
Indonesian Tropical Fruits Research Institute**

MB 1 Hybrid Melon Variety

The Melon MB 1 is an early maturing hybrid variety which can be harvested at 55-60 days after planting or 30-35 days after flowering, 1.8 to 2 kg fruit weight, and 90% of net percentage. The flesh is greenish-white, crispy in texture, moderate aroma, and oval fruit shape.

This hybrid melon is expected to benefit the community and has a prospective to be developed further by the horticultural seed industry.





MB 2 Hybrid Melon Variety

Inventor : Makful, Sunyoto, Kuswandi,
Hendri, Sahlan, and Yemi Meldia
Indonesian Tropical Fruits Research Institute



The MB2 is an early maturing variety which can be harvested at 55-60 days after planting or 30-35 days after flowering. The fruit weight is 1.6-1.8 kg, 90% net percentage, orange flesh, strong aroma, crispy texture, round fruit shape and sweet flesh with TSS 15.0° Brix.

It has a potential to be further developed by horticultural seed industry.



BT 1 Hybrid Watermelon Variety

Inventor : Sunyoto, Makful, Kuswandi, Hendri, Sahlan, and Yeni Meldia
Indonesian Tropical Fruits Research Institute

The BT 1 is an early maturing watermelon which can be harvested at 80-85 days after planting or 35-40 days after flowering. Fruit weight is 7-8 kg each with thin fruit skin (less than 1 cm), red flesh color, and crispy fruit texture.

This hybrid watermelon is desirable as an alternative for people in selecting a fruit to be consumed or cultivated on a large scale.





BT 2 Hybrid Watermelon Variety

Inventor : Sunyoto, Makful, Kuswandi, Hendri, Sahlan, and Yeni Meldia
Indonesian Tropical Fruits Research Institute



The BT 2 is an early maturing variety which can be harvested at 75-80 days after planting or 30-35 days after flowering. Fruit weight is 6.5-7 kg, approximately less than 1 cm skin thickness, yellow flesh color, and crispy fruit texture.

This variety is expected to be an option for farmers who grow watermelons in addition to its potential to be grown on a large scale.



Inventor : Erti Sofiani, Kusmana,
I.M. Hidayat, F. Kasim,
Tri Handayani, H. Kurniawan,
and M. Ameriana
Indonesian Vegetables Research Institute

Ping 06 Potato Variety

The Ping 06 potato variety is derived from a crossing between Granola and Michigan clones. It has pink skin color, tubers are slightly rounded with yellow flesh, slightly deep tuber eyes, and the variety has a yield potential of 28.4 to 40.3 tons per hectare.

This variety is more resistant to late blight compared to the Granola variety and has a potential for import substitution.



GM 08 Potato Variety



Inventor : Erry Sofiari, Kusmana, I.M. Hidayat, F. Kasim,
Tri Handayani, H. Kurniawan, and M. Ameriana
Indonesian Vegetables Research Institute

The GM 08 variety is derived from a crossing between Granola and Michigan clones. GM 08 is oval in shape, has creamy skin color, white flesh, shallow eyes, and a yield potential ranging between 28.9 to 35.2 tons per hectare.

This variety is more resistant to late blight compared to the Granola variety.

Tubers can be processed into various food stuffs like potato chips.

This variety has a potential to support food diversification in forms of French fries, crisps, potato flour, and other processed food stuffs.



Kikondo Potato Variety

Inventor : Asih K. Karyadi, Azis A Asandhi, Wiwin Setiawati, Kusmana, Buchory A, Evi Paulina R.P., and Loso Winarto
Indonesian Vegetables Research Institute

IPR Protection Status : No. 20/PVHP/2008

The Kikondo adapts well at altitudes of 1000-2000 m asl. The plant height is 40-96 cm with pale yellow tuber skin and yellow tuber flesh. The tuber has rather shallow eyes with pink color surround the tuber eyes. The skin surface is smooth with purple tuber buds. It matures in 90-100 days with 2.7% starch content.

The Kikondo is a high yielding variety, 18-24 tons per hectare, with a shelf life of 2.5-3 months at room temperature.

Sugar reduction content of the tubers is 0.019%, specific gravity 1.07, and 20.15% dry matter which is suitable for processed potatoes. This superior potato is suitable to support industries such as processed potato fries (French fries), crisps, flour, and other processed foods.



Repita Potato Variety



Inventor : Kusmana, E. Sofiari, and R.S. Basuki
Indonesian Vegetables Research Institute

IPR Protection Status : 021/BR/PVHP/8/2008



The Repita potato variety has an upright growth type, with plant height of 80-90 cm, and is ready to be harvested in 90-100 days after planting. It has a round tuber shape with creamy skin color and creamy white flesh. The tuber eyes are notched, and the variety has a yield potential of 30-32 tons per hectare. This variety contains sugar reduction 0.039° Brix.

The Repita potato variety is suitable for vegetable potato, is resistant to late blight, and adapts well at the altitude of 1,000 m asl.



Tenggo Potato Variety

Inventor : Kusmana, Rofi S.B., and Dimiyati
Indonesian Vegetables Research Institute

IPR Protection Status : No. 22/PVHIP/2008

The Tenggo variety has a yield potential of 33.5 tons per hectare and adapts well in the highlands with a plant height of 90 cm. The stem is round and green, while leaves are ovate with a size of 7 x 4.2 cm, smooth surface, not hairy, and green.

The tuber size is 6-7 cm, weighing 60-80 grams, round in shape with bent eyes. The skin color is creamy white the texture of the tuber flesh is a little moist and sticky. Potato quality is quite good with a specific gravity of 1,067 grams per cc, reducing sugar content is 0.039° Brix, and carbohydrate content is 11.8%. The Tenggo variety can be harvested at 90-100 days after planting and is resistant to root nematodes and late blight. It has a potential to be developed further for import substitution.



Balsa Potato Variety



Inventor : Kusmana, Rofi S.B., and Dimiyati
Indonesian Vegetables Research Institute

IPR Protection Status : No. 23/PVHP/2008



The Balsa variety yields 22.4 tons wet tubers per hectare. The average plant height is 80 cm and the shape of the tubers is oblong oval with shallow eyes notched. The tuber size is about 6-8 cm with an average weight of 60-80 grams. Skin color is creamy, the white tuber flesh has a rather dry texture (mealy). Other characteristics of the variety are 1,087 grams per cc specific gravity, 0.048° Brix reduction sugar, and 15.8% carbohydrate content.

Balsa can be harvested at 90-100 days and is well adapted to high altitudes. It is resistant to roots nematodes and moderately resistant to late blight.

Balsa potato variety has a potential to support the food processing industry, eg. chips, and potato starch.



GM 05 Potato Variety

Inventor : Kusmana, E. Sofari, H. Kurniawan,
I.M. Hidayat, Tri Handayani, F. Kasim, and
M. Ameriana
Indonesian Vegetables Research Institute

The GM 05 potato is derived from a crossing between the parental clones of Granola and Michigan. The improved variety has yellow tuber skin, light yellow flesh, and oval shape. It yields 36 tons per hectare. In addition to cooking, this variety can also be processed into chips.

It has a potential to be grown in major potato production centers in Indonesia, which are spread in the province of Aceh, North Sumatra, West Sumatra, Jambi, West Java, Central Java, East Java, South Sulawesi, North Sulawesi, and West Nusa Tenggara.



Andina Potato Variety

Inventor : Kusmana, E. Sofiani, I. Sulastri,
A. Hasyim, H. Kurniawan, M. Pakih, and
N. Rachmawati
Indonesian Vegetables Research Institute



The Andina variety is derived from a crossing between parental 391580.30 and 385524.9 lines. The main characteristics of Andina are yellow tuber skin, creamy flesh, and oval shape. The potential yield is 34 tons per hectare. In addition to be used as a vegetable, Andina can also be used for chips.

Like the GM 05 variety, Andina is promising to be grown in major potato production centers in Aceh, North Sumatra, West Sumatra, Jambi, West Java, Central Java, East Java, South Sulawesi, North Sulawesi, and West Nusa Tenggara.





Kastanum Potato Variety

Inventor : Kusmana, E. Sofari, I. Sulastri, A.
Hasyim, H. Kurniawan, M. Pakih, and N.
Rachmawati
Indonesian Vegetables Research Institute

The Kastanum was selected from a crossing between parental 393077.54 (M) x 391011.17 (F) lines. Its yield potential is 34 tons per hectare. In addition to use as a vegetable, Kastanum can also be processed into chips. Its tuber skin and flesh are yellow while the tuber shape is oval.

Similar to GM 05 and Andina, this variety is also expected to contribute to potato production increase in various provinces, such as Aceh, North Sumatra, West Sumatra, Jambi, West Java, Central Java, East Java, South Sulawesi, North Sulawesi, and West Nusa Tenggara.



Vernei Potato Variety



Inventor : Sofiani, E, Kusmana, I, Sulastrini, A, Hasyim, H, Kurniawan, M, Pakih,
and N. Rachmawati
Indonesian Vegetables Research Institute

Generated from a cross between parental lines of 391011.17 (F) x 385524.9 (M), Vernei can yield up to 36 tons per hectare. The main characteristics of this variety are having cream-colored skin, white tuber flesh, and oval shape of tuber.

High yielding Vernei can be used as a vegetable and suitable to be developed in potato production centers scattered in various areas in provinces of Aceh, North Sumatra, West Sumatra, Jambi, West Java, Central Java, East Java, South Sulawesi, North Sulawesi, and West Nusa Tenggara.





Pikatan Shallot Variety

Inventor : Sartonu Putrasamedja
Indonesian Vegetables Research Institute



Shallots are needed for seasoning. Sometimes domestic production can not meet the demand due to low production. The use of a high yielding variety is expected to accelerate efforts to increase national shallot production.

The Pikatan variety has a yield potential of 23.3 tons per hectare and can be harvested at 55 days after planting with a shelf life of 6 months. Further development of the Pikatan variety requires support of seed multiplication by seed growers or the horticultural seed industry.



Trisula Shallot Variety

Inventor : Sartono Putrasamedja
Indonesian Vegetables Research Institute

The use of this high yielding variety is expected to accelerate efforts to increase shallot production. The Trisula variety has a yield potential of 23.2 tons per hectare and can be harvested 55 days after planting and then stored for up to 5 months.

Further development of this shallot variety on a large scale is expected to contribute to an increase in national shallot production. Support by seed growers or the horticulture seed industry is needed.





Pancasona Shallot Variety

Inventor : Sartono Putrasamedja
Indonesian Vegetables Research Institute

Increase in shallot production can be pursued through the development of high yielding variety. The Pancasona variety has a yield potential of 23.7 tons per hectare and can be harvested 75 days after planting and then can be stored for 3-4 months.

Large scale farming of shallot requires high quality seed in sufficient quantities. Support from seed growers or the horticulture seed industry is needed.



Mentas Shallot Variety

Inventor : Sartono Putrasamedja
Indonesian Vegetables Research Institute

The Mentas variety has yield potential of 27.6 tons per hectare and can be harvested 58 days after planting and then stored up to 3-4 months.

The Mentas variety developed on a large scale requires considerable quantities of seed. In this case, the role of seed growers or the horticultural seed industry is very important.





Balitsa 1 Upright Bean Variety

Inventor : Diny Djuriah
Indonesian Vegetables Research Institute

IPR Protection Status : No. 70/Peng/12/2011



The Balitsa 1 variety can yield 19 tons per hectare and can be harvested at 53-55 days after planting. It has a good quality of pods and does not require stakes or trellis. Balitsa 1 is well adapted to the low altitudes up to 400 m asl and can be chosen by farmers as an early maturing variety with high yield potential. This variety also has potential to be grown on a large scale and has been licensed to CV Fajar Seed for 5 years duration, 2011-16.

Balitsa 2 Upright Bean Variety

Inventor : Diny Djuariah
Indonesian Vegetables Research
Institute

IPR Protection Status :
No. 71/Peng/12/2011
Licensed by : CV. Fajar Seed



The Balitsa 2 upright bean has a yield potential of 23.8 tons per hectare and as an early maturing variety it can be harvested first at 47-48 days after planting. It has a good quality pods when grown in the low altitudes up to 400 m asl.

The characteristics of early maturing and high yield potential is expected to increase farmers' income and support the development of nutritious vegetable cultivation. This variety has been licensed to CV Fajar Seed for 5 year agreement period, 2011-16.





Balitsa 3 Upright Bean Variety

Inventor : Diny Djuariah
Indonesian Vegetables Research Institute

The Balitsa 3 is able to yield up to 23.8 tons per hectare with the first harvest at 47-48 days after planting. It has a good seed quality and adapts well in low altitudes up to 400 m above sea level. Like Balitsa 1 and Balitsa 2, this variety does not require staking during the growth period.

Its early maturing and high yielding characteristics, are expected to be an alternative for farmers in choosing beans varieties to be grown. Further development of Balitsa 3 variety requires high quality seeds to be able to give high yields.



Lingga Red Chilli Variety

Inventor : Yenni Kusandriani
Indonesian Vegetables Research Institute



The Lingga chili variety yields up to 16.1 tons per hectare for one-time harvest. The first harvest begins at 88-95 days after sowing. This improved variety is well adapted in medium elevations.

Early maturity and high productivity make this variety an alternative variety for farmers in selecting chilis to be cultivated. Further development of this improved variety requires high quality seed in sufficient quantities.





Ciko Red Chilli Variety

Inventor : Yenni Kusandriani
Indonesian Vegetables Research Institute



The Ciko variety has yield potential of 20.5 tons per hectare and the first harvest begins at 81-84 days after sowing. This variety is well adapted to medium elevations.

Further development of the Ciko variety is expected to increase the production of chilli. This high yielding variety can be perceived as an alternative for farmers in choosing an early maturing chilli with high productivity. Seed of the Ciko variety is expected to be developed by seed growers or the horticultural seed industry.



Kencana Red Chilli Variety

Inventor : Yenni Kusandriani
Indonesian Vegetables Research Institute

IPR Protection Status : No. 67/Peng/6/2012

The Kencana variety yields up to 18.4 tonnes per hectare and can be harvested 95 days after sowing. This improved variety is adapted to medium elevations.

Kencana is expected to be widely adopted by farmers in order to increase the national production of red chillis. Further development of this variety also requires support from seed growers or the horticulture seed industry.

It has already been licensed to PT. Agrindo Hartha Blooms and CV. Fajar Seed for a 5-year period, 2012 - 2017.



Tosca Tomato Variety

Inventor : Etti Purwati
Indonesian Vegetables Research Institute

The tomato is a vegetable that has many uses, including as a source of vitamin C. The Tosca variety yields up to 40 tons per hectare, is well adapted to high altitudes, and it can be harvested 75 days after sowing. Tosca can be stored for a relatively long time.

This variety is expected to be widespread and provides an alternative for farmers in choosing early maturing and high yielding tomatoes. Seed of the Tosca variety can be developed by seed growers or horticultural seed companies.

Ruby Tomato Variety

Inventor : Eti Purwati
Indonesian Vegetables Research Institute

Improved varieties play an important role in increasing tomato production. The Ruby variety can yield up to 40 tons per hectare. This improved variety is well adapted to high altitudes, and it can be harvested 75 days after sowing.

Ruby is expected to be grown widely by farmers because of its short maturity and high yield. Seed growers or seed companies are expected to be able to supply high quality seeds.



Topaz Tomato Variety

Inventor : Etti Purwati
Indonesian Vegetables Research Institute



The Topaz variety yields up to 40 tons per hectare and can be harvested 75 days after sowing. It adapts well in the highlands. The fruits can be stored for a relatively long period.

This variety is expected to be widespread and perceived by farmers as an alternative in choosing a short maturity and high yield tomato. Topaz seed variety can be developed by seed growers or seed companies.





Puspita Kencana Chrysanthemum Variety

Inventor : Budi Marwoto, Lia Sanjaya, and Kusumah Effendi
Indonesian Ornamental Plants Research Institute

IPR Protection Status : PVT No. 00010/PPVT/S/2008

The chrysanthemum is a very popular ornamental plant and preferred by many consumers in Indonesia because it has a beautiful appearance. Puspita Kencana, a cut chrysanthemum variety has sharp yellow, large sized flower petals.

Kencana Puspita is also flowering earlier (response to shorter time period) and is resistant to rust disease (*Puccinia horiana* Henn.), a common disease found in chrysanthemum cultivation in Indonesia.



Puspita Nusantara Chrysanthemum Variety

Inventor : Budi Marwoto, Lia Sanjaya, and Kusumah Effendi
Indonesian Ornamental Plants Research Institute

IPR Protection Status : PVT No. 00011/PPVT/S/2008

The Puspita cut chrysanthemum variety was derived from hybridization since 2000 followed by adaptation trials conducted in 2001 and test of consumer preferences in 2002. The cultivar was then released as a new variety in 2003. In 2004 to 2005 a preference test was carried out by PT. Alam Indah Bunga Nusantara. The result showed that the variety Puspita archipelago was preferred by many consumers.

In addition to having a soft yellow petal colors, Puspita Nusantara also has the character of early flowering (response to short time period), resistant to rust disease (*Puccinia horiana* Hem.), and tolerant to CSVd (*Chrysanthemum Stunt Viroids*) which is commonly found in chrysanthemum.

This variety has been licensed to PT Nusantara Alam Indah Bunga Nusantara, with a total production of 3,800 seedlings (in 2012) and all have been distributed. The 5-year agreement period is 2011-2016.





Mustika Kaniya Chrysanthemum Variety

Inventor : Kurnia Yuniarto, Yadi Supriyadi, Rika Meilasari, Budi Marwoto, Riswan Aang Solihin, and Agus Sudiana
Indonesian Ornamental Plants Research Institute

IPR Protection Status : No. 95/PVHP/2010

The Mustika Kaniya variety is a cut flower and can be grown in a pot. Mauve colored flower petals with large numbers of flowers, uniform efflorescence and fresh flowers can stand for a relatively long period. The Mustika Kaniya variety has fibrous roots, rapid rooting initiation from cuttings with the response time to flowering of 80-82 days after the light is turned off.

Mustika Kaniya has large flowers, unique color, flowering uniformly, easily propagated by cuttings, and well adapted to areas with an altitude of 700-1200 m above sea level.

Since Mustika Kaniya can be used as cut flowers as well as pots flower, it has a high potential for mass production by the floral industry.



Swarna Kencana Chrysanthemum Variety

Inventor : Kurnia Yuniarto, Yadi Supriyadi, Rika Meilasari, and Agus Sudiana
Indonesian Ornamental Plants Research Institute

IPR Protection Status : No. 92/PVHIP/2010

The Swarna Kencana variety is a cut flower spray double petal type which remains fresh over a relatively long period. The plant height is 122 cm, strong orange petal flower and yellow flower color contrasting with the bright green tube. Sturdy trunked with alternate leaf arrangement, fibrous roots, and rapid root initiation from cuttings with flower response time of 65-67 days after the light is turned off.

This variety has a large number of flowers, flowering uniformly, easily propagated by cuttings, resistant to rust disease (*Puccinia horiana*), and adapts well in areas with an altitude of 700-1200 m above sea level.

It has a short rooting from cuttings, early maturing, and potential to be developed commercially, especially by seed and cut flower industry.

Chrysanthemum Swarna Kencana is licensed to PT. Alam Indah Bunga Nusantara, with a total production of 4,000 cuttings (in 2012) and all have been distributed. A five-year period of the license agreement was started in 2011.





Tirta Ayuni Chrysanthemum Variety



Inventor : Kurnia Yuniarto, Yadi Supriyadi, Rika Meilasari, and
Riswan Aang Solihin
Indonesian Ornamental Plants Research Institute

IPR Protection Status : No. 99/PVHP/2010

The Tirta Ayuni is a cut flower spray double petal type which remains fresh for a relatively long period. It has sturdy trunked flowers, alternate leaf arrangement, fibrous roots, and rapid rooting of cuttings with flowering response time of 65-67 days after the light is turned off.

Tirta Ayuni has a large number of buds, uniformly flowering, perfect paired with other colored flowers in a circuit, and adapted well to the area with an altitude of 700-1200 m above sea level. Short period rooting of cuttings and production life makes it attractive for commercialization. Tirta Ayuni has the potential to be mass produced by the floral industry.



Wastu Kaniya Chrysanthemum Variety

Inventor : Kurnia Yuniarto, Yadi Supriyadi, Rika Meilasari, and Riswan Aang Solihin
Indonesian Ornamental Plants Research Institute

IPR Protection Status: No. 89/PVHP/2010



A chrysanthemum variety of cut flowers, Wastu Kaniya is a type of decorative spray, white flower petals, sturdy trunked with alternate leaf arrangement, fibrous roots, with a response time of 63-69 days after the light is turned off.

Number of florets and florescence is uniform, cuttings root fast and plants are resistant to rust disease (*Puccinia horiana*). This variety adapts well to areas with an altitude of 700-1200 m above sea level.

Rapid rooting of cuttings and short production life make this variety attractive for commercialization. This variety is likely to be developed by the cut flower industry.



Arosuka Pelangi Cut Chrysanthemum Variety

Inventor : Kurnia Yuniarto, Yadi Supriyadi, and Agus Sudiana
Indonesian Ornamental Plants Research Institute

The Chrysanthemum is a popular ornamental plant and in demand by consumers in Indonesia for its beauty. Arosuka Rainbow is a variety of chrysanthemum with flower type spray and double flower forms with plant height from 121.5 to 128.5 cm, a trunk diameter from 6.8 to 8.6 mm, yellow orange flowers from 5.9 to 6.4 cm in diameter, and a floral tube 1.2-1.4 cm in diameter with cuttings initiating roots in 7-9 days.

The Arosuka Rainbow is an excellent variety with bright yellow flowers with a bright green disc. Flowering response time is 56-61 days with fresh flowers lasting 14-17 days in a vase. This variety can be developed in areas with altitude of 700-1200 m above sea level.



Solinda Pelangi Cut Chrysanthemum Variety

Inventor : Kurnia Yuniarto, Suryawati, and Agus Sudiana
Indonesian Ornamental Plants Research Institute



The Solinda Pelangi Chrysanthemum has white flowers with a bright green flower disc, spray type flower, and double flower forms. This variety is moderately resistant to rust diseases. The plant height is 130-135 cm, leaf length 10-11 cm, leaf width 6-7 cm, and flowers have a diameter of 7-8 cm. Cuttings initiate roots in 7-9 days and flower in 55-65 days.

The Solinda Pelangi variety can be grown commercially in areas of 700-1200 m above sea level.

Yulimar Cut Chrysanthemum Variety



Inventor : Laaw Lia Sanjaya and Dedeh Kurniasih
Indonesian Ornamental Plants
Research Institute

IPR Protection Status: No. 86/PVHP/2013

The Yulimar variety has a standard cut flower type with a fresh period of 10-14 days. Plant height is 110-120 cm with decorative flower shape and white ribbon flowers. It has a strong trunk with 1.5-2.0 internodes, thin and coarsely toothed green leaves and sinuses side a among the opening lobe. Fibrous roots, rapid rooting of cuttings, 8-11 days, after a period of 8-10 weeks of long days.

This variety is easily propagated by quick cuttings and adapts well to altitude of 750-1200 m above sea level.





Alifia Carnation Variety

Inventor : Minangsari Dewanti, Budi Marwoto, Yadi Supriyadi, Nur Qomariah Hayati, Rika Meilasari, Alimad Hidayat, and Wisnu Ap Wibawa
Indonesian Ornamental Plants Research Institute

IPR Protection Status: No. 109/PVHP/2010

The Alifia variety is a double flower type with two colors and rather flat textures, sturdy trunk, and does not sprout laterally as apical growth is dominant. Waxed and tapered leaves are arranged opposite each other.

Flower production rates range between 10-15 stems per year and have a long freshness. It has large flower size, early maturity, and is moderately resistant to Fusarium wilt disease. It is easily propagated by cuttings and has rapid root growth. This variety can be grown in areas with an altitude of 700-1500 m above sea level.

Alifia variety can be chosen as an alternative for prospective growers of cut flowers and commercially developed by industrial plants.





Sitari Carnation Variety

Inventor : Minangsari Dewanti, Budi Marwoto, Yadi Supnyadi, Nur Qomariah Hayati, Ahmad Hidayat, M. Wahyu Hidayat, and Yana Mulyana
Indonesian Ornamental Plants Research Institute

IPR Protection Status : No. 110/PVHP/2010

The Sitari variety has double flowers with two colors, a sturdy trunk and does not have lateral buds as apical growth is dominant. The leaves are tapered, coated with wax, and are arranged facing each other.

Production rates range from 10-15 stalks per plant per year with a relatively long level of freshness, early maturing, propagated by cuttings, and rapid root growth. This variety is moderately resistant to Fusarium wilt disease and adapts well to areas with an altitude of 700-1200 m above sea level.

Sitari is expected to be commercially developed, both by farmers and cut flower industry.



Riska Gladiolus Variety

Inventor : Dedeh Siti Badriah, Toto Sutater, I. Djatnika,
Riseta Sri Rahayu, and Erlina Setiawati
Indonesian Ornamental Plants Research Institute

IPR Protection Status: No. 120/PVHP/2010

The Riska variety has a symmetrical flower arrangement. The color of the upper flower crown is purple with white striped and orange at the edge, while the lower crown is greenish yellow with orange edge. The stem length is 129 cm, and flowers are large.

Flower productivity reaches 14 florets per stalk, flowering at 45 days, harvesting at 70 days, and 15 days of flower freshness. This variety is resistant to Fusarium wilt disease and adapts well to areas with an altitude of 600-1400 m above sea level.

To meet the needs of cut flowers, the Riska variety is expected to be an alternative for farmers and the cut flower industry.





Annisa Gladiolus Variety

Inventor : Dedeh Siti Badriah, Toto Sutater, Djatnika,
Risna Sri Rahayu, and Erlina Setiawati
Indonesian Ornamental Plants Research Institute

IPR Protection Status: No. 121/PVHP/2010



The Annisa variety has flowers with a symmetrical arrangement. The color of the upper flower crown is purple with white striped and orange at the edge, while the lower crown is greenish yellow with orange edge. The blooming flowers touch each other, are decorative flower type, with long flower stalk, and the flower size is large.

The number of flowers is 13 florets per stalk, flowering at 45 days, harvesting at 70 days, and the blooms remain fresh for 15 days. The Annisa variety is resistant to Fusarium wilt disease and adapts well to areas with an altitude of 600-1400 m above sea level.

The uniqueness of the color and flower size, long stalk and early maturity make it attractive for further commercial development. The Annisa gladiolus variety can be a valuable alternative for commercial farmers and the cut flower industry.

Deloren Lily Variety

Inventor : Budi Marwoto, Lia Sanjaya,
Minangsari Dewanti, and Wisnu Aji Wihawa
Indonesian Ornamental Plants Research Institute

IPR Protection Status: No. 6/PVHP/2009



The Deloren variety of lilies is a perennial with plant height of 50-70 cm, and blooming flower width of 12.0 to 13.5 cm. The color of the flower is orange and they are not fragrant, produce 5-6 flower stalks per year, and have 4-6 tillers per plant.

This variety starts flowering at 3 months and the freshness of flowers is 7 days. This variety is well adapted in low to high elevations, 300-1200 m above sea level and can be cultivated in 70-80% home lighting.

The Deloren variety has high commercial value as a cut flower. The flower industry can play an important role in the development of this variety.



Candilongi Lili Variety

Inventor : Budi Marwoto, Lia Sanjaya, Rika Meilasari,
and Eka Fibriyanti
Indonesian Ornamental Plants Research Institute

IPR Protection Status : No. 7/PVHP/2009



The Candilongi variety is a perennial with plant height of 60-85 cm and 10-12 cm wide blossoms. The color of the fragrant flowers is white. Productivity of Candilongi is 5-6 stalks per year with 4-6 tillers per plant. It begins to flower in 3-4 months and the flower remains fresh for 7 days.

This variety is well adapted in the low up to high altitude of 300-1200 m above sea level and can be cultivated in open fields. The Candilongi variety can be developed commercially as a cut flower and the flower industry is expected to play a role in further development of this improved variety.





Delina Lili Variety

Inventor : Budi Marwoto, Lia Sanjaya, Yusdar Hilman,
and Fitri R

Indonesian Ornamental Plants Research Institute

IPR Protection Status: No. 8/PVHP/2009

The Delina variety is a perennial with plant height of 80-120 cm and flowering in 3 months. The bunches of Delina are corymbose with 9-11 cm long flower buds, flowers are deep yellow with upright orientation and pointing upward, somewhat fragrant, the number of flower buds per stalk is 5-7, and the period freshness of the flowers is 8 days.

Delina variety adapts well to altitude 300-1200 m above sea level and can be cultivated in open fields with 70-100% illumination. It has a potential to be commercially developed by the ornamental plant industry.



Fomolongi Lili Variety

Inventor : Budi Marwoto, Lia Sanjaya, Margono M.T.,
and Kurniawan B
Indonesian Ornamental Plants Research Institute

IPR Protection Status: No. 9/PVHP/2009



The Fomolongi variety belongs to the perennial growing type with the plant height of 80-125 cm and flowering in 4-6 months. This variety has racemose flower bunches, white in color, 14-16 cm long flower buds, horizontal in orientation of flowers and leads to the side, fragrant flowers, number of flowers per stem is 5-15 buds, with 6 days of flowers freshness. Productivity of Fomolongi is 7-8 stalks per year.

It adapts well to altitudes of 100-1200 m above sea level and can be cultivated in open fields with 70-100% lighting. This variety has a potential to be developed by the ornamental plant industry.



Puspa Enay Spathoglottis orchids Variety

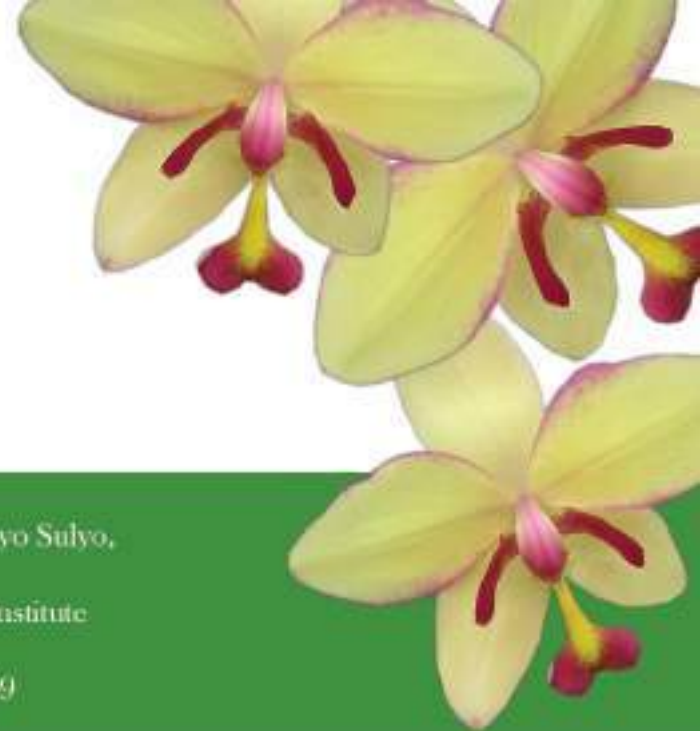
Inventor : Suskandari Kartikaningrum, Laily Qodriah,
Sri Rianawati, Suryamah, and Suparmin
Indonesian Ornamental Plants Research Institute

IPR Protection Status: No. 10/PVHIP/2009

The Puspa Enay Spathoglottis variety is monopodial, plain floral, width of a blossom is 6.4 cm, 5.3 cm flower diameter, 24 cm stem length, 0.35 cm stalk diameter, flowers face two directions, blooms number 4-5 per stalk bud, productivity 15-25 florets per clump per year, and endurance of florets bloom is 29 days.

This variety is well adapted to areas with altitude of 700-1100 m above sea level and can be cultivated in open fields. This variety can be developed commercially as a pot plant or in the garden.





Ani Bambang Yudhoyono Spathoglottis Variety

Inventor : Suskandari Kartikaningrum, Yoyo Sulyo,
Laily Qodriah, and Suparmin
Indonesian Ornamental Plants Research Institute

IPR Protection Status: No. 11/PVHP/2009

This variety is a sympodial orchid (grown clumpy), with star-shaped flowers, plain style, flowers are 6.2 cm long and 6 cm wide, 6.0-6.5 cm flower diameter, stalk length 50-115 cm, 0.4-0.6 cm stems diameter, flowers face all directions, the number of blooms is 4-5 per stalk, and flower productivity is 14-21 florets per clump per year.

The Ani Bambang Yudhoyono variety is well adapted to the plains and altitudes from 50-1100 m above sea level. The intensity of the red color of the flowers varies according to the environment. This variety is developed and commercialized as potted plants or ornamental garden plants.

Sutera Ungu Spathoglottis Variety

Inventor : Suskandan Kartikaningrum, Nur Qomariah H.,
Sri Rianawati Istianah P. Siregar, and Suparmin
Indonesian Ornamental Plants Research Institute

IPR Protection Status: No. 12/PPVT/S/2008



The Sutera Ungu variety was derived from crosses between *Spathoglottis plicata* and *Spathoglottis unguiculata*. This orchid has star-shaped flowers with flower 4.0-4.5 cm long, ovoid dorsal sepals are purple (purple groups N78A), lateral sepals ovate, oval shape purple petal, or lip callus flower of a simple type 1.1-1.5 cm long, 1.2-1.5 cm wide and purple. Flowers face all directions, plain floral, 48-76 cm stem length, stem diameter 0.3 to 0.8 cm. Number of blooms per stalk is 7-11 florets, fresh flowers can stand for 5 long days in the field. Productivity of flowering reaches 12 stalks per clump per year.

It adapts well to the terrain altitude of 50-1100 m asl. The orchid can be a potted plant or grown in the garden. This variety has a potential for further development.

Koneng Layung Spathoglottis Variety

Inventor : Suskandari Kartikaningrum, Nur Qomariah,
H. Sri R. Istianah P. Siregar, and Suparmin
Indonesian Ornamental Plants Research Institute

IPR Protection Status: No. 13/PVHP/2009

The Koneng Layung variety belongs to bushy type plants, derived from crosses between *Spathoglottis aurea* and *Spathoglottis plicata*. This orchid has star-shaped flowers 6.0 to 7.0 cm long, 6.5-7.5 cm wide, dorsal sepals oblong (elliptic) yellow, callus or simple lip-type flowers are long, 2.0 to 2.2 cm, 1-1.2 cm wide, and purple. Flowers face in all directions, and at the time of blooming become flat, shades of red tinge on the edge of the flower, 55-111 cm stem length, number of florets 4-10 blooms per stalk, 3 days of fresh flowers in the field. Productivity rates ranging from 15-20 stems per clump per year.

Layung Koneng orchid variety adapts well on the plains with the altitude of 50-1000 m asl. As a garden plant, the intensity of the red color changes according to the environment. This variety has a potential to be developed commercially as potted plants or cut flowers.



Kartika Spathoglottis Variety

Inventor : Suskandari Kartikaningrum, Istianah, H.
Sri Ranawati, Suparmin, and Suryanah
Indonesian Ornamental Plants Research Institute

IPR Protection Status: No. 14/PPVT/S/2008



The Kartika variety belongs to clumpy orchids and can be grown in pots. This orchid has star-shaped flowers 5.0 to 6.2 cm long and 5.1 to 6.5 cm wide, oval-shaped dorsal sepals are purple (purple groups 71A), lateral sepals and petals ovate shape purple, callus or simple lip-type flowers are 1.2-1.6 cm long and 1.2 cm wide and purple.

Flowers face in all directions, plain floral, flower stalks 32-45 cm long. Number of blooms 3-4 florets per stalk with 3 days fresh flowers in the field. Average productivity is 12 stems per clump per year. Kartika orchid adapts well in the plains of 50-1100 m asl. This variety has a potential to be commercially developed as potted plants or cut flowers.

Tiara Puspa Kencana Phalaenopsis Orchid Variety

Inventor : Suskandari Kartikaningrum, Ridho Kurniati, Muchdar Soedarjo,
Nurmalinda, Nur Qomariah, and Suparnin
Indonesian Ornamental Plants Research Institute

IPR Protection Status : No. 15/PVHP/2009

The Tiara Puspa Kencana variety is characterized by its rather dark flower, flat round appearance, bright yellow sepals and petals with contrasting red lips, medium flower type, flower diameter 6.4 to 6.7 cm, productivity 5-14 flower buds per plant per year, number of blooms 5-7 florets per stalk.

This orchid adapts well in the plains with an altitude of 700-1100 m above sea level. Period of freshness of the flowers ranged from 25-30 days in the protected house. The Tiara Puspa Kencana variety has a potential to be commercially developed as potted plants or as cut flowers.



Rahayuni Phalaenopsis Orchid Variety

Inventor : Dedeh Siti Badriah, Fitri Rahmawati, Risma
Sri Rahayu, Erlina Setiawati, and Muchidar Soedarjo
Indonesian Ornamental Plants Research Institute



The Rahayuni is a potted plant multiflora type with large flowers. Unique flowers with color dominated by degradation of purple and brown, striped and speckled pattern. Three-way flower arrangement, arrangement of petals lined up neatly and tightly on the flower stalk.

Productivity of the flower is 23 florets per stem per year, 3-4 months fresh flowers in pots, has a longer stalk and rachis than the imported phalaenopsis orchid. This variety can adapt well in areas with elevation of 600-1400 m above sea level.

Its characteristic color, size, shape, type, and period of freshness will attract many orchid devotees. This variety can be an alternative for farmers or the orchid industry and has a potential for massive development.



Sri Rahayu Phalaenopsis Variety

Inventor : Dedeh Siti Badriah, Suskandari Kartikaningrum, Fitri Rahmawati, Sri Wuryaningsih, Risna Sri Rahayu, and Erlina Setiawati
Indonesian Ornamental Plants Research Institute

The Sri Rahayu variety of phalaenopsis orchids is a standard type potted plant and has large flowers, with flower arrangement facing three directions, flowers are lined up neatly and tightly on the flower stalk.

Average productivity is 15 buds per stem, yellow petals, freshness period is 3-4 months, thicker sepals and petals. Number of petals and the lengths of flower, stem, and rachis are better than imported phalaenopsis orchids. The Sri Rahayu variety can be grown in areas with altitude of 600-1400 m above sea level.

The uniqueness of the color, size, shape, type, and period of freshness will attract fresh flowers lovers. This variety can be an alternative for orchid growers and has a potential for massive development.



Sri Mulyani Phalaenopsis Variety

Inventor : Dedeh Siti Badriah, Suskandari
Kartikaningrum, Risma Sri Rahayu, and Erlina Setiawati
Indonesian Ornamental Plants Research Institute



The Sri Mulyani variety is a phalaenopsis orchid potted plant with multiflora flowering type, large size and yellow flowers. Flowers are lined up neatly and tightly arranged on the flower stalk.

The average flower production is 12 buds per stalk, 3-4 month period of fresh flowers in pots, long flower, stalk, and rachis, flower arrangement is more robust than the imported phalaenopsis orchid. It adapts well in the altitude of 700-1400 m above sea level.

The unique colors, sizes, shapes and types of flowers are expected to hold a fascination for this orchid in its development on a commercial scale. The Sri Mulyani variety can be an alternative for farmers or the industrial flower industry to be further developed.





Balithi CF022 23 Dendrobium Orchid Variety

Inventor : Nina Solvia, Puji K. Utami, Suryanah,
Nurmalinda, and Giant Prayoga
Indonesian Ornamental Plants Research Institute

The Balithi CF022 variety has flowers with a length of 5.1 to 5.3 cm and 5.7 to 5.9 cm wide. Flowering position is at the edge of pseudobulb, and flowers are facing in two directions. The stalk is 47-51 cm long, and number of flowers is 7-13 buds per stalk, flower remains fresh for 3 month period, and it produces 1-3 stalks per pseudobulb per year. The main feature of this variety is the bright deep pink crown and lips of the flowers, horizontal lip position, and clearly visible difference of calli colors.

This variety has the texture of thick strands of flowers, evenly colored, relatively fresh for a longer period after cutting and can be developed commercially in areas with an altitude of 150-1100 m above sea level.



Rosma Cut Rose Variety

Inventor : Wahyu Handayati, Darliah, Ika Mariska,
Ragapadmi Purnamaningsih, Donald Sihombing,
Budi Marwoto, and Ridwan Daelani
Indonesian Ornamental Plants Research Institute

IPR Protection Status: No. 16/PVHP/2009



The Rosma cut rose variety is slightly prickly, plant height is 93-147 cm, and starts flowering in 6-8 weeks after planting, flower diameter is 8-12 cm, double flower types, fragrant aroma, length of stalks 8 - 11 cm, and the leaf shape is oblong. Interesting features of this variety are its red color, lots of crown flowers, large flower diameter, cut flowers in a vase last 5-8 days, somewhat resistant to mites and downy mildew.

It has a potential to be commercially developed for cut flowers.



Red Flamingo Anthurium Variety

Inventor : Yoyo Sulyo, Kurniawan Budiarto, Fitri Rachmawati, and Laily Qodriyah
Indonesian Ornamental Plants Research Institute

IPR Protection Status : No. 06/PVHP/2010

The Red Anthurium Flamingo has large flowers of 15.2 x 12.2 cm, 80 cm stem length, and strong anthocyanin coloration. Leaves of young plants are dark red and just before maturing turn to reddish green. Leaf size is 60x40 cm with sturdy trunk.

This variety can be used as a cut flower or cut leaf, average productivity is 2 stalks per month, and flowers remain fresh for more than 15 days at room temperature. Red Flamingo is resistant to wilt and soft stem rot disease *Xanthomonas* sp, and is adapted well to the areas of 800-1100 m above sea level.

The Red Flamingo variety can be chosen as an alternative by farmers and the flower industry for further development of cut flowers as well as cut leaves. This plant has a potential for development on a large scale.

Violeta Anthurium Variety

Inventor : Yoyo Sulyo, Kurniawan Budiarto, Ika Mariska, and Wahyu Handayani
Indonesian Ornamental Plants Research Institute

IPR Protection Status: No. 17/PVHP/2009



The Violeta variety is an Anthurium pot plant with 30-40 cm height, crown width of 45-55 cm, ovate leaf shape (oval), the intensity of the color is dark green at upper leaves, flower stalks 25-35 cm long, spathe position is slightly above, spathe ovate elliptic shape, no spathe curvature, spathe shape is narrow end pointed, concave wedge shape spathe in cross section, the angle between the base of the flower stalk inflorescence spathe blunt, Spadix 4.0 to 6.5 cm long and 0.5 to 0.85 cm width.

The Violeta anthurium variety adapts well in areas of 800-1100 m asl. Violet-colored flowers Violeta has a potential to be commercially developed as potted plants or an ornamental garden plant.



PLANTATIONS CROPS



Halina 1 Small White Ginger

Inventor : Nurliani Berniwie, Budi Martono, Nur Ajjah, Siti Fatimah
Shalud, Taryono, and Hermanto
Indonesian Spice and Medicinal Crops Research Institute

IPR Status : Registered No. 01/PVHP/2007

The Halina 1 small white ginger variety was released in 2006. It has a starch content of 43.3%, 2.9% volatile oil, fiber content of 7.9%, and 2.7% phenol. Ginger is an excellent herbal raw material for industry, healthy drinks, and food. Halina 1 matches other varieties developed in the area with an altitude between 300-800 m above sea level. This variety has a commercial value and further development is expected to increase its added value.





Halina 2 Small White Ginger Variety

Inventor : Nurliani Bernawie, Budi Martono,
Nur Ajjah, Siti Fatimah Shahid, Taryono, and
Herman

Indonesian Spice and Medicinal Crops
Research Institute

IPR Status : Registered No. 01/PVHIP/2007

The small white ginger variety Halina 2 was released in 2006. The average productivity of the rhizome is 10.4 tons/hectare. The shape of the stalk is flat, rhizome color is brownish, the flesh of the rhizome is yellowish-white. It contains 45.2% starch, 2.9% volatile oil, and 7.6% fiber. This improved variety can be developed commercially in areas with an altitude of 350-800 m above sea level.



Turina 2 Turmeric Variety

Inventor : Cheppy Syukur, Sitti Fatimah Syahid, Lala Udarno,
Supriyadi, Oti Rostiana, and Budi Martono
Indonesian Spice and Medicinal Crops Research Institute

IPR Status : Registered No. 128/PVHP/2009

The Turina 2 variety of turmeric (*Curcuma domestica* Val.) has 1-2 parent rhizomes, 5-6 primary rhizomes, the color of rhizome's skin is brown, the rhizome flesh is yellow-orange, the rhizome weight per clump varied from 500-2,500 g. The Turina 2 variety has advantages over other varieties such as the rhizomes have curcumin content of 10.16%, 6.2% essential oil, water-soluble extract of 21.92%, 14.89% alcohol soluble extract, and ash content of 0.52%.

This turmeric high yielding variety is suitable to be developed on a sandy loam soil, in lowland areas with altitudes of 2,000 m above sea level, with 2,000-4,000 mm of rainfall per year. The Turina 2 variety has a potential to be developed commercially to increase its added value.



Turina 3 Turmeric Variety



Inventor : Cheppy Syukur, Siti Fatimah Syahid ,
Laba Utarno, Supriyadi,
Otih Rostiana, and Budi Martono
Indonesian Spice and Medicinal Crops
Research Institute

IPR Status : Registered No. 129/PVHP/2009

The Turina 3 turmeric (*Curcuma domestica* Val.) variety has an average plant height of 181 cm, 7-8 tiller number, the leaf is oval in shape, the number of parent rhizomes is 2-3, 9-11 number of primary rhizomes, the color of rhizome's skin is brown, the color of rhizome is orange, rhizome weight average is 500-2,500 g per clump.

The Turina 3 variety advantages include having quality curcumin content of rhizomes of 8-9%, 5.2% essential oil, water-soluble extract of 21.92%, 14.89% alcohol soluble extract, and ash content of 0.29%. This variety is suitable to be developed in sandy loam soil, in lowlands with an altitude up to 2,000 m above sea level, 2,000-4,000 mm of rainfall per year. This turmeric variety is superior and has a potential to be developed commercially.





Curdonia 1 Tumeric Variety

Inventor : Siti Fatimah Shaheed, Cheppy Syukur, Natalini NovaKristina, Joko Pitono, Dono Wahyuno, Rodiah Ballas, Malrita Willis, Henry Lukman, Pujo Hasapto, and Rudiana Bakti
Indonesian Spice and Medicinal Crops Research Institute

IPR Status : Registered No. 16/PVHP/2013

The Curdonia 1 is an improved tumeric variety tolerant to shade. This variety has a yield potential of 10.6 tons per hectare, suitable to be developed in areas with an altitude of 425-484 meters above sea level.

The curcumin level of Curdonia 1 ranged from 6-8%. Starch content is 29-42% making it suitable as a raw material for medicine. Curdonia 1 has 4-6% essential oil content, This variety is moderately resistant to leaf spot disease.

The plant height ranged from 70-119 cm. It has 1-3 pseudo stems. The sepal color is green. The shape of rhizome is round. The color of rhizome layer is brown, and rhizome flesh is orange.



Cursina 2 Curcuma Variety

Inventor : Rudi T. Setiyono, Nur Ajjah, and
Nurliani Bernawie
Indonesian Spice and Medicinal Crops
Research Institute

IPR Status : Registered No.131/PVHP/2013



The Cursina 2 curcuma (*Curcuma xanthorrhiza* Roxburghii) variety, known locally as temulawak, was developed through an individual selection of curcuma populations from South Sumatera. The improved curcuma variety has elliptical shape of leaf, tiller number varied from 3-6, leaf length ranged from 57-87 cm, the width of leaf is 17-21 cm.

The upper leaves are green and the bottom leaves are light green. The average number of leaves per plant is 8-11. The shape of rhizome is oval, light brown skin, the flesh of rhizome is orange in color, with an average weight of 640-1300 g per clump.





Cursina 3 Curcuma Variety

Inventor : Rudi T. Setivono, Ntr Ajjah, and Nurliani Bermawie
Indonesian Spice and Medicinal Crops Research Institute

IPR Status : Registered No.132/PVHP/2009

The Cursina 3 curcuma (*Curcuma xanthorriza* Roxb) was derived from curcuma population of Majalengka origin through a meticulous individual selection process. This variety has an elliptical shape of leaf, number of tillers is 3-6, the size of leaf is 56-95 cm long and 17-24 cm wide. The upper leaves are green and the bottom leaves are light green with number of leaves is 8-11 per plant. The rhizome is slightly cone-shaped with light brown skin, the flesh color inside is dark orange, weight of rhizomes ranges from 600-1200 g per clump. The rhizome yield average is 31 tons per hectare.

This variety contained 5.22% curkuminoid, 6.47% volatile oil, 0.97% xanthorizol, 48.9% starch, 5.74% ash, 2.51% fiber. This tenulawak variety has a great potential to be developed commercially for the beverage industry and medicine.

Verina 1 Vetiver Variety

Inventor : Deliah Seswita, Endang Hadipoentyanti, Yang Nuryani, and Ropianyo.

Indonesian Spice and Medicinal Crops Research Institute

IPR Status : Registered No.96/PPVHP/2012



The Vetiver grass is a tropical plant which grows naturally. In Indonesia, vetiver grass can be found growing in a wide range of areas from highlands to lowlands in various soil conditions. The Verina 1 Vetiver (*Vetiveria zizanioides*, syn. *Andropogon zizanioides*) variety has an average oil productivity of 66.4 kg per hectare, wet roots of 10.4 tons, and dry roots of 3.7 tons per hectare. The vetiverol level is 50.4% which is above the ISO standard. The Verina 1 variety is suitable for use as raw material to produce essential oils of vetiver (akarwangi, Indonesian).

The leaves are erect, rather stiff with 75 cm of length and 8 mm of width, and grow in strands. This species appears in a dense clump and grows fast through tillering. Leaf color is yellow-green. Plant height ranges from 144-170 cm and the clump diameter is about 51-56 cm. The tiller numbers ranges from 81-105. The clump weight is around 0.5-1.0 kg, stem color is yellow-green. It contains 1-2% oil and 50-52% vetiverol. This high yielding variety has a great potential to be developed on a wide scale.



Verina 2 Vetiver Variety

Inventor : Deliah Seswita, Endang
Hadipoentiyanti, Cheppy Syukur, and Repianyo
Indonesian Spice and Medicinal Crops
Research Institute

IPR Status : Registered No.106/PVHP/2013



The Verina 2 vetiver variety has an average oil productivity of 60.5 kg per hectare, wet root weight is above the average of 10.6 tons per hectare, and the highest weight of dry root of 3.84 tons per hectare. The content of vetiverol is 55.5%, above the ISO standard. The demand for this variety is high especially by the crafts industry, wicker homemade furniture industry, and as a botanical pesticide.

The leaves grow in strands, leaf color is greenish yellow, plant height of 144-170 cm with clump diameter of 53-63 cm, number of tillers range from 81-105, clump weight of 1-2 kg, stem color is yellow-green. The stems contain 1-2% oil, and 55-58% vetiverol.





Castina 1 Pegagan Variety

Inventor : Nurliani Bernawie, Susi Purwiyanti, and
Meynarti Sari Dewi
Indonesian Spice and Medicinal Crops
Research Institute

IPR Status : Registered No. 107/PVHP/2013

The Castina 1 pegagan variety was selected from a Manoko population of pagagan. The potential yield of fresh herbs is around 2.63 tons, and 420 kg of dried herbs per hectare. The average level of asiaticosida in Castina 1 variety is 29% higher than the standard of 1.2% as set by the Ministry of Health.

If planted in a different location, this variety will produce a similar yield because of the wide adaptability to different agro ecosystems. When it is produced, the Castina 1 variety has a great commercial value as a raw material for health beverages, traditional medicines, and cosmetics.



Castina 3 Pegagan Variety

Inventor : Nurliani Bernawie,
Susi Purwiyanti, and Budi Martono
Indonesian Spice and Medicinal Crops
Research Institute

IPR Status : Registered No. 108/PVHP/2013



The Castina 3 pegagan variety was selected from a Banjaran population of pegagan. The potential yield of fresh herb is around 2.31 tons, and 370 kg of dried herbs per hectare. The adaptability of this variety is above the average of other varieties. Therefore, high yield can be attained even if is grown on less fertile soil or under a fertilizer-saving cultivation system.

This high yielding variety of Castina 3 is able to produce the crude drug with a high level of asiaticosida (1.43%), higher than the standard of 1.2% as set by the Ministry of Health.

The Castina 3 variety has a potential to be developed commercially as a health beverage raw material, for traditional medicine, and cosmetics.





Sambina 1 Sambiloto Variety

Inventor : Sri Wahyuni, Hohir, Nurliani Bernawie, Supriya, Cheppy Syukur, D. Rusmin, M. Jantawati, M.Yusro, and J. P. Sunardi
Indonesian Spice and Medicinal Crops Research Institute

IPR Status : Registered No.109/PVHIP/2013

Yield potential of Sambina 1 sambiloto variety is around 7.4 tons per hectare. The content of andrographolid in the plant varied from 0.47-1.84%, which meets the standard of the Indonesian Herbal Pharmacopoeia (0.64%). The plant height is around 31-82 cm. The canopy is a shrub type. The cross-section of the stem is square. The stem is green. The flower has labial shape. Fruit is harvested 1-2 months after planting, and seed is harvested 26-27 days after flowering.

The fruit is oval in shape with purplish brown color; shape of seed box is slightly rounded with light brown color. Soluble level of pollen in water is around 21-33%, in rethanol is around 14-23%, and levels of andrographolid in a powder is around 0.5-1.8%. The Sambina 1 variety can be produced on a wide scale.



Kanesia 10 Cotton Variety

Inventor : Emmy Sulistyowati, Hasnam, and Sivi Sumartini
Indonesian Sweetener and Fiber Crops Research Institute

IPR Status : Registered No. 54/PVHIP/2008

The Kanesia 10 cotton variety starts flowering at the age of 55-60 days. The weight of cotton may reach 556 g per 100 fruit.

This variety produces a high-quality of fiber with a fiber proportion of 45-47%, the fibers are around 29 mm long, the strength of fiber is 27.1 grams per tex, elasticity is around 6.3%, fineness of fiber is 4.4 mic, and fiber uniformity level is 83.7%. Yield potential is around 3 tons per hectare.

The advantage of Kanesia 10 is its level of productivity and stability indices of around 1.0, meaning this variety is able to adapt widely to different areas. This improved variety has a potential to be commercialized. Prospective regions are East Java, Central Java, West Nusa Tenggara, South Sulawesi, Yogyakarta, Bali, and East Nusa Tenggara.





Kanesia 11 Cotton Variety

Inventor : Emy Sulistowati, Hasuan, Siwi Sumartini,
Hadi Sudarmo, IGAA Indriyani, and Cece Suhara
Indonesian Sweetener and Fiber Crops Research Institute

IPR Status : Registered No. 30/PVHIP/2008

The Kanesia 11 cotton variety which was released in 2007 can be grown without the use of chemical pesticides. Productivity of this variety reached more than 2 tons of seed cotton/hectare in the absence of insecticide application.

The Kanesia 11 variety has fiber proportion of 38.9%, an acceptable quality for industry. The fiber length is 28 mm, fiber strength of 27.8 grams per tex, fiber fineness of 4.5 mic, and fiber uniformity of 83.3%.

The Kanesia 11 variety is resistant to the sucking pest *Amrasca biguttula*. This high yielding variety has a high commercial value.



Kanesia 12 Cotton Variety



Inventor : Emmy Sulistyowati, Hasnam,
and Siwi Sumartini
Indonesian Sweetener and Fiber Crops
Research Institute

IPR Status : Registered No. 56/PVHP/2008

The Kanesia 12 cotton variety starts flowering at age of 55-60 days. Stems and leaves are hairy. Other characteristics are compact branching and fruit weight of 0.5 kg per 100 fruits. The type of fruit is normal at the time it splits. Fiber content of 34.5%, fiber length is around 29.3 mm, fiber strength is 29.5 g per tex, elasticity of about 6.1%, fineness of about 4.6 mic, and fiber uniformity of about 84.6%.

Among other attributes, Kanesia 12 has excellent levels of productivity and stability indices of about 1.0, meaning it is able to adapt to various conditions.

This improved variety is tolerant to *Amrasca biguttula*. The cotton of Kanesia 12 is a good raw material for the textile industry. Proposed areas for Kanesia 12 cotton production are East Java, Central Java, West Nusa Tenggara, South Sulawesi, Yogyakarta, Bali, and East Nusa Tenggara.

Kanesia 13 Cotton Variety

Inventor : Emy Sulistyowati, Hasnain, Siwi Sumartini,
Hadi Sudarmo, IGAA Indrayani, and Cece Suhara
Indonesian Sweetener and Fiber Crops Research Institute

IPR Status : Registered No. 41/PPVHP/2008



Yield potential of Kanesia 13 cotton variety ranges from 1.5-2.5 tons of cotton with seed per hectare without insecticide application. When insecticide imidachlorit is used to treat seed (10 g per kg of seed), followed by the applications of neem seed extract as herbal insecticide, yield attained can reach up to 3 tons of cotton with seed cotton per hectare.

The length of fiber is 26.9 mm, with a strength of 28.3 per tex, fineness of 5.1 mic, and uniformity of 83.6%. Kanesia 13 has a potential to be commercially developed to meet the national need for cotton.



Kanesia 14 Cotton Variety

Inventor : Emmy Sulistyowati, Hasanun, and Sowi Sumartini
Indonesian Sweetener and Fiber Crops Research Institute

IPR Status : Registered No. 22/PVHIP/2009

The Kanesia 14 cotton variety produces high-quality fibers with fiber content of 39%, fiber length of 28.5 mm, fiber strength of 31.2 grams per tex, fiber elasticity of 6.1%, fiber fineness of 4.7 mic, and fiber uniformity levels of 84.7%. Kanesia 14 cotton productivity ranged from 1-2 tons of cotton with seed per hectare when grown under limited water availability, and it reached 3.9 tons per hectare under optimal water availability.

Besides a high yield with high quality of cotton, Kanesia 14 has other advantages such as being well adapted to conditions with limited water availability, and it is resistant to the potential pest *Anurasca biguttula*. The cotton fiber can be developed commercially as a raw material for the textile industry and other industries that use cotton material. Areas with potential for production are East Java, Central Java, West Nusa Tenggara, South Sulawesi, Yogyakarta, Bali, and NTT.



Kanesia 15 Cotton Variety

Inventor : Emmy Sulistyowati,
Hastiani, and Sivi Sumartini
Indonesian Sweetener and Fiber Crops
Research Institute

IPR Status : Registered No. 23/PVHP/2009



The Kanesia 15 produces high quality fiber. Fiber content of approximately 44%, fiber length of 30 mm, fiber strength of 32.2 g per tex, fiber elasticity of 5.6%, fineness of 4.9 mic, and fiber uniformity of 86%. This improved variety can produce 2.2 tons of cotton with seed per hectare under limited water availability, while under optimal water conditions may reach 3.6 tons per hectare.

Kanesia 15 variety is able to adapt to conditions with limited water availability. It is resistant to *Anurasa biguttula*, an important pest of cotton. Kanesia 15 can be produced commercially on a large scale.

Areas for potential production are Yogyakarta, Central Java, East Java, West Nusa Tenggara, South Sulawesi, Bali, and East Nusa Tenggara.





MH3 Kapok Variety

Inventor : M. Sahid, Bambang Heliyanto, and Emmy Sulistyowati
Indonesian Sweetener and Fiber Crops Research Institute

IPR Status : Registered No. 22/PVHP/2008

The kapok variety MH (Muktiharjo) 3 is a cross between a high-yielding clone introduction with a local clone having a shiny white fiber.

Yield potential of this variety can reach 2,400 fruits per tree having a weight of 4.2 kg per 100 fruit, or 28 tons of fruit per hectare per year, which is equivalent to 5.5-6.0 tons kapok/hectare/year.

Fiber content of 21.5% with a shiny white fiber featuring good quality 'Java Kapok'. The MH 3 kapok variety can be developed in a wide scale to meet export and local demand.





MH4 Kapok Variety

Inventor : M. Sahid, Bambang Heliyanto, and Emmy Sulistyowati
Indonesian Sweetener and Fiber Crops Research Institute

IPR Status : Registered No. 23/PVHP/2008

The MH (Muktiharjo) 4 has a fiber content of 21%, shiny white fiber that meets the standard quality of 'Java Kapok'.

Yield potential of MH4 can reach 2,200 fruit per tree, weight of 5 kg per 100 fruit, or about 27 tons of fruit/ha/year which is equivalent to 6.0-6.5 tons kapok/ha/year. The MH 4 variety can be developed extensively to meet export and domestic demand.



KR 14 Kenaf Variety

Inventor : Sudjindro, Marjani, Rully Dyah Purwati, and Lareky Setyo Budi
Indonesian Sweetener and Fiber Crops Research Institute

IPR Status : Registered No. 42/PVHP/2008

The Karangploso (KR) 14 kenaf variety has an average production capacity of 1.4 tons fiber/ha on yellow red podsolic soil type.

Flowering starts at 75-90 days and harvest at 120-140 days. The leaf has a finger shape type with green color. The color of seeds is grey. The plant height varied from 270-425 cm. The color of fiber is shiny white and classified as grade A, a super quality.

The fiber is 260-375 cm long, 22-29 g per tex strength, yield rendemen of 5-7%. KR 14 is tolerant to drought and moderately tolerant to Al toxicity at low soil pH under anaerobic environment. KR 14 has potential to be developed on a wide scale.





KR 15 Kenaf Variety

Inventor : Sudjindro, Marjani, Rully Dyah Purwati, and Lucky Setyo Budi
Indonesian Sweetener and Fiber Crops Research Institute

IPR Status : Registered No. 07/PVHP/2007

The KR (Karangploso) 15 kenaf variety has similar characteristics to that of KR 14. This variety is also designed to be produced in areas with Yellow Red Podsollic soil type.

The KR 15 variety was derived from Kenaf line 85-9-66-1. The fiber productivity of KR 15 is relatively similar to that of KR 14 at 1.4 tons/ha.

This improved variety is worthy to be developed by the private sector. Seeds of the KR 15 variety can be purchased at the seed center of ISFCRI in Malang.

Asepan Grompol Java 1 Tobacco Variety

Inventor : Sesanti Basuki, Suwarso, and
Fakhur Rochman
Indonesian Sweetener and Fiber Crops
Research Institute

IPR Status : Registered No. 21/PVHP/2008



Yield potential of Asepan 1 Grompol Java is of 3.2 tons/ha. and quality index of dry leaf (krosok) is 78-84.

This variety has been planted extensively by PT. Indonesia Dwi Nine (IDS), PT. Primary and PT Pandu Sata, and Indonesia Indah Tobacco Citraniaga.

There are still opportunities to be developed through collaboration with other parties. Seeds of the Asepan Grompol Java 1 variety can be purchased at the seed center of ISFCRI in Malang.



Bligon 1 Sliced Tobacco Variety

Inventor : Sesanti Basuki, Suwarso,
Aniek Herwati, and Sri Yulukah
Indonesian Sweetener and Fiber Crops
Research Institute

IPR Status : Registered No. 24/PVHIP/2008

The Bligon Sliced local tobacco variety 1 released in 2007 has a yield potential of 1.4 tons sliced tobacco/ha with nicotine levels of 2-3%.

This variety is suitable to be developed in lowland rice fields such as in Sleman (Yogyakarta) and Magelang (Central Java). Sliced Variety Bligon 1 has been developed commercially on a large scale by the Gudang Garam cigarette factory.

For further development, seeds of this high yielding variety can be propagated by seed producers.



Kemloko 3 Tobacco Variety

Inventor : Fatkhur Rochman, Abdul Rachman SK, and Suwarso
Indonesian Sweetener and Fiber Crops Research Institute

IPR Status : Registered No. 26/PVHP/2008

The Kemloko 3 tobacco variety was released in 2005. It was derived from a cross between Sindoro 1 variety and a Virginia variety known to be resistant to nematodes and bacterial wilt disease.

Sindoro 1 was obtained from a cross between Temanggung local varieties of tobacco which are moderately resistance to disease caused by the bacterium *Ralstonia solanacearum*. The Kemloko 3 variety has been recognized to have a high-grade of sliced tobacco.

This improved variety is more appropriate to be grown in Temanggung and the surrounding area. The private sector is expected to play a role in the development of Kemloko 3.

Prancak N 1 Tobacco Variety



Inventor : Suwarso and Anik Herwati
Indonesian Sweetener and Fiber Crops Research Institute

IPR Status : Registered No. 10/Peng/04/2008

The Prancak N 1 is a new improved tobacco variety obtained from a cross between Madura tobacco (Prancak 95) with an Ismir oriental tobacco variety. The plant grows upright and the plant canopy is conical. Buds are potentially grown into a young branch. Leaf shape is oval or elliptical.

Pracak N 1 has combined properties from both parents and the average of nicotine content is 1.8%.

This high yielding tobacco variety has commercial value. A proper area for this variety to be planted is in Madura island.





Prancak N 2 Tobacco Variety

Inventor : Suwarso and Anik Herwati
Indonesian Sweetener and Fiber Crops
Research Institute

IPR Status :
Registered No. 11/Peng/04/2008

The Prancak N 2 variety, in a number of cases, resembles characteristic of Prancak N 1. Both are a cross between local Madura tobacco (Prancak 95) with oriental varieties (Ismir). The plant grows upright and the plant canopy is conical. Buds potentially grow into a young branch. Leaf shape is oval or elliptical.

The Prancak 2 variety has an average nicotine content of 2%. The average productivity is 789 kg sliced tobacco per hectare.

This variety is resistant to bikini disease (*Phytophthora nicotianae*) known locally as lanas disease. Prancak N2 is recommended to be grown in Madura.





Balakrisnan 02 (B 02) Cashew Variety

Inventor : M. Hadad EA, Sri Wahyuni,
Nuriani Bermawie, Nawi, and U. Rasman
Indonesian Sweetener and Fiber Crops
Research Institute

IPR Status : Registered No. 121/PVHP/2008

The Balakrisnan 02 (B 02) cashew variety was released in 2007. Currently, cashew production centers include Southeast Sulawesi, Central Sulawesi, North Maluku, Maluku Tenggara, East Java (Madura), Central Java, Bali, West Nusa Tenggara (NTB) and East Nusa Tenggara (NTT).

This line can be grown on marginal land with dry climate. There are several promising lines ready to be released. The B 02 variety can produce 10.5 fruits per bunch. An average cashew production is 9.0 kg of nuts per tree per year.

This B 02 line is resistant to *Helopeltis* sp., the main pest of cashew. The B 02 variety has to be developed by the private sector under a licensing agreement.



Segayung Muktiharjo 9 (SM 9) Cashew Variety

Inventor : M. Hadad EA, Sri Wahyu,
Nurliani Bermawie, Nawi, and U. Rasiman
Indonesian Sweetener and Fiber Crops
Research Institute

IPR Status : Registered No. 13/PVHIP/2008



Cashew (*Anacardium occidentale* L.) is widely cultivated in eastern Indonesia and has a high commercial value. Segayung Muktiharjo 9 (SM 9) was able to produce 25 fruits per bunch. An average cashew production is 11.8 kg nuts per tree per year.

The SM 9 variety is resistant to *Helopeltis* sp. Because of high productivity and good quality nuts, the SM 9 variety is expected to be well accepted by farmers and private agencies alike.

Indonesian Sweetener and Fiber Crops Research Institute (ISFCRI) multiplied Source Seed of SM 9 to support cashew seed multiplication by seed growers.

Currently, ISFCRI is collecting nut seeds at Experimental Farms in Cikampek, Muktiharjo and Asembagus.



IP 3P Jarak Pagar Variety

Inventor : Hasnam, Cheppy Syukur, Dilyo Pranowo,
Hadi Sudarmo, and Edi Purlani
Indonesian Industrial and Beverage Crops Research Institute

The Jarak Pagar (*Jatropha curcas* L.) variety of IP 3P was selected from a population of IP 2P through recurrent selection. The age of seedlings in a nursery is 6 weeks old. The plants start flowering at 6 weeks after transplanting (WAT) .

The *Jatropha* fruits were harvested 14 WAT. In the first year, about 60 bunches were produced and the number of fruits per plant were 500-550. The average weight of fruit with water content of 7% was 685 g per 1000 seeds.

The yield increases with plant age. Yield attained in the 1st, 2nd, and 3rd year were 2- 3 tons, 5-6 tons and 8-9 tons/ha/year, respectively. The oil content ranged from 33-36%.

This variety is well adapted to areas with 500-2500 mm rainfall per year. In addition to high production, the 3P IP variety can be intercropped with other crops.

This improved variety IP 3P can be produced on a wide scale to support national energy security.



Asembagus 81 (Asb 81) Jarak Kepyar Variety

Inventor : Rusim Mardjono, Suprijono,
Suardi, M. Syaefi HD, and Soehandrijo
Indonesian Sweetener and Fiber Crops
Research Institute

IPR Status : Registered No. 40/PV11P/2008

The Jarak Kepyar (*Ricinus communis*) variety of Asembagus 81 was obtained from a selection of Jarak Kepyar population of Muneng origin, Probolinggo District, East Java Province.

The Asb 81 variety can be grown in monoculture or intercropped with other crops with plant spacing of 2 m x 2 m, or 4 m x 2 m. In each hole only one plant finally was retained. Yield potential of ASB 81 is 2.500 kg/ha, higher than the national average of 500 kg/ha. The oil content of this variety was 53.5%.

The Asb 81 variety is relatively resistant to *Acaca janata*, a pest of Jarak Kepyar. High yielding Asb 81 variety is suitable to be produced on dry land with dry climates. This variety remains productive during the dry season if water is sufficient during the initial growth of the plant.

For the large scale biofuels industry, large quantities of Jarak Kepyar raw materials are required.

Seed of the Asb 81 variety has been grown by farmers covering an area of 304 ha, mostly planted by the private sector in Central Java, West Nusa Tenggara and Central Sulawesi.



Sumberrejo 1 (Sbr 1) Sesame Variety

Inventor : Rusini Mardjono and Suprijono
Indonesian Sweetener and Fiber Crops Research Institute

IPR Status : Registered No. 37/PVHP/2008

The Sbr 1 is a local Sesame variety of Wotan origin, Sumberrejo, Bojonegoro, East Java. This variety was developed through negative selection.

This crop can be grown in monoculture and intercropped with other crops with a plant spacing of 60 cm x 25 cm, two plants per hole. In each hole only one plant was retained.

The recommended rate of fertilizers per hectare is 45 kg N + 20 kg P₂O₅. The Sbr 1 variety can produce 1.6 ton seeds/ha which is higher than the national average of 400 kg seeds/ha.

This improved variety can be grown on dry land or in paddy fields with limited irrigation water. The plants can be harvested at 105 days. The oil content ranged from 55-59%. Sbr 1 is resistant to mites (*Tetranychus* sp.), and moderately resistant to diseases caused by *Phytophthora* sp. and *Pythium* sp.



Sumberrejo 3 (Sbr 3) Sesame Variety

Inventor : Rusini Mardjono, Suprijono, and Hadi Sudarmo
Indonesian Sweetener and Fiber Crops Research Institute

IPR Status : Registered No. 18/PVHP/2008

The Sumberrejo 3 variety is suitable to be cultivated on dry land at the beginning of the rainy season. This high yielding variety is resistant to disease caused by the fungus *Sclerotium* and moderately resistant to *Phytophthora* and *Fusarium*.

Judging from the positive characteristics of Sumberrejo 3, this variety can be produced commercially by private companies.



Sumberrejo 4 (Sbr 4) Sesame variety

Inventor : Rusin Mardjono, Suprijono, and Hadi Sudarmo
Indonesian Sweeteners and Fiber Crops Research Institute

IPR Status : Registered No. 19/PVHP/2008

This improved Sumberrejo sesame variety was released in 2007. The average yield of Sumberrejo 4 is 1.4 tons/ha. This variety was selected from local sesame varieties of Bulukumba origin, South Sulawesi.

Sumberrejo 4 is suitable to be cultivated in the dry season on rice fields after rice or tobacco. This variety is resistant to diseases caused by the fungi *Fusarium* and *Phytophthora*.

It is moderately resistant to *Sclerotium*, *Rhizoctonia*, and resistant to mites *Polyphagotarsonemus latus*. Like other improved sesame varieties, Sumberrejo 4 can be cultivated on a large scale in cooperation with the private sector.



Winas 1 Sesame Variety

Inventor : Hadi Sudarmo, Rully Dyah Purwati,
Rusim Mardjono, and Djinnali
Indonesian Sweetener and Fiber Crops
Research Institute

IPR Status : Registered No. 61/PVHP/2012



Winas 1 is an early maturing sesame variety of 101 days that potentially can produce 2.2 ton/ha with oil content of more than 50%.

The advantage of this variety is its tolerance to drought. Because it is an early maturing variety, Winas 1 can be cultivated following a second crop of rice. Further production of this variety in the dry season after rice will increase farmers income.





Winas 2 Sesame Variety

Inventor : Hadi Sudarmo,
Eany Sulistyowati, Cece Suhara, and Tukimin
Indonesian Sweetener and Fiber Crops
Research Institute

IPR Status : Registered No. 62/PVHP/2012

The yield potential of the Winas 2 sesame variety is 1.9 tons per hectare with oil content of more than 70%. This improved variety is moderately resistant to mites *Polyphagotarsonemus latus* and disease caused by the fungus *Phytophthora spp.*

Better crop management can reduce pests and diseases. In addition to high productivity, the Winas 2 variety produces small seeds, a quality of sesame seed that is preferred by the food industry.

Winas 2 is an early maturing variety of 101 days. This variety is tolerant to drought. Therefore, the Winas 2 variety is suitable to be grown in paddy fields after rice in the dry season. With better crop management, the Winas 2 variety can produce high yields and increase farmers income.





Inventor : Untung Setyo Budi, Sudjindro, Rr. Sri Hartati,
Rully D. Purwati, Marjani, Budi Santoso, and Djumali
Indonesian Sweetener and Fiber Crops Research Institute

IPR Status : Registered No. 46/PVHIP/2012

Ramindo 1 Hemp Variety

One of the most promising potential plants as a source of natural fibers to be developed in Indonesia is hemp. The Ramindo 1 hemp variety has small leaves, bright green, rough wrinkled, fine and thick hair, tapered leaf tip, dense layered red shoots, leaves are serrated and pointed. Pink color of flowers later changes to red when it become old.

Plants of this improved variety have green stems with plant height of 190-255 cm, a diameter of 11-13 mm, and 12-17 tillers per hill.

Advantages of this variety are its high-productivity of 2-3 tons of fiber per acre per year, high fiber quality, well adapted to the lowlands and uplands as well, and even to peat moss.

Hemp fiber is required as a raw material for textiles, pulp and paper. Leaves of this hemp plant variety contain 24% protein so are good for feed.

Waste from hemp fiber processing can be used as compost. Development of the Ramindo 1 variety can be integrated with animal husbandry.

Shrimp Gambir Variety

Inventor: Achmad Denian, Nurmansyah,
Erna Suryani, Jamalius, Zulkifli Hasan,
and M. Hadari E. A.
Indonesian Industry and Freshner Crops
Research Institute

IPR Status : Registered No. 15/PVHP/2008



The Shrimp gambir variety was released in 2007. This variety has superior characteristics in terms of productivity, adaptation to the environment, and in compatible with marginal lands.

Development of this superior variety could increase farmers' income and gambir production. In accordance with its advantages, the Shrimp gambir variety can be commercially produced by the private sector.



Cubadak Gambir Variety

Inventor : M. Hadad EA, Sri Wahyu,
Nurliani Bernawie, Nawi, and U. Rasman
Indonesian Industrial and Beverage Crops
Research Institute

IPR Status : Registered No. 14/PVHIP/2008

The Cubadak gambir variety was released in 2007. This improved high yielding variety is able to adapt to a marginal dry land ecosystem that is widely available outside of Java.

The average productivity of the Cubadak variety is 903 kg resin/ha, with a rendemen of 6.1 - 6.5%. The private sector can play a role in the development of this commercial product.





Riau Gambir Variety

Inventor : Achmad Denan, Nurmaisyah, Ernia Suryani,
Jamalins, Zulkifli Hasan, and M. Hadad E. A.
Indonesian Industrial and Beverage Crops Research Institute

IPR Status : Registered No. 13/PVHP/2008

The Riau gambir variety was released in 2007. The productivity of this variety is 803 kg per hectare with a rendement of 5.5-6.0%. It is tolerant to shade. Development of this high yielding variety is expected to increase production and farmer's income.

Commercialization of this variety can accomplished through collaboration between the Indonesian Agency for Agricultural Research and Development and the private sector.





Vania 1 Vanilla Variety

Inventor : Endang Hadipoentyanti and Lala Udarmo
Indonesian Industrial and Beverage Crops Research Institute

Vania 1 is a site-specific, high yielding variety, well adapted to dry climates with an altitude up to 900 m above sea level, rainfall of less than 100 mm per month for 6-9 months per year.

The productivity of the Vania 1 vanilla variety is 8.9 tons wet pod/ha, or equivalent to 2.6 tons dry pod/ha. Dry pods contain 2.8% vanili. The plant is resistant to fruit rot disease of vanilla. Cultivating Vania 1 variety is an alternative choice for farmers.

This improved variety can be commercialized by seed growers and prospective gambir plantations.



Vania 2 Vanilla Variety

Inventor : Firdang Hadipoentyanti,
Laba Udarno, Ernawati,
and Robert Asnawi
Indonesian Industrial and Beverage
Crops Research Institute



The Vania 2 vanilla variety was selected from a Gisting population, a local variety. The plant is well adapted to dry climates with an altitude up to 900 m above sea level.

The required rainfall is less than 100 mm per month for a period of 6-9 months per year. The productivity of this improved variety may reach 8.3 ton wet pod/ha or equivalent to 2.2 ton dry pod/ha. The vanilla content of dry pods is about 3.0%.

The plant is moderately resistant to fruit rot disease of vanilla. The Vania 2 variety has a good potential to be developed on a wide scale.





Mapanget Late Coconut Variety

Inventor : Elsie T. Tenda, Hengky Nowarinto, Miftahorrahman,
Rusthanin H, Akuba, Henkie T. Lunningan, Tine Rompas,
Zamal Mahmud, and Jeanette Kunnamang
Indonesian Palm Crops Research Institute

IPR Status : Registered No. 12/PVHP/2007

Mapanget was released as a national coconut high yielding variety in 2005. This superior variety was developed through a positive mass selection.

This is an indigenous coconut population in Mapanget village, Minahasa District, North Sulawesi Province. The Mapanget variety grows well in lowlands at an altitude of 300 m above sea level, and in dry lands having rainfall of 2500-3500 mm per year.

The plant, begins to bear fruit at the age of 5 years. The shape of fruit is round, medium in size, and fruit skin color generally brownish red. The average of fruit production is 90 fruit per tree per year, or equivalent to 3.3 tons of copra per hectare per year with oil content of 63%.

This variety is tolerant to drought, resistant to bud rot disease *Phytophthora palmivora*. Development of this variety will be directed to multiply coconut source and refurbish the coconut program.





Inventor : Henkie T. Luntungan, Helderling Tampake,
Eddy Wardiana, Emy Randriani, and Hengky Novariantio
Indonesian Palm Crops Research Institute

IPR Status : Registered No. 13/PVHP/2007

Salak Early Coconut Variety

Salak coconut is an early maturing variety originating from Pematang Panjang, South Kalimantan. It was explored in the 1980's.

This early maturing variety grows well in the lowlands at an altitude of 300 m, in dry land under wet climate with a rainfall of less than 2,500 mm/year. Plants begin to bear fruit at the age of 2 years. Harvest begins at age of 3 years.

The coconut is round, small, and green in color. The Salak variety produces 80-120 coconuts per tree per year. This high yielding variety is resistant to Phytophthora disease. The Salak variety can serve also as an ornamental plant.

Young coconut fruit and the water can be used as a refreshing drink. This early maturing Salak variety was developed to support the tourist industry.





Yellow Early Kopyor Coconut Variety

Inventor : Ismail Maskromo, Elsie T. Tenda, Meity Tulalo,
Hengky Novianto, and Bambang Heliyanto
Indonesian Palm Crops Research Institute

IPR Status : Registered No. 20/PVHIP/2007

The yellow early kopyor coconut variety is widely adapted to dry areas with an altitude up to 300 m above sea level. Circle size of the fruit is 52 cm and round size is 42 cm.

The oil content is 9.2% wet weight. The fruit can be harvested when the plant is about 48 month old. Number of fruit per tree is around 100-120, or approximately 1,300 fruit of medium size per hectare per year.

An average weight of individual fruit is 1.2 kg. Demand for this kopyor coconut type is high.

This yellow early kopyor coconut variety is appropriate to be developed commercially in a tourist area.





Brown Early Kopyor Coconut Variety

Inventor : Ismail Maskromo, Elsje T. Tenda, Meity Tulalo,
Hengky Novianto, and Bambang Heliyanto
Indonesian Palm Crops Research Institute

IPR Status : Registered No. 21/PVHP/2007

The brown early kopyor coconut variety is wide adaptable to dry land areas with wet climate at an altitude up to 300 m above sea level. Circle size of the fruit is 49 cm and round size is 43 cm. The oil content is 8.0% wet weight.

The fruit can be harvested when the plant is about 48 months old. Number of fruit per tree is around 80-150, or approximately 1,200 fruit of medium size per hectare per year. An average weight of individual fruit is 1.1 kg.

This brown early maturing kopyor coconut variety is generally well accepted by consumers. Therefore, this variety has been widely developed commercially.



Green Early Kopyor Coconut Variety

Inventor : Ismail Maskromo, Elsie T. Tenda, Meity Tulalo,
Hengky Novarianto, and Bambang Heliyanto
Indonesian Palm Crops Research Institute

IPR Status : Registered No. 22/PVHIP/2007

The green early kopyor coconut variety is well adapted to dry land areas with wet climate, and at altitude up to 300 m above sea level. Circle size of the fruit is 51 cm and round size is 42 cm.

The oil content is 8.4% wet weight. The fruit can be harvested when the plant is about 48 month old. Number of fruit per tree is around 120-140, or approximately 1,400 fruit of medium size per hectare per year. An average weight of individual fruit is 1.1 kg.

This green early maturing kopyor coconut variety is well preferred by consumers. Therefore, this variety has potential to be widely cultivated by farmers.







ANIMAL HUSBANDRY

Sumatra Composite Sheep



Inventor : Subandriyo, Bess Tiesnanurti, Bambang Setiadi, Dwi Yulistiani,
and Wisri Puastuti.
Indonesian Center for Animal Research and Development



The Sumatra Composite sheep is derived from crosses between local Sumatra sheep with sheep seeds from St. Origin Croix Virgin Islands, United States and Barbados Sheep blackbelly from Barbados Islands. Research on this composite sheep was completed after more than two decades where the generated sheep can be raised under semi-intensive condition.

This type of sheep characterized by a uniform pattern of coat color like white, brown, striped or blackbelly Barbados pattern. There are several characteristics of this composite sheep, among others, are able to adapt to the tropical and humid environments, reproductive cycles throughout the year, good growth (101 grams per day), and has similar number of lambkin to local sheep.

The birth weight of the sheep is 2.2 kg, wean weight is 10.3 kg, weight of the sheep after 48 weeks is 22.0 kg, age of first delivering is 18 months, and number of lambkins is 1.5.

The current population is about 23,000 head and spreads mainly in the provinces of North Sumatra, Aceh, Riau, Banten, and Central Java.



Garut Composite Sheep

Inventor : Ismeth Inomti, Bess Tiesnamurti, and Eko Handiwirawan,
Indonesian Research Institute for Animal Production

Garut Composite sheep is generated from a cross between a local Garut sheep with Moulton Charollais sheep from France and sheep St. Croix of the United States with genetic proportions $\frac{1}{2}$: $\frac{1}{4}$: $\frac{1}{4}$.

The aim of this cross is to generate a superior traits which is derived from the parental traits in terms of rapid growth rate of body weight pre- and post-weaning, and able to adapt well to the humid tropical environment. This growth rate advantage would appear if the sheep is raised with a high quality of feed. Another superior characteristics taken from the local parent is the number of lambkin per delivery is relatively high and the ability to delivering throughout the year.

The main characteristic of Garut Composite sheep are as follow :

Calf's Performans

1. Birth Weight ranges from 2.8-2.9 kg
2. Weaning Weight is 12.1-12.3 kg
3. Pre-weaning Body weight gain is 101.7-109.1 g/days

Young Lamb's Performans

1. Body Weight 6 months is 18.6-18.9 kg
2. Body Weight 12 months is 29.9-35.5 kg

Elder Productivity

1. Once the number of young lamb born is 1.5-1.8 kg
2. Total Weight of birth of young lamb is 4.7-5.2 kg
3. Viability Pre-weaning of young lamb is 77.9-79.5%
4. Total weaning weight of young weaning is 17.7-19.9 kg/elder



Boerka Goat

Inventor : Bambang Setiadi, Simon E. Simulingga,
and M. Dolosarihu
Indonesian Goat Research Station



The Boerka goat is derived from crosses between local goat and Boer goat, which generates the combination of early reproductive potential with weight capacity. High reproducibility is derived from local goats (*Kacang Goats*) which has a relatively low weight capacity. The high weight capacity comes from the Boer goat.

Boerka goats have weight capacities that can reach 35 kg at the age of 1 year and high reproducibility by the number of goatkin per birth from 1.6 to 1.7 individuals per parent and adapts well to tropical-wet conditions in Indonesia. This goat has a potential to meet the need of the export market that demands specification of the body weight which is difficult to be achieved by the local goats.



KUB Chicken

Inventor : Tike Sartika, Benny Gunawan, Desniyati Zamuddin, Sofjan Iskandar, and Hety Resnawati
Indonesian Research Institute for Animal Production

KUB—Superior native chicken of Live-stock Research Institute is a selected native high yielding chicken layer. Fur color varies with body weight ranges from 1200-1600 grams and egg weight from 35-45 grams.

It has an earlier spawn at the age of 175 days, with an egg production peak of 65%. Major characteristics of KUB chicken are the ability to produce eggs with higher productivity, ranging from 130-160 eggs per head per year, and resistant to diseases.

KUB chicken is licensed to PT. Ayam Kampung Indonesia with a 5-year agreement period, 2012 to 2017.





PMp Ducks

Inventor : L. Hardi Prasetyo, Pius P. Ketaren, Majon Purba, Triana Susanti,
and Soni Sopiya
Indonesian Research Institute for Animal Production

The PMp duck is a broiler derived from crosses between a Peking duck and a native white Mojosari duck. PMp is a white furred duck with a clean and bright carcass skin. Characteristics traits of broiler or egg layer duck include 2-2.5 kg weighs per head at the age of 10 weeks.

When mated with males Mannila duck, they will generate Serati duck weighing more than 3 kg at the age of 10 weeks. As an egg layer ducks, the first spawn PMp duck is around 5.5 months.

PMp ducks is an alternative source of poultry meat and eggs which has a potential to be developed by chicks raiser.



Master Duck

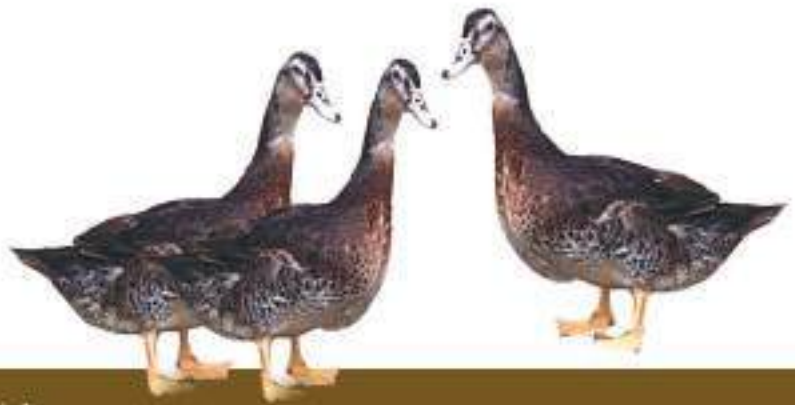
Inventor : L. Hardi Prasetyo, Pius P. Ketaren,
Argono R. Setioko, and Triana Susanti.
Indonesian Research Institute for Animal Production



The Master duck is derived from a crossing between Kirkcaldy duck and selected native Alabio duck.

The special characteristic of Master duck is earlier first spawn age which resulted in higher egg productivity. In addition to the more consistent egg production, this duck also has a more rapid growth and the males ducklings bred can be raised as broiler duck.

Serati Ducks



Inventor : Argono R. Setioko
Indonesian Research Institute for Animal Production

Crossing between



Males Manula duck

X



Females PMp duck



Serati duck

The Serati ducks is generated from a crossing between males Manula ducks and females PMp ducks through the application of artificial insemination technology.

Serati ducks has arapid growth, lower fat, and higher meat protein content.

Probion

Inventor : Budi Harvanto
Indonesian Research Institute for
Animal Production

IPR Protection Status :
Patent No. S 00200100219

The Probion is a supplementary livestock feed ingredients that can be used directly as a mixture of concentrate feed or to improve the quality of rice straw through fermentation process. Probion is a rumen microbes of ruminants which is enriched with essential minerals for the growth of the microbes. Probion is made in the form of powder so it can be stored for a long period. As a concentrate feed mixture, the Probion used is 0.5%. When it is used in the fermentation process of rice straw, a dose of 2.5 kg urea and 2.5 kg Probion is applied for each ton of rice straw.



The application of Probion can increase the protein content of the rice straw twice and enhance the value of fiber digestibility (NDF). In addition, Probion can also increase the weight of livestock about 10% in a relatively short period of time, and reduce production costs which resulted in higher profit.

This technology is commercially potential to be further developed by ruminant feed industry, especially in rice production centers. Commercialization opportunities will be greater when it is integrated into a rice-livestock systems.

Bioplus Probiotics

Inventor : M. Wintugroho, Y. Widiawati, and Sri Marjati
Indonesian Research Institute for Animal Production

IPR Protection Status : Patent No. P 20010039



The Bioplus Probiotics is a mixture of nonpathogenic rumen microbes, i.e. fiber-digesting bacteria (population 109 per gram) and digestive functions (population 105 per gram). Probiotics Bioplus is obtained from various ruminant and monogastric animals, which are then transferred to other livestock. Bioplus provision is aimed to improve and increase productivity, especially in the efficiency of feed utilization.

Bioplus can improve the efficiency of utilization and digestibility of low feed quality, animal health, stimulate the animal growth, prevent the decline of body weight during the dry season when feed quality is very poor and not fresh, increase parent body weights and feed consumption ratio. With the application of this technology, no longer synthetic materials, such as antibiotics or growth hormones are needed besides no residues in the animal tissues.

Bioplus has a potential to be developed to support the livestock feed industry in the animal production centers with low quality of feed raw material or as a reserve feed during dry season.



Receptalum Prebiotics



Inventor : M. Winugroho
Indonesian Research Institute for Animal Production

IPR Protection Status : Patent No. P 00200400359

The Receptalum prebiotics is made of dried sunflower base and then is processed into flour. This prebiotic is an additives feed to reduce subclinical mastitis as a major cause of milk production decline in Indonesia. Its application in dairy cattle is combined with bioplus probiotics.

When combined with a prebiotic bioplus, it can drastically reduce SCC (Somatic Cell Count), which is an indicator that shows the number of bacteria that cause mastitis, from 1.6×10^6 to 8.9×10^3 cells per ml of milk.

Receptalum can serve as a substitute for antibiotics, does not lead to residues in milk, produced milk is free of pathogenic bacteria, improve animal health and improve birth spacing and increase farmers' income.

This technology has a potential to suppress cattle mastitis cases in Indonesia which is still high, reduce imports of milk, and can be developed by dairy cattle industry and sunflower cultivation.





Rater Probiotics

Inventor : Sukardi Hastono, M. Winugroho, and Ayi Ratnaningsih
Indonesian Research Institute for Animal Production

IPR Protection Status :
Patent No. Probiotics 00200500591

Rater probiotics is formulated from the yeast of fermented *Saccharomyces cerevisiae* that can be used as a ruminant feed supplement. *S. cerevisiae* is the main protein source of local yeast, Single Cell Protein (SCP) for livestock feed.

Rater probiotics is produced in fine white powder form and has a characteristic odor of sweet fermented rice, can improve the efficiency of feed digestibility and microbial balance in the digestive duct of ruminants, increase the efficiency of feed concentrate and has a positive synergy when it is combined with Probiotics Bioplus.

This technology is commercially potential to be developed in feed industry of ruminant production centers because it can provide multiple benefits for the small / large livestock industry.

Poultry Additive Feed Bioavian



Inventor : I Putu Kompiang
Indonesian Research Institute for
Animal Production

IPR Protection Status :
Patent No. P 00200500590

The Bioavian is a live microbial consortia of *Bacillus apiarius* and *B. coagulans*, used as supplementary feed ingredients (additives) in poultry rations.

Bioavian technology can improve the productivity of poultry, regardless of the dependence use on growth promoter antibiotics (GPA), eco-friendly because it is free of antibiotics, and can reduce the cholesterol levels in meat and eggs. This technology can also improve the performance of poultry in order to obtain a healthy products, free of antibiotics and hormones.



Zinc Biocomplex

Inventor : I Putri Kompiang
Indonesian Research Institute
for Animal Production

IPR Protection Status :
Patent No. S 00200600763



The Zinc Biocomplex is made of inorganic zinc (Zn) compounds with extract of corn meal/waste and inoculant *Saccharomyces cerevisiae* media, as a feed supplement to increase livestock production. Zn is one of the minerals needed to enhance the development of rumen microbes in ruminants.

Zinc deficiency will result in sub-optimal rumen microbial activity which lower the level of feed utilization and in turn will reduce the productivity of livestock.

This technology does not require high investment, can increase microbial activity in the rumen of ruminants, improve productivity, more rapid and directive zinc absorption.





Inventor : I Putu Kompiang
Indonesian Research Institute
for Animal Production

IPR Protection Status :
Patent No. S 00200100018

Cassapro

The Cassapro is engineered to improve the nutritional content of various junky feed ingredients (cassava, cassava waste, palm kernel cake) through solid system fermentation. The inoculum/starter used is naturally active *Aspergillus niger*.

On solid fermentation, gelatinous stages (steaming) are removed, which shorten the processing time and reduce the cost of production. Cassapro is an easily adopted technology by small and large scale business farms.



This technology has a potential to be developed in the production centers of cassava and palm oil through a synergic Siska program (oil palm-livestock Integration Systems) by harnessing the solid waste as raw material of animal feed with high nutrients content.

Ferlawit



Inventor : Arnold P. Simurat, M.B. Tresnawati, and J. Darna
Indonesian Research Institute for Animal Production

IPR Protection Status : Patent No. ID 0020249

The Ferlawit is a substitute feed ingredients derived from dry oilpalm sludge fermented using *Aspergillus niger*. Aerobic fermentation process was carried out for 3 days followed by anaerobic enzymatic processes for 2 days. Ferlawit technological advantage lies in the two-stage fermentation process (aerobic and anaerobic), resulting in a higher product with the nutritional value and digestibility compared to the raw material.

In addition, Ferlawit concentrate feed can be given as much as 10%. This technology would transform agro-industry waste into nutritious animal feed ingredients.



Ferlawit offers a commercial opportunity for feed industry and farmers in the regions of oil palm plantations and can be synergized with Siska Program (oilpalm-livestock integrated system).

Bioport for Feed during Transportation



Inventor : M. Winugroho
Indonesian Research Institute for Animal Production

IPR Protection Status :
Patent No. ID 0020248

The Bioport feed for ruminants transport prevents the decline in body weight and stress during transport from farmer's location to selling/slaughtering location. Bioport is made of three types of main ingredients: 1) a electrolyte liquid containing 10 vitamins (55%), 2) material containing local probiotic yeast *Saccharomyces cerevisiae* (25%), and 3) materials containing immunoglobulin derived from pure colostrum powder (20%).

Special characteristics of Bioport are, among other, raw materials used are easily obtained, each of which has the functions of mutual support. The addition of electrolytes and vitamins function as a substitute for the body ions, antistress, immune and antioxidant. In addition, Probiotics *S. cerevisiae* serves to preserve and stabilize the body's nutrient protein, whereas the colostrum contains immunoglobulin serves to improve the stamina or endurance of the cattle.

This technology is commercially potential to be developed to cater to the needs of the livestock industry in reducing the economic losses incurred during the period of transportation or traffic of livestock, such as from the origin of the livestock to the slaughter locations.





Fermented Rice Straw as Feed

Inventor : Budi Haryanto
Indonesian Research Institute for Animal Production

IPR Protection Status :
Patent No. ID 0022138

Rice straw as feed ingredients needs to be improved its nutritional value in order to enhance the rumen degradability values. The improvement of nutritional value can be made through fermentation using mixed microbial starter material which is capable of producing fiber breaking enzyme. Straw fermentation is able to provide energy in the form of easy to fly fatty acids for livestock and improve feed metabolism efficiency.

The fermented rice straw technology can be used as a primary source of fibrous feedstuffs replacing grass for sheep and beef cattle and increase the productivity of livestock. This technology can also provide added value s to farmers in rice production centers.

Fermented rice straw technology has a potential to be developed by relevant Directorate General and local government to meet fibrous feed for ruminants and can be integrated in the rice-livestock farming system.



Silage of Cocoa Fruit Skin For Feed

Inventor : Wisni Puastuti, Yemi Widiawati, and Dwi Yulistiani
Indonesian Research Institute for Animal Production



The Silage of cocoa fruit skin (CFS) is a processed feed through fermentation in anaerobic (without oxygen) with the addition of carbohydrates sources (e.g. rice bran, maize flour, cassava waste).

CFS feed made into silage has advantages, among others, can be directly given, more palatable, under anaerobic conditions can be stored in the long term (can be save > 4 months), and does not require drying process thus saving time and effort , and easy to apply in the field, both by small and large farmers.

CFS silage can be used up to 50% as a basal feed in the diet of ruminants (goats, sheep, cattle) or can replace up to 100% forage grasses with nutritious feed. During anaerobic conditions CFS silage can be used as stock feed.





Fermented Corn Cobs for Beef Cattle

Inventor : Eri Siti Rohaeni, Ahmad Subhan, Arief Darmawan, and Noor Amali
South Kalimantan Assessment Institute for Agricultural Technology

IPR Protection Status :
Patent No. S 00200600261

Fermentation of corn cob is a feed formula that uses basic ingredients of fermented corn cobs (55%), enriched with grounded corn, rice bran, disposable dried fish, coconut dregs, cassava slice, urea, lime, and salt for beef cattle. This formula can support the provision of feed for one cattle for 333-500 days, assuming consumption is between 2-3 kg per cattle per day.

The advantages of fermented corn cobs, among others, can increase the added value of waste corn cobs into a complete feed for cattle, overcome the difficulties in finding high quality feeds, especially during the dry season and famine, and help the environment sanitation.

This technology has a potential to be developed commercially by the animal feed industry, especially in corn production centers, utilizing cob waste into high-quality animal feed. In addition it provides opportunities for farmers, home industry, and small enterprises.





Etec Multivalent Vaccine

Inventor : Supar
Indonesian Research Center for Veterinary Science

The Etec multivalent vaccine is an inactivated vaccine made of bacteria cells *E. coli* containing antigen fimbriae (pili) K88; K99; F41, and 987P. This vaccine plays an important role in the control of neonatal diarrhea and is used to control colibacillosis in piglets against *E. coli* K88, K99, F41, and 987P.



Etec multivalent vaccine technology can be made from local isolates and safety is assured, able to protect piglets from infection colibacillosis through immunization, and the protection of maternal antibodies persist for 3-4 weeks after delivery. In addition, the adjuvant does not induce necrosis at the injection site.

This vaccine has a potential to be developed by the animal/veterinary pharmaceutical industry, and commercial pig farmers in efforts to prevent the spread of *E. coli*.

Aerovak SE 34

Inventor : Lily Natalia
Indonesian Research Center
for Veterinary Science



The Aerovak SE 34 is a freeze-dried vaccine products containing live bacteria of *Pasteurella multocida* B: 3, 4. It is administered intranasally with a spray in the nose of livestock for controlling snoring disease. Vaccination of cattle and buffalo to prevent snoring disease in healthy cattle aged 6 months or more. In contaminate areas (enzootic), vaccination needs to be repeated every year.

The vaccine is given by way of using a clean sprayer. In addition to potentially control the snoring illness in cattle and buffaloes, Aerovak 34 SE is also able to protect animals from challenge test for 1 year after vaccination.





Poultry Medicinal Herbs

Inventor : M. Januwati, M. Syakir, Nurliani Bernawie, M. Yusron,
B. S. Sembiring, Nur Maslahah, Desmayati Z., Ening Wiedosari, and Agus Setiyono
Indonesian Spice and Medicinal Crops Research Institute

The Poultry Medicinal herbs (named 'jamu' in local language) for chicken is made from fermented Zingiberacea, a bitter plant *Sambilotto* (*Andrographis paniculata*) and betel. This herbs can boost the immune system and feed efficiency through FCR (Feed Conversion Ratio), suitable for organic poultry, as an immunomodulator which is able to control endemic diseases, including the bird flu H5N1 strain, prevent the death of chickens, and cost-saving vaccinations.

This technology can be utilized by poultry farmers to increase efficiency use of feed, vaccination, and the immune system in poultry.





Poultry Medicinal Herbs Immunity Enhancer

Inventor : M. Janiwati, Bagem Sofiana Sembiring, Desmayanti,
Ening Wiedosari, and Agus Setiyono
Indonesian Spice and Medicinal Crops Research Institute

Poultry herbs consists of a mixture of fermented various Zingerberaceae, Sambiloto (*Andrographis paniculata*), betel, and garlic that have activity as an immunomodulator and antiviral on human being. Up to present, no effective prevention and control has been found to overcome such viral disease. Oseltamivir carboxylate (Tamiflu) is the only one drug prescribed by the government to address human bird flu.

This formula can boost the immune system, improve the productivity of chickens, and an organic chicken farming technology. This formula can also improve the efficiency of feed utilization through FCR (Feed Conversion Ratio). The herbs fermentation technology has the advantages, among others, serve as an immunomodulator, improve chicken productivity, as an alternative medicine on bird flu, and improve the economic value of medicinal plants.

Medicinal Herbs for Anti-coccidiosis Poultry

Inventor : M. Jantuwati, Bagem Sofiana Sembiring, Desmayanti,
Erang Wiedosari, and M. Rizal
Indonesian Spice and Medicinal Crops Research Institute

The Coccidiosis or dysentery disease is caused by *Eimeria tenella*, a protozoa parasite that damages the digestive tract and cause severe inflammation. *Eimeria* contaminates chicken at the age of 3-4 weeks and the highest mortality occurred on 4 and 6 days after infection. The disease can be prevented and treated by administering sulfa preparations, sulfaquinoxalin. This drug is expensive and has to be imported. As an alternative, various herbs such as *sambiloto* (*Andrographis paniculata*), red ginger, java ginger (*Curcuma zanthorrhiza*) and *temu ireng* (*Curcuma aeruginosa*) can be used. Herbal formulas in the form of powder of these plants can act as antiparasitic which can boost immunity against coccidiosis disease.

This medicinal herbs is effective in suppressing the population of oocyste, similar to sulfa coccidiostat and also act as immunomodulators. Benefits of this herb is to improve the poultry health/immunity, productivity, appetite, reduce fat meat, and reduce the bad smell of sewage around the cage.

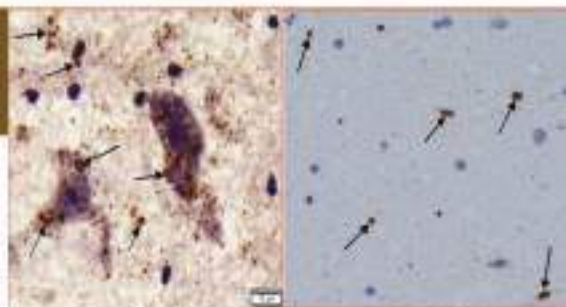


Rabies virus detection by d-RIT technique

Inventor : Rini Damayanti, and Agus Wiyono
Indonesian Research Center for Veterinary Science

The innovation of d-RIT (de rect-Rapid Immuno Histochemistry Test) is useful for the detection of rabies virus antigen with a touch preparations of brain organ which only requires 1.5 hours of testing without using a fluorescent microscope.

Another advantage of this technology is to shorten the examination time and the specimen can be in form of brain organ pieces (fresh, frozen, or fixed in a solution of PBS-50% glycerol). The results are examined by using standard conventional microscope, does not require a fluorescent microscope as the FAT standard of verification for the diagnosis of rabies.



Positive Rabies
(thick segment)

Positive Rabies
(thin segment)

Besides cheaper and easier, the results of this technique are relatively more permanent than FAT. Its sensitivity and specificity are very accurate, close to 100%. The verification is relatively easy and the results can be read easily because detected antigens has different color with its background.

Rhinovet

Inventor : Muliaram Saepulloh
Indonesian Research Center for Veterinary Science

The Rhinovet is an inactivated vaccine for controlling infectious bovine rhinotracheitis disease in cattle. This vaccine has the composition developed BHV-1 local isolates N60521T/Jabar/07, montanide adjuvant ISA 70 and L-Ascorbic Acid Sodium Sal (1 mg/ml) and Copper (II) sulfate (0.5 mg/ml).

The advantages of this vaccine is for the prevention of IBR disease in dairy and beef cattle. IBR is an infectious reproductive disease in cattle that can cause miscarriage caused by a virus Bovine herpesvirus group-1 (BHV-1).

The vaccine can be given to cattle at all ages with a dose of 5 ml intramuscularly (im). First vaccination is given on 5 months old calves, the second is given one month after the first one, and then repeated for every 12 months. Rhinovet vaccine is safe to use in pregnant cattle.





Kernel Oilpalm Slag for Dairy Cattle

Inventor : Yeni Widiawati, Abdulah Bannualim,
and I. Wayan Mathius
Indonesian Research Institute for Animal Production



Kernel Oil Palm slag (KOPS) is a by-product of palm oil industry (CPO / Crude Palm Oil). This product contains 14-17% protein, 9.1 to 10.5% fat, 12-18% crude fiber and rich in P, Zn, and Mn minerals. Kernel Oil slag can be used as a source of protein and energy in ruminant feed.

The addition Kernel Oil slag is meant to substitute the use of imported feed ingredients protein source i.e. soybean meal and DGDS. Concentrates formulation for dairy cows containing Kernel Oil slag up to 50% of the dry matter can reduce the concentrate price by 14.2% with comparable protein content and energy.

By providing the concentrate formulation containing 50% KOPS in dairy cattle lactation would increases milk fat content from 3.3% to 4.1%. Physically, the milk color becomes more yellow and fat layer on the surface of the milk becomes thicker. KOPS also increase milk production by 21.3% and reduce the feed cost by 20.2%.



Stick Test Kit: The Rapid Detection of Total Microbial Contaminants in Fresh Milk

Inventor : Misgyarta and Agus Budianto
Indonesian Center for Agricultural Postharvest
Research and Development



The Stick Test Kit is a rapid test equipment of microbial contaminants in fresh milk which consists of two devices, namely: (a) Stick Test Kit, materials such as cardboard or cotton on the end of the stick that has a formula biosensors, and (b) a standard color map, a color map that shows the level of microbial contaminants.

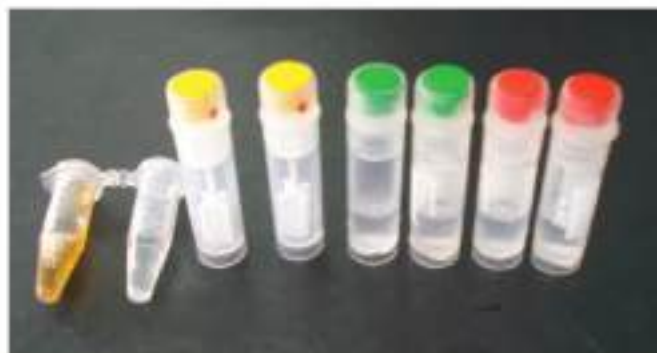
The advantage of Stick Test Kit:

- (1) The applications is faster (<10 min) while plating method takes 48 hours
- (2) Easy to apply, no need laboratory equipment and no need special training
- (3) Cost analysis is cheap, Rp. 1.500 /sample, while plating method (TPC) Rp. 100.000/sample.

Stick Test Kit Benefits: Detects microbial contaminants in fresh cow's milk is fast (<10 min), the level of accuracy is > 90%, and the stability is > 1 year.

How to Use Stick Test Kit: Stir fresh milk to be tested, then dipped the Test Kit Stick tip in fresh milk for 1 minute, lift the stick and allow 2-5 minutes until the color changes occur on the Stick Test Kit. Match the color with the standard color maps.

Felisa Vet ver.1



Inventor : Didik Tulus Subekti and Eni Kusmaningtyas
Indonesian Research Center for Veterinary Science

The Felisa Vetver 1 is a diagnosis technique based on ELISA (Enzyme Linked Immunosorbent Assay) technology which is designed for practical application in the field that serologically can detect disease rapidly. Felisa Vet ver.1 is designed to test one sample toward eight kinds of diseases in a single test serum, plasma, blood, and milk.

Felisa Vet tech ver.1 is practical to be applied in the field, fast (± 25 minutes) in detecting eight diseases at once, and can be customized as needed so it is more flexible in its development.





Fumelisa Mono Ab

Inventor : Romsyah Maryam M.
Indonesian Research Center for Veterinary Science

Fumelisa Mono Ab is a prototype of ELISA kit (Enzyme Linked Immunosorbent Assay) based on a monoclonal antibody (Sub clone 2B1F6F7). It is developed to detect fumonisin B1 (FB1) on agricultural products and animal feed.

Fumelisa Mono Ab technology is a direct competitive to ELISA format (dc-ELISA), has a good performance in detecting Fumonisin on corn and feed used as a model. Antibodies react specifically against FB1 (100%) and FB2 (4.9%) with a detection limit of 0.5 ng/ml (ppb). The benefits of this technology for the agricultural community is to help overcome Fumonisin toxicity in agricultural products and animal feed.

Progesterone Sponges

Inventor : Umi Adiaty
Indonesian Research Institute for Animal Production

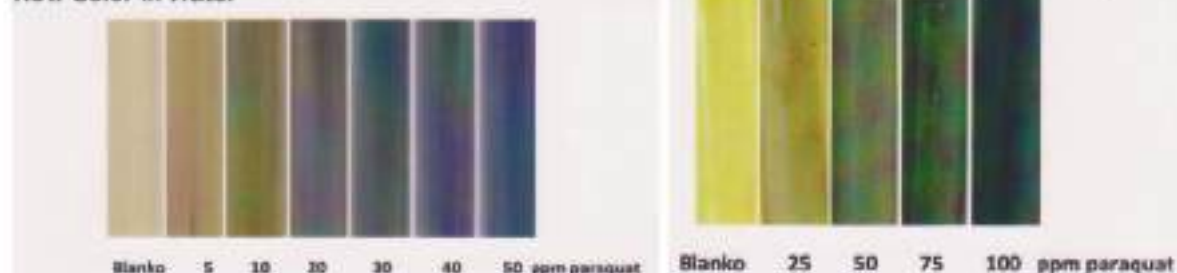


Progesterone sponges is developed for hormonally lust synchronization on the ruminants. Sponge containing Fluorogeston acetate hormone with a concentration of 20 mg and 30 mg.

Lust synchronization plays an important role in reproductive management, especially in term of time and labor efficiency. Lust synchronization means that copulation and birth can be done in a relatively the same time period. The attention of employee/farmers can be focused on cattle copulation or birth only so that the flow of time in the workforce become more efficient.

The use of progesterone sponge for lust synchronization in cattle is relatively easy. By using a special application, the sponge is inserted into the females vagina and let stand for 14 days. In about 2 days after the sponge is revoked then the females lust would be arise. When a female lust is arising, it is the right time for copulation. The copulation can be carried out simultaneously by gathering a group of lust females and a male in the copulation cage or by artificial insemination.

The Concentration of the Herbicide Paraquat Row Color in Water



Rapid Detection Method of Paraquat Herbicide

Inventor : Yuningsih

Indonesian Research Center for Veterinary Science

Rapid detection method of paraquat herbicide is developed to diagnose toxicity in cattle quickly and easily applied, both in the field and laboratory, without using instruments. In addition, this method can also be used for monitoring the presence of paraquat in animal feed (grass) for prevention of accidental poisoning in cattle.

This rapid method is applied based on the color sequence corresponding to the sequence of paraquat concentration and the concentrations series belongs to the stipulation level of tolerance limit in the grass (forage).



FERTILIZER, BIOLOGICAL CONTROLS, BASIC INFORMATION, AND ENVIRONMENT

Citromic

Inventor : Sutopo
Indonesian Citrus and Subtropical Fruits
Research Institute

The Citromic is an essential nutrient for citrus. Citromic main ingredient is the extract of organic matter containing humat and fulfat, amino acids, macro and micro nutrients, and plant growth hormones.

The main benefit of Citromic is to overcome nutrient deficiency, enhance plants tolerance to extreme climatic changes, and optimize growth and production of citrus.

Citromic is applied by spraying citrus plant when the shoot is sprouting with 2 ml of Citromic/liter of water once every two weeks.



Multipurpose Microbial Fertilizer



Inventor :
Rasti Saraswati, Ratih Dewi Hastuti,
and Erny Yuniarti

Indonesian Center for Agricultural
Land Resources Research and Development

Multipurpose Microbial Fertilizer contains microbes coming from manure that plays an important role as a provider of nutrient sources, booster for plant growth, decomposer of organic matter and heavy metal detoxification. This technology is able to improve the efficiency of fertilizer N, P, and K. In addition, microbial fertilizer is also efficient in decompose organic matter, maintain nutrient balance, and improve soil productivity.

The production process is using advanced aseptic techniques with strict quality control and consistent so as to guarantee the quality and advantage of the product.

These multipurpose fertilizers contain microbes native to Indonesia developed to improve the availability and uptake of nutrients for plants. There are three biofertilizer products namely **M-DEC**, **Bio Nutrient** and **Nodulin**, each has different advantage. These products have been developed in collaboration with PT. Nusa Palapa Gemilang.



SMESh: Biological Fertilizer for Soybeans



Inventor : Edi Santoso, Surono, and Elsanti
Indonesian Soil Research Institute

IPR Protection Status :
Patent No. P00200900416

The SMESh is a biological fertilizer designed to help improve fertilizer efficiency, soil productivity, and soybean resistance to disease. This biological fertilizer is a combination of microbes selectively superior to soybean plants as N-fixing bacteria, phosphate solvent, hormones producer, and antagonistic pathogen.

Other advantages of SMESh are (1) environmentally friendly because it uses tropical microbes, (2) efficient use of fertilizers SP-36 to as high as 80%, (3) increased plant resistance to diseases, and (4) shorten the harvest time.

SMESh is potential to be developed commercially to substitute inorganic fertilizers and insecticides for soybean plants.

SMART: Biological Fertilizer for Rice



Inventor : Edi Smitoso, Suroho, and Elsanti
Indonesian Soil Research Institute

IPR Protection Status : Patent No. P00200900415



The SMART is a biological fertilizer designed to help improve fertilizer efficiency, soil productivity, and rice plant resistance to disease. The formula of this biological fertilizer is combination of microbes selectively superior to rice plants as N-fixing from the air, phosphate solvent, hormones producer, and as anti-plant pathogen.

Another advantage of SMART is environmentally friendly because it uses tropical microbes that can reduce the application of insecticide to about 50%, increasing plant resistance to disease, and speed up the harvest time.

SMART is potential to be developed commercially to substitute inorganic fertilizers and insecticides for rice plants.

BETA: Soil Ameliorant



Inventor : Ai Darliah, Neneng Leila Nurida,
A. Rachman, and Sutono
Indonesian Soil Research Institute

The BETA is a formula to ameliorate soil and is composed of organic and mineral which can help speeding up the rehabilitation process of degraded land.

BETA serve to improve soil structure, increase soil water holding capacity, organic C content, cation exchange capacity (CEC), and neutralize soil pH.

As an ameliorant, BETA is potential to be produced and applied on marginal land to improve the physical and chemical properties of the soil.



BIO - VET: Biofertilizer for Forage Crops

Inventor : I Putu Kompiang,
and Supriyat
Indonesian Soil Research Institute

IPR Protection Status :
Patent No. ID 0019731

The BIO-VET is a probiotic microbial fertilizer composed of *Bacillus* sp. and *Trichoderma* sp. isolated from rumen of cattle. BIO-VET serves as biofertilizer to improve forage crop production and efficient use of fertilizer. BIO-VET is available in fermented liquid form. This microbial fertilizer is applied into the plant by means of watering or spraying.

BIO-VET technology is simple that investment to produce the fertilizer is not costly. BIO-VET can reduce the fertilizer use for feed crops up to 50%.





Orlitani



Inventor : Selly Salma, Sutrisno, Eity Pratiwi,
Eef Syaeful Anwar, and Tili Tentrem
Indonesian Center for Agricultural Biotechnology
and Genetic Resource Research and Development

IPR Protection Status : Patent No. ID 00.2008.035262



The formula of Orlitani is bio-activator containing *Trichoderma harzianum* and *T. koningii*. The isolates are of Indonesia origin and the strain has natural adaptability and high saprophytic competition. Orlitani is able to accelerate decomposition of agricultural waste. For example, rice straw and other plant litter can be decomposed within 2-4 weeks, while the sugar mill waste in the form of filter cake within 2-5 days, and C / N decline 60-80%.

Orlitani is potential to be commercially developed by bio-fertilizer industry.



BIORIZA 02T: Active AMF Biological Fertilizer

Inventor : Irvan Muas

Indonesian Research Institute for Citrus and Subtropical Fruit

IPR Protection Status : Patent No. P00201000060

Acid dry land area in Indonesia covers about 40 million ha. To increase land productivity needs additional agricultural input such as lime and organic fertilizer. The price of these agriculture inputs tend to increase from time to time and bring about higher cost for production. One solution to address this problem is the use of bio-fertilizers that contain active Bioriza 02T arbuscular mycorrhizal fungi (AMF).

Bioriza 02T is easily applied with a low dose (1-2 grams/seedling). This formula make use environmentally friendly materials. It effectively improve the growth of various crops. This bio-fertilizers is likely to address problem of nutrient deficiency on marginal drylands for plantation and fruits crops.





Tithoganic Organic Fertilizer

Inventor : Wiwiek Hartati and Guriwati Samsidi
Indonesian Soil Research Institute



Tithoganic organic fertilizer was enriched with minerals and forage materials *Tithonia diversifolia*. It contains high N, P, K nutrients.

Tithoganic is able to make use organic fertilizer efficiently by 50% and save the use of inorganic fertilizer up to 30%.

Tithoganic organic fertilizer can improve the physical, chemical, and biological soil by providing macro-nutrient N, P, K, Ca, Mg, S, micro-nutrients Cu, Zn, Mn and Fe, and growth hormone for plants.

Biochar SP50 : Soil Ameliorant



Inventor : Neneng L. Nurida, Ai Dariah, and Sutono
Indonesian Soil Research Institute

The Biochar SP50 is formulated as soil ameliorant and is made of charcoal coming from burned agricultural waste which is difficult to decompose.

Biochar SP50 can reduce the rate of CO₂ emissions, create good habitat for symbiotic microorganisms, increase soil carbon stocks, increase soil pH and water-holding capacity, nutrient retention, and increase soil CEC.

This technology is very useful to restore degraded lands.





BioSure Biological Fertilizer

Inventor: Yuli Lestari, Mukhlis, M. Saleh, Yulia Raihana, Arif Budiman, Sudirman Umar, and Fatimah Azzahra
Indonesian Swampland Agricultural Research Institute

IPR Protection Status : Patent No. P00201100317



The BioSure biological fertilizer is formulated using sulfate reducing bacteria for use in wetlands.

BioSure can increase the pH of soil, reduce solubility of sulfate ions, efficient use of lime up to 80%, and increase rice yields of over 20%.

As a biological fertilizer, BioSure is potential to increase land productivity in Indonesian swampy area that covers about 33.1 million ha.



Biotara Biological Fertilizer

Inventor : Mukhlis, Yuli Lestari, and Arif Budiman
Indonesian Swampland Agricultural Research Institute

IPR Protection Status : Patent No. P00201100316

Biotara biofertilizer contains microbial decomposers, P solvent, and N binder from the air. The media for propagation are rice straw or empty fruit bunches of oil palm.

Biotara is suitable for use on acid soils and swampy land to increase crop productivity, availability and efficiency of N and P soil, accelerate decomposition of organic materials, and support plant growth.

Biotara has been proven to increase rice yields in wetlands by 20%. Biotara is licensed by PT. Kaltim Fertilizer for a period of 1 year period, 2012-2013.





Active Charcoal Coated Urea and Zeolite

Inventor : Asep Nugraha Ardiwinata, Eman Sulaeman, and Joby Marany
Indonesian Agricultural Environment Research Institute

IPR Protection Status: P 00201000709



The active charcoal coated urea and zeolite is formulated from three main ingredients, namely urea, activated charcoal and zeolite. It is enriched with beneficial microbes such as *Citrobacter sp*, *Sphareotillus natans*, *Bacillus sp*, *Azotobacter sp*, and *Aspergillus sp*. This fertilizer formula can bind contaminants organochlorine pesticide residue, accelerate the degradation of pesticides, urea efficiency increased by 35%, and a slow release urea.

This technology could be an alternative for farmers in obtaining slow release urea while reducing environmental pollution. This environmentally friendly fertilizer can be developed commercially. The formula has been licensed by Indonesia with PT Agro Nutrimas with the agreement for 10 years, from 2012 to 2022.



Super Jerandi Compound Fertilizer

Inventor : Enggis Tuherkih, Djoko Santoso, Joko Purnomo, and Koko Kusuma
Indonesian Soil Research Institute

The Super Jerandi is a compound fertilizer containing N, P, K, Ca, Mg and S nutrient for citrus crops. Fertilizer is formulated based on the crops need specifically the nutrients balance of the soil.

Super Jerandi is available in the granules which facilitate the easy application and high efficiency of fertilizer use.

This compound fertilizer can be an alternative choice for, especially citrus growers. This compound fertilizer has a potential market for fruit production.





Super Active Decomposer

Inventor : Rasti Saraswati and Ratih Dwi Astuti
Indonesian Soil Research Institute



A Super Active Decomposer is formulated from *Trichoderma* sp., *Aspergillus* sp., and *Trametes* (mixed microbial decomposer).

This formula is a breakthrough in accelerating the composting time. By using this formula, organic materials can be composted in 3 days. Growth hormone substances is produced, and the spread of soil pathogens is inhibited.



This Super Active Decomposer can shorten the time for land preparation. Therefore it increases cropping intensity.



PUGAM : Peat Fertilizer

Inventor : Made Subiksa, Joko Purnomo, Husen Suganda, and Agus Sudaryanto
Indonesian Soil Research Institute

Pugam formulated from raw steel slag, urea, natural phosphate, and potash fertilizers that are commonly used in peatlands. PUGAM is a granular in type and relatively slow release fertilizer.

PUGAM is able to reduce emissions of greenhouse gases, reduce extensive use of fertilizers, and improve soil productivity. This fertilizer has a long residual effect so as to stabilize the peat soil productivity.

Pugam is an alternative of choice for farmers to obtain efficient fertilize that is environmentally friendly. This fertilizer has been licensed by PT. Polowijo Gosai for a period of 5 years, from 2012 to 2017.



Landtonic : Liquid Organic Fertilizer



Inventor : Mathens Sariubang and Repelita Kallo
South Sulawesi Assessment Institute for Agricultural Technology

The Landtonic fertilizer is mixture of manure and urine of cow with a ratio of 1:1. Once it is processed in a biogas digester, the slurry is filtered, than it mixed with MOL (Local Organic Micro) with a ratio of 1 liter MOL to 800 liters of cow urine. Once fermented for 1 week, then aerated for 3-6 hours to remove ammonia gas. Once the aeration process is completed, POC is packed in jerry cans. To produce solid organic fertilizer, solid waste enriched with CaO was fermented using a ratio of 2.5 liters MOL for 1 ton of solid waste.



Landtonic can increase rice productivity by 25% and reduce costs for fertilizer application by 75% fertilization. With applications of Landtonic yield of rice that can be attained was 8.7 ton/ha. A Gapoktan (consortium of farmer groups, at sub-district level) in South Sulawesi has successfully produced liquid and solid organic fertilizer.



POG : Granule Organic Fertilizer

Inventor : Husnain, Rosmini, Ibrahim Adami, Adha Siregar, and Sri Rochayati
Indonesian Soil Research Institute

Granule organic fertilizer is made from local raw materials of high quality. The nutrient content is complete and the release of nutrients is well controlled. The use of organic fertilizer granules can improve the physical, chemical and biological properties of soil, increase plant growth and productivity. This product is environmentally friendly and easy to apply on wet land and upland. It also can be applied in pot with a mixed media for ornamental plants and horticulture crops.

Spesification:

Shape	: Granule
Color	: Brownish black
C-organik content	: >20 %
Nutrient	: N (1-3%), P ₂ O ₅ (2,50 g/100g), K (1,32 g/100g), Ca (2,00 -2,50 gram/100g), Mg (0,20 - 0,35 g/100 g) and micro nutrient Cu, Mn, Fe and Zn
Water content	: 15%
Aroma	: Odorless
Recommended Rate	: 1-2 ton/ha
<i>Salmonella sp</i> and <i>E. coli</i>	: Negative



POCr: Prill Organic Fertilizer

Inventor : Husein, Rosmimi, Ibrahim Adami, Adha Siregar, and Sri Rochayati
Indonesian Soil Research Institute



POCr contains natural ingredients of selected quality. Based on field verification test, POCr can improve the physical, chemical and biological properties of soil. It can also accelerate the availability of nutrients supply that effectively increase crop productivity. The use of POCr can save the use of inorganic fertilizer up to 25%. The fertilizer is environmentally friendly, and suitable for use on dry land.

Specification:

Shape	: Prill
Color	: Brownish black
C-organik content	: >20 %
Nutrient	: N (1-3%), P ₂ O ₅ (2,50 g/100g), K (1,32 g/100g), Ca (2,00 -2,50 gram/100g), Mg (0,20 - 0,35 g/100 g) and micro nutrient Cu, Mn, Fe and Zn
Water content	: 15%
Aroma	: Odorless
Recommended Rate	: 1.5-2,0 ton/ha
<i>Salmonella</i> sp and <i>E. coli</i>	: Negative



NPK Slow Release Fertilizer

Inventor : Husnain, Rosninni, Ibrahim Adami, Adha Siregar, and Sri Rochayati
Indonesian Soil Research Institute

Nutrients from the granule NPK fertilizer (12-10-10) are not readily available. The nutrient is released slowly and it takes time so more nutrients can be absorbed by the plants. This process can reduce the fertilizer lost and the nutrient does not pollute the environment.

Result of field test show the effectiveness of Slow Release NPK (20-10-10) fertilizer match of that compound fertilizers. The main advantages of Slow Release Fertilizer NPK are to increase rice productivity and grain quality, easy to apply fertilizer in the field, and save cost for labor.



Silica fertilizer



Inventor : Hushain, Rosmimi, Ibrahim Adami, Adha Siregar, and Sri Rochayati
Indonesian Soil Research Institute

A granule silica fertilizer is good for rice, sugar cane, and other crops that require significant amount of Si. The shape of silica fertilizer is granule, grey in color, with silica content (SiO_2) of 25%. Although silica is not considered as macro nutrient, however, its role to support plant growth is no doubt. Field test showed that silica fertilizer can affect plant growth as shown by the firm stems, and increase plant resistance to pests and diseases. Under a degraded wetland, all rice straws are retained in the rice field. The silica content in soil increased of about 1 ton per hectare.



Agrimeth Bio-Fertilizer



Inventor : Ery Pratiwi, Selly Salma, Ratih D. Hastuti, and Jati Purwan
Indonesian Soil Research Institute

The Agrimeth is a bio-fertilizer contains nitrogen-fixing symbiotic, non-symbiotic, solvent-P, and phytohormones bacteria.

Agrimeth fertilizer can be stored for 6 months at a temperature lower than the average of room temperature.

Agrimeth bio-fertilizer is good for rice, soybean, and chili that are grown in acid and non-acid soil.

The application of this bio-fertilizer can increase yield of soybean, rice, and chili, Economical analysis indicated that the increase of productivity of those crops subsequently increase farmers' income.





Zeonano 1: Slow Released Nitrogen Fertilizer

Inventor : M. Al-Jabri, Diah Setyormi,
and Wiwik Hartatik
Indonesian Soil Research Institute

IPR Protection Status : Patent No. P00201100472



Zeonano 1 is a zeolite added urea prill, enriched with P, S, Cu, Zn, B, and organic fertilizer.

The advantage of this fertilizer is the ability to improve the N fertilizer efficiency, slow release the N nutrient, trap the heavy metals, and buffer the soil pH.

Zeonano 1 is useful to restore the productivity of contaminated and degraded land.





Bio-Lec

Inventor : Yusmani Prayogo
Indonesian Legume and Tuber Crops Research Institute

IPR Protection Status :
Patent P 002010163

The Conidia of *Lecanicillium lecanii*, an entomopathogenic fungi, is the main active agent of Bio-Lec. This bio-insecticide is produced by using cassava flour or sweet potato flour as a carrier. The conidia is diluted in 300-500 liters water per hectare per application. Bio-Lec can be stored for 18 months. A spreader-sticker is added to the diluted conidia in order to increase the effectiveness of Bio-Lec.

Bio-Lec is a target specific insecticide because it is ovisidal and is effective to control the egg of *Riptortus linearis*. Bio-Lec is effective to control the nymphs and adults of sucking pests of soybean pods.

Bio-Lec is environmentally friendly, safe use for some types of insect predators such as spiders (*Oxyopes javanus* Thorell), *Oxyopidae spp*, and *Coccinella spp*. The application of Bio-Lec does not cause a resistance to the target pests.





Bio-nematicide

Inventor : Rita Harni
Indonesian Industrial and Beverage Crops Research Institute

IPR Protection Status :
P00201100473

The formula of this bio-nematicide contains endophytic bacterium *Achromobacter xylosoxidans*. The formula is enriched with molasses and peptone. This endophytic bacterium can improve plant growth, nutrient availability, produce hormones, and induce plant resistance. This endophytic bacterium will multiply in plant tissue. Therefore it is advisable to apply once during the crop season.

Bionematicide will benefit farmers to improve plant resistance to pests. Subsequently increases crop productivity.





HaNPV Biopesticides

Inventor : Ir. IG.A.A. Indrayani, MP
Indonesian Sweetener and Fiber Crops
Research Institute

IPR Protection Status :
P00201000062

HaNPV is abbreviated from *Helicoverpa armigera* Nuclear Polyhedrosis Virus. This NPV is a naturally occurring virus that infects and kills larvae of the target pest. This virus is very host specific. It does not infect beneficial insects, fish, wildlife, livestock or human. HaNPV Bio-pesticides contains virus that kill larvae of *Helicoverpa armigera* caterpillars. The formula of biopesticide is enriched with kaolin, talc, and molasses as feed stimulant and adhesives. HaNPV is also effective to control boll weevils of cotton, leaf-eating insect and other pests of tobacco.



Another advantage of this biopesticide is a good agent to control *Spodoptera litura*. Through a contamination, HaNPV is transmitted to the insect eggs. Application of HaNPV biopesticide can reduce a cost which is initially spent for chemical pesticide. This technology is an alternative of choice for farmers to control pests of cotton and tobacco.



SLNPV Biopesticide

Inventor : Bedjo
Indonesian Legume and Tuber Crops Research Institute

IPR Protection Status :
Patent P00201000063



SLNPV is abbreviated from *Spodoptera litura* Nuclear Polyhedrosis Virus. SLNPV contains a naturally occurring virus that infect soybean armyworm (*Spodoptera litura*).

Among other advantages as an alternative pest control, SLNPV does not cause an adverse impact to the environment and human health. The virus can easily be propagated in vivo in the laboratory. This formula is cheap and compatible with other control measures. SLNPV should be practiced in the field in accordance with the principles of IPM. The virulence level of this biopesticides reaches 100%.



Prima BAPF

Inventor : Hamdin, M. Machmud,
Budi Tjahjono, Budi Marwoto, and Karden Mulya
Indonesian Ornamental Plants Research Institute

IPR Protection Status :

Patent number for emulsion formula : P00200600769

Patent number for suspension formula : P00200300457

Bio-PF, Bio-GL, and Prima BAPF biological pesticides are instrumental to control soil borne diseases of horticultural crops.

Bio-PF is biological pesticide contains bacterium *Pseudomonas fluorescens* and effectively control the diseases caused by fungus. Bio-GL is a liquid containing *Gliocladium spp.* and is able to control soil borne disease caused by *Phomopsis sclerotioidea*

Prima BAPF is a liquid bio-pesticide contains *Bacillus sp.* and *Pseudomonas fluorescens*, and effective to control swollen roots, damping-off, Fusarium wilt, bacterial wilt, Rhizoctonia rot disease. Prima BAPF has already been developed and now is licensed to PT. Mainstay Primasid Utama. Jakarta.

Gliostar



Inventor : Eliza, Demi Emilda, I Djatnika, and Catur Hermanto
Indonesian Tropical Fruits Research Institute

IPR Protection Status : Paten P00200800840

Gliostar bio-fungicida contains fungus *Gliricladium* sp. and can control diseases of horticultural crops. This bio-fungicide can survive in the plant 3 months after application. The stability of this product in the field can be maintained by application of organic manures.

Fungus *Gliricladium* sp. can be propagated in a steril media, then stored it in a sterilized storage in order to obtain a population density of spore as much as 10^6 - 10^8 spores per gram. The advantages of this product are environmentally friendly, low cost, and easy to obtain raw materials for propagation media. This biofungicide can control *Fusarium oxysporum* f. sp. *cubense* (Foc), a soil borne fungal pathogens of banana by 70%.



Trichoderma Biopesticide

Inventor : Sri Hardaningsih

Indonesian Legume and Tuber Crops Research Institute

IPR Protection Status : Patent P11201/000162

Trichoderma spp. is a saprophytic soil fungus and antagonistic to many soil born pathogens. The fungus survived in the soil by exploiting a variety of organic compounds as a source of carbon and nitrogen.

As a biopesticides, *Trichoderma spp.* can control soil borne diseases. It is environmentally safe. The fungus is also able to inhibit the growth of *Colletotrichum sp.*, the causal agent of dieback disease on cassava plants. *Trichoderma spp.* suppress the development of fungal pathogens of soybean, peanut, and green beans.

The capsulated fungus *Trichoderma spp.* withstands ultraviolet light. The product is easy to apply to the field.





Bevarian 10 WP Biopesticide

Inventor : Bachaki
Indonesian Center For Rice Research

IPR Protection Status : Paten P00201000048

Brown planthoppers (BPH) and whiteback leafhoppers are destructive pests affecting the supply of national rice production. Both pests can be controlled using resistant varieties and application of insecticides. However, in the case of BPH, after several year of pest infestation, a resistant variety can be overcome by the present of new BPH biotype. If insecticide become a second choice, it is necessary to select insecticide which is environmentally friendly.

Bevarian 10 WP is a dry formula of entomo-pathogenic *Beauveria bassiana* that is known effective to control brown planthopper up 80% and white back planthopper up to 97%. The product can be stored at room temperature up to 7 months.





Metarian 10 WP Biopesticide

Inventor : Bachaki
Indonesian Center For Rice Research

IPR Protection Status :
Patent P00201000049



Organic farming requires that the crops must not be treated with agrochemical fertilizers and pesticides. The crops should be grown naturally. The use of environmentally friendly biopesticide should guarantee the agriculture products are safe and healthy. On the other hand it reduces damage to ecosystems.

One of the breakthroughs in controlling rice brown planthopper is the use dry formula of *Metarhizium anisopliae* (MA Formula). Metarian 10 WP is effective to control brown plant hopper up to 90%. MA formulas can be stored at room temperature for 7 months.

The biopesticide is potential to be developed commercially to control brown plant hopper, a major pest of rice crop.



Bioinsecticide for Maize

Inventor : A. Teniraweia
Indonesian Cereal Research Institute

IPR Protection Status :
Patent P00201000126



HaNPV bioinsecticide contains a virus isolated from pest *Helicoverpa armigera*, a borer of maize cobs.

HaNPV is transmitted through a contamination of food or by means of transovarial passage. The virus infected the female. The virus transmitted eggs will be infertile. This bioinsecticide is target specific. It is safe for other insects. The virus can persist in the soil and plant surfaces. It does not give rise a residual effect in nature.

The application of HaNPV can be integrated with other control measures.

Serratia Bio-insecticide



Inventor : Jelfina Alouw, Meldy Hosang, and Diana Novianti
Indonesian Palm Crops Research Institute

Serratia bioinsecticide contains bacteria *Serratia* spp. The bacteria can control *Brontispa longissima* (Coleoptera : Chrysomelidae), borer of young coconut leaves.

In its application in the field, Serratia bio-insecticide can be combined with *Tetraneura brontispae*, a parasitoid of coconut leaves borer.

This bioinsectides will benefit coconut growers and other palms. The mass production of Serratia bioinsectide will make the product available in market and help coconut growers in controlling the leaf borer.





Biofungisida for Maize Stem Rot Disease

Inventor : A. Haris Talanca
Indonesian Cereal Research Institute

IPR Protection Status :
Patent P30201000125



Corn stalk rot disease is controlled generally by using chemical fungicides that adversely affect the environment. One of the breakthroughs to control this disease is to use an antagonistic microorganism, such as fungi *Tricoderma viridae*.

Propagation of *T. viridae* as the active agent was performed on PDA medium and then inoculated on corn kernels. Infected corn kernels dried for 24 hours, then blended, sieved, and packed. One gram of this medissifter contain conidial fungus *T. viridae* as much as 9.6×10^3 - 9.6×10^4 . Advantage of this product is safe for the environment.

Bio-CAS

Inventor : Suprio Guntoro
Bali Assessment Institute for Agricultural Technology

IPR Protection Status :
Patent P00200500735



Bio-CAS is a probiotic feed supplement contains multiple microbes that could help increase digestive ability and efficiency of large and small ruminants. The storage time for Bio-CAS is long enough of about 6-7 months at room temperature.

The beauty of Bio-CAS are accelerated animal growth, increased fertility, increased appetite and health, as well as reduce odor of the manure. The application of Bio-CAS into the animal diet is easy. The Bio-CAS has been awarded a winner of the Ministry of Research and Technology Patent Competition in 2005.

Bio-CAS has been widely adopted by cattle and goat ranchers in Bali and East Java because it can compete with factory-made probiotics.



Bio-PF

Inventor : Djatnika, Wakjah Nuryani, Evi Silvi, and Hanudin
Indonesian Ornamental Plants Research Institute



BIO-PF is a biofungicide contains bacteria *Pseudomonas flourescens* and can control fungal diseases such as leaf spot and damping-off caused by *Fusarium sp.*, *Phyitium sp.*, *Verticillium alboatrum*, *Alternaria spp.*, and *Rhizoctonia solani*. This biofungicide can be used for vegetables, fruit, food, and estate crops.

The application of this biofungisida does not leave toxic residues, unlike the application of agrochemical fungicides.





Ratel : Fumigant for Rat

Inventor : Syaiful Asikin and Muhammad Thamrin
Indonesian Swampland Agricultural Research Institute

IPR Protection Status :
P00201100314



Ratel fumigant is a tool which was developed to fumigate rats that attack rice and other crops, while the rats were in their nests. The tool is composed of a tube with a length of 12 cm and a diameter of 1.5 cm. One end of this tube is equipped with a fuse to burn the herb. This herb serves as materials when it is burnt will produce toxic smoke.

The other end of a tube is sealed. Ratel is able to suppress populations of rats up to 90% of the number of active nests, or 1.5 times more effective than the smoke blower.



Burning dry herb materials in rat nets will cause flame then followed by white smoke which is poisonous for rats that reside in a burrow.

This technology is needed by farmers to eradicate rats in the wetland area.

EXI Pheromone



Inventor : I Made Samudra, Harioto, Dodin Koswaminudin, Rafika, and Budihardjo Soegiarto
Indonesian Center for Agricultural Biotechnology and Genetic Resources Research
and Development

IPR Protection Status : Patent P00201000047

Shallot caterpillar (*Spodoptera exigua* Hbn.) is a major pest of shallot. Control of shallot maggot in shallot production centers is generally done by spraying it with insecticides.

Exi Pheromones is environmentally safe agricultural materials to control caterpillar pests of shallots. The pheromone is mounted on the trap.

Exi Pheromones contains chemical compounds used to help the male moth to communicate with the female one of the same species. The synthetic compounds of pheromone can lure the male to approach the female insects. The synthetic sex pheromone could be used to control caterpillar pests shallots and also able to capture male insects with an average of 400-500 insects per night per trap.

The formula of this sex pheromone licensed to CV Nusagri for a period of 5-year, from 2011 to 2016.



Ostri Pheromone

Ostri Pheromone is a biopesticide of synthetic compound functions as sex pheromone to attract adult males. The attractiveness of male insect to this synthetic sex pheromone is much stronger than that of pheromone originated from a virgin female insect. This synthetic compound placed in a trap is good as a decoy for male insect. Ostri pheromones can also be used as a monitoring tool and also to suppress populations of corn borer *Ostrinia furnacalis*. Chemical of Ostri Pheromone remains active for 2-3 months.

Ostri pheromone adds to the currently available control measures for *O. furnacalis*, the corn borer.



Inventor : I Made Samudra, Harnoto,
Doon Koswanudin, and Rafika
Indonesian Center for Agricultural
Biotechnology and Genetic Resources
Research and Development

IPR Protection Status :
Brand D002009017208





PBPK Pheromone

Inventor : I Made Samudera, Harnoto,
Dodin Koswatinidin, and Rafika Yuniawati
Indonesian Center for Agricultural Biotechnology
and Genetic Resources Research and Development

PBPK Pheromone is useful to cope with rice pest *Scirpophaga incertulas*, the yellow rice stem borer. The pest infested young seedling in the nursery until the rice plant is planted. The active chemical compounds of these pheromones are Z-11 and Z-9-heksadecenal, a sex attractant for adult yellow rice stem borer. PBPK pheromone can be used as bait in a trap provided with water, and as a mean for monitoring and controlling the insect pests. The trap having pheromone inside was installed in the rice field starting at planting time, 12-18 traps per hectare.

PBPK Pheromone is effective in reducing pest populations, environmentally safe, non-toxic, and target specific as it does not kill other pests and natural enemies. The technique is practical and easy to handle. The insect populations of yellow rice stem borer decline with the application of PBPK Pheromone.



Grayak Pheromone

Inventor : I Made Samudera, Harnoto,
Dodin Koswamudin, and Rafika Yuniwati

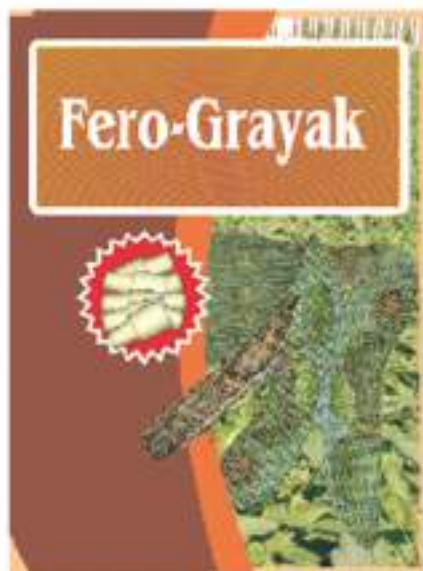
Indonesian Center for Agricultural
Biotechnology and Genetic Resources
Research and Development



Armyworm, *Spodoptera litura* F. (Lepidoptera, Noctuidae) is one of the important pests of legumes.

This pest is not a host specific. In addition to soybean, armyworm also infested many crops such as green beans, onions, taro, and spinach, causing leaf become perforated, cut, and even be consumed by the larvae resulting in a lower crops productivity.

Control of armyworms is still relying on insecticides application. Development of Grayak Pheromone provides an alternative to control armyworms. Male insects of army worm trapped by means of Grayak Pheromone application will inhibit subsequent marriage resulting in a decrease of army worm population.



Metarhizium Bioinsecticide

Inventor : Jelfina C. Alouw
Indonesian Palm Crops Research Institute

IPR Protection Status : P00201100118

The main component of this bioinsecticide is a fungus *Metarhizium anisopliae* var. *anisopliae* isolated from insects *Brontispa longissima* (Gestro).

The coconut leaf beetle (*B. longissima*) is one of the most damaging pests of coconut and other palms. The larvae and adults of the beetle feed on the soft tissues of the youngest leaf in the throat of the palm. Affected leaves dry up, resulting in stunting of the palm and reduced nut production.



Protease and destruxin enzymes are produced by the fungus, penetrate cuticle the of leaf beetle and these chemical compounds become toxic to the insect. The fungus multiplies in the body of the insect and the conidia produced infect healthy insects.

The application of this technology can support the stability of coconut oil production and at the same time increase natural biodiversity.

Repellent for Citrus Fruit Borer

Inventor : Mizi Istanto and Muryati
Indonesian Tropical Fruits
Research Institute

IPR Protection Status :
Patent P00200800841



Repellent for citrus fruit borer consists of citronella essential oil and liquid paraffin as a carrier. Essential oil is obtained by taking the leaves and extracted using a steam distillation method. Liquid paraffin is used as an evaporation retardant for citronella essential oil. The essential oil can last for about 1 week.

The paraffin liquid is neutral because it does not affect and change the scent of citronella so that the potential of the material is not reduced. With neutral and physical characteristics of the liquid which is somewhat viscous, paraffin is a good choice to be the carrier in the formulation of an essential oils product.

The repellent is dripped on cotton which is located in a glass of mineral water with a hole on the left and right side. The aroma that comes from essential oils of citronella reject fruit borer for coming to the citrus crops.



Gliocompost

Inventor : Wakiah Nuryani
Indonesian Ornamental Plants Research Institute

IPR Protection Status : P00201000050

The active component of Gliocompost is a biopesticide *Gliocladium sp.*, available in the flour form with blackish brown in color.

Gliocompost is useful to control soil borne pathogens such as *Fusarium spp.*, *Pythium sp.* (damping-off), *Ganoderma boninense* and *Ralstonia solanaceum* (bacterial wilt) on various horticultural crops. This is an eco-friendly biopesticide because it only produces toxins (gliotoxin) against plant pathogens.

The application of gliocompost can be an alternative practice for horticultural crops farmers in controlling diseases caused by soil borne pathogens. This technology has been licensed to PT. Berdikari (Persero) for a period of 5-year from 2012-2017.





M - RIF : Biological Control Agent

Inventor : Budi Kariwa, and Setyono Hari Adi
Indonesian Tropical Fruits Research Institute



M-RIF is a natural control agent containing organic matter of rice straw and husk fuel, urea, agricultural lime, NPK, the remains of fish, $ZnSO_4$ and $CuSO_4$. It can be applied alone or together with other biological control agents. In practice, 1-2% M-RIF is applied into the soil in the planting hole.

M-RIF is able to control *Fusarium sp.*, a causal agent of wilt disease in banana plants. The raw material used in a process to produce M-RIF is easily found in banana production centers. The M-RF biological control agent is as good as that of mixture S-H from Taiwan.

MLP : Traping the Coconut Sexava

Inventor : Meldy L.A. Hosang
Indonesian Palm Crops Research Institute

IPR Protection Status : S00201100032



Sexava known as grasshopper is a notorious pest that seriously damage coconut palm. The pest eats coconut leaves causing leaf defoliation. Sexava also eats inflorescences and the young fruit resulting in immature nutfall and the coconut palm tree is no longer able to support the crops. Efforts have been made to identify several alternatives of control measures to manage the Sexava pest.

Researchers of the Indonesian Palmae Crops Research Institute succeeded in developing a tool to trap Sexava pest. This tool was designed based on the behavior of Sexava spp. that was active during night time and moved from one place to other by walking on coconut stem. This tool consists of insect traps and glue, with a function to capture nymph of Sexava sp. The eggs hatch in the soil and imago climb to the palmae trees in search of palm leaves for food. These traps can also catch a nymph and imago of Sexava that move from one palm tree to another tree. The use of this trap is able to reduce plant leaves damage cause by Sexava.



These traps seem to be more effective to catch nymphs than adults. This technology could potentially be used together with other biological control and crop managements. The technology is cheap and easy to handle by farmers.



Peskabel

Inventor : Subiyakto, Nur Asbani, Tukimin, Dwi A. Sunarto,
Andi M. Amir, and Deciyanto Soetopo
Indonesian Sweetener and Fiber Crops Research Institute

IPR Protection Status : Patent P00200800393

Peskabel is an acaricide and act as fungicide as well. It contains potassium polysulfide. In a solution, the color of Peskabel is golden yellow. The Peskabel pesticides is packaged in a pint-sized plastic bottles and can be capped for more than one year. A recommended dose is 1-2 ml /1 liter. Besides it is effective to control mites, Peskabel could be an option for farmers to control powdery mildew fungus, rust disease, rotten fruit, and leaf spot of several crops such as apple, citrus, and jatropha.

This pesticide is relatively inexpensive and environmentally safe. It does not cause phytotoxicity to the plants and does not leave chemical residues.

It is advisable to apply this pesticide in an integration with other control measures.



CEKAM : Botanical Pesticides

Inventor : Supriadi
Indonesian Spice and Medicinal Crops
Research Institute

IPR Protection Status : Patent P002010000-L5



Indonesia is wealthy with essential oils served as source of plant-based pesticides.

Spices and medicinal plants, such as cloves and cinnamon leaf, can be extracted as botanical pesticides. The composition of CEKAM botanical pesticide consists of essential oils of clove and citronella, and emulsifiers to make these oils mixed easily with water. This pesticide is a contact poison as well as a fumigant against bacteria, fungi, and mosquito larvae.

To control *Ralstonia solanacearum* of ginger plant, the plant is sprayed with a solution of 2-6% CEKAM around the ginger plant. This botanical pesticide is also effective to control leaf spot diseases and insect borers.

CEES : Botanical Pesticide

Inventor : Supriadi
Indonesian Spice and Medicinal Crops
Research Institute

IPR Protection Status : Patent P00201000016



The CEES is a botanical pesticide made from clove and citronella oil which serves as an anti-bacterial and anti-fungal plant diseases and anti-termite. Some bacterial and fungal diseases that can be controlled with this botanical pesticide are *Ralstonia solanacearum* causing bacterial wilt, *Erwinia* sp. causing soft rot, and fungus *Phyllosticta* sp. causing leaf spot. CEES can also control termite (*Cryptotermes cyanocephalus*) that damage dry wood and a life plant.

The advantage of CEES pesticide is having no adverse impact on human health and environment. It does not cause the target disease or pest become resistant. With this existing composition, CEES has a multi purpose pesticides, namely as an anti-bacterial and anti-fungal plant diseases and anti-termite.



OrgaNeem: Organic Pesticides

Inventor : Subiyakto and Dwi Adi Sunarto
Indonesian Sweetener and Fiber Crops
Research Institute

IPR Protection Status: Paten P00200600708

OrgaNeem is a botanical pesticide containing neem seed extract (*Azadirachta indica*, A. juss). The azarachtin's concentration of 0.8% to 1.4%. The manufacturing is specific without cooling process.

OrgaNeem is easily soluble in water and can be stored up to 12 months. This organic pesticide is effective to control insect pests that are resistant to chemical insecticides. The mechanism of OrgaNeem is to damage the egg development, kill larvae and pupae, inhibits molting, disrupt the insects communications, inhibit reproduction of female insects, and repel the insects.

OrgaNeem is suitable for use in organic farming. OrgaNeem can be applied in several crops such as soybean, vegetables, tobacco, citrus, and cotton.





Tarasida-Kr

Inventor : Muhammad Thamrin
Indonesian Swampland Agricultural
Research Institute

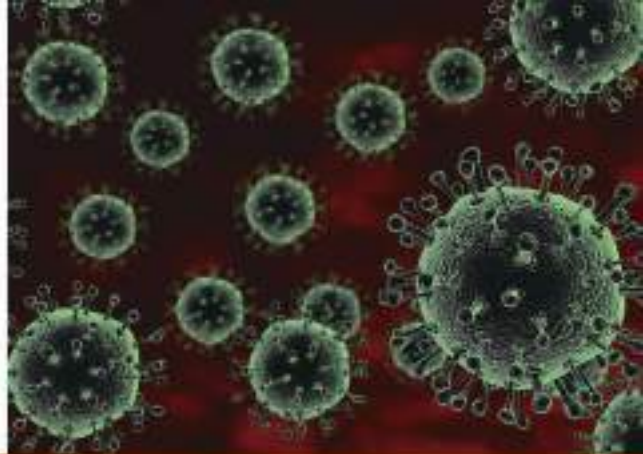
IPR Protection Status: P00201100474



Tarasida-Kr is a botanical insecticide made from leaves and stems of *Chromolaena odorata* using ethanol as a solvent. This botanical insecticide is effective to control armyworms (*Spodoptera litura*) and plutella (*Plutella xylostella*).

It is environmentally safe and is target specific. Tarasida-Kr is a potential botanical insecticide and is suitable for use in organic farming.

Avian Influenza Virus Antigen



Inventor : Moh Indro Cahyono and N.L.P. Indi Dhamayanti,
Indonesian Research Center for Veterinary Science

Antigen is available in freeze-dried form for serological diagnostic avian influenza (AI). This antigen is able to survive for more than 2 years in a freeze dried form, whereas after diluted using PBS buffer it survived for 14 days at 4° C. One capsule of antigen can be used for more than 100 tests. This technology can help poultry farmers in overcoming a disease.





Azadirachtin - Botanical Insecticide

Inventor : Sri Wahyuni Indhati
Indonesian Legume and Tuber Crops Research Institute

Azadirachtin is a botanical insecticide obtained from neem leaves and seeds that grow well in upland. Besides being as insecticide, Azadirachtin can also act as fungicide, nematocide, bactericide, and acaricide.

The process of making this botanical insecticide is simple. The neem leaves and seeds were mashed, soaked and dissolved in water, filtered and ready for application. Neem seed extract is effective to suppress red mite infestation on cassava.

The application of this plant-based insecticide can be integrated with other control measures such as resistant varieties, biological agents, and chemical insecticides.

Botanical insecticide Azadirachtin is prospective to be developed, provided that the leaves and neem seeds are available in a large quantity.



Pseudomonas fluorescens Biopesticides

Inventor : Mudji Rahayu and Tantawizal
Indonesian Legume and Tuber Crops Research Institute

Pseudomonas fluorescens biopesticide is effective to inhibit the infection of plant pathogen. This bacterium grows naturally in the soil around the plant roots. The application of this biopesticide can suppress the development of *S. rolfsii*, soft rot disease of soybean.

The formula of *P. fluorescens* is good for seed treatment. It is dissolved in water and mixed with the seed, or is sprayed on the base of soybean stem.

P. fluorescens biopesticides is complementary to other integrated pest management components. Large-scale development of this biopesticide is expected to have an impact in increasing productivity of soybean.



Ceka: Botanical Fungicide



Inventor : Sumartini
Indonesian Legume and Tuber Crops Research Institute

Ceka is made from a distillation of clove leaf. It is effective to control rust disease of soybean caused by fungus *Phakopsora pachyrhizi*, and also quite effective to control rust disease of peanut and green beans. It reduces yield loss caused by pathogens.

This botanical fungicide does not have a negative effect on environment. The application of Ceka to control soybean diseases is compatible with other control methods. The formula can be stored at a room temperature up to 2 years.





Zingeron: Botanical Insecticide

Inventor : Sri Wahyuni Indriati
Indonesian Legume and Tuber Crops
Research Institute

Zingeron ketone compound present in *Zingiber officinale* rhizome is toxic against insect pests. To obtain this insecticidal agent, the rhizomes were mashed, dissolved in water, filtered and the formula was ready for use by farmers. This plant-based insecticide can be combined with other botanical insecticides and synthetic chemical insecticides.

A recommended concentration is 20 g Zingeron/liter of water. It can suppress population of pest thrips of green beans and is comparable to synthetic insecticide such as that of 2 ml fipronil / liter of water. Zingeron does not pollute environment. Zingeron can act as repellent for many insect pests.



Repel 1 Botanical Insecticide

Inventor : Mizi Istianto and Muryati
Indonesian Tropical Fruits Research Institute

Repel-1 is a liquid botanical insecticide which contains essential oil of citronella. This is an insecticidal agent for citrus fruit borer, aphids, whiteflies, thrips causes mottled skin of mangos teen, and *Diaphorina citri* a vector of CPVD.

Repel-1 botanical insecticide is effective to control some major pests, safe for consumers and the environment, and easy to apply.

Because of abundant local raw materials, the price of Repel 1 is cheap. Repel-1 is an insect repellent, an eating inhibitor for insects, and insect killer through a skin irritation process. The recommended dose is 2 ml/l of water.





Metabron

Inventor : Meldy Hosang and Jellina C. Alonw
Indonesian Palm Crops Research Institute

Metabron is abbreviated from **Metarhizium** and **Brontispa**. Metabron contains *Metarhizium anisopliae* which was isolated from *Brontispa longissima*, main pest of coconut. The active agent is enriched with extract of coconut oil and palm oil served as protection for the active agent from ultra violet. Bioinsecticide Metabron is available in a powder or liquid form. It is effective to control *B. longissima*. *Brontispa* pests can cause serious damage to both immature and mature coconut plants.

Metabron is a selective bioinsecticide against target pests, easy to reproduce, does not leave any residue, environmentally friendly, safe for human health. The price of Metabron is competitive.

Metabron is applied by spraying the unopened leaf midrib, a place for the larval imago of *Brontispa* to develop. The applications is done twice a year with an intervals of 2 weeks after the first application.



Latricid

Inventor : Mutia Erti Dwiastuti, Yumimar, Sri Widyaningsih,
Susi Wuryantini, and Otto Endarto
Indonesian Citrus and Subtropical Fruits Research Institute

Latricid is a biological pesticide developed to control *Diaphorina citri*, insect vector of CPVD disease. The citrus psyllid, *D. citri*, is a sap-sucking, hemipteran bug in the family of Psyllidae. It is an important pest of citrus, as it is one of the only two vectors of the serious citrus greening disease (CPVD). It is widely distributed in South and Southeast Asia.

The active agent of Latricid is entomopathogenic fungus *Hirsutiella citriformis*, attacking adult *D. citri* in a managed citrus grove. To be easily applied in the field, this biopesticide is formulated in three forms, namely suspension, extract, and flour. Latricid can also parasitizing brown citrus aphid (*Toxoptera citricida*). The aphid colonizes young leaves, stems, blossoms, and growing points of host. The primary hosts of *T. citricida* are citrus and citrus relatives.

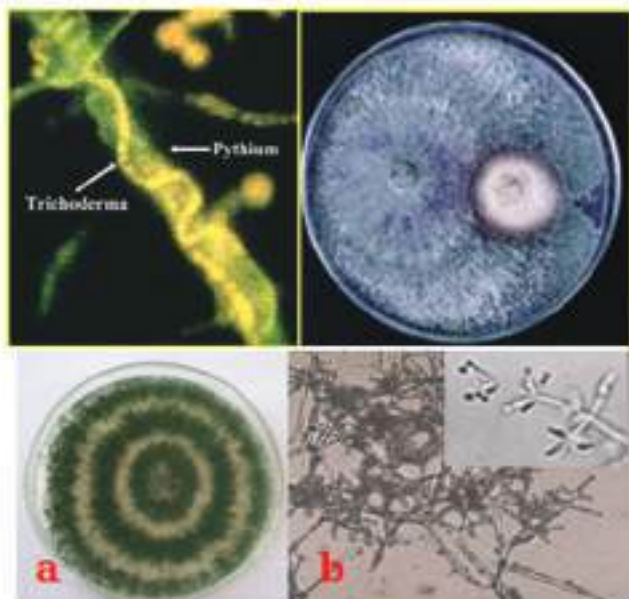


Latricid can be mixed with selective fungicides and applied to the citrus plant in spot during the growth of budding. Application is done twice a day, in the morning and afternoon. The effectiveness of Latricid to control *D. citri* has been demonstrated in the citrus production area in West Kalimantan and Probolinggo.



Trichocompos

Inventor : Eli Korlma and Diding Rachmawati
East Java Assessment Institute for Agricultural Technology



Trichocompos is enriched with fungus *Trichoderma* sp. *Trichoderma* is widely known as a biological agent that is easily isolated from soil and organic matter. The fungus grows rapidly in artificial medium.

The advantages of Trichocompos are safe, inexpensive, environmentally friendly, easy to develop, are parasitic to other fungi, but not for animals or humans. *Trichoderma* sp. can also as decomposers. Trichocompos has been circulated among farmer groups in several areas in East Java, especially groups of farmers participating in Field School of Integrated Crop Management. Trichocompos is potentially accepted by farmers and developed in a wider scale.



Biorama

Inventor : Djatnika and Wakiah Nuryani
Indonesian Ornamental Plants Research Institute

Aphids *Macrosiphoniella sanborni* is one of the important pests that cause serious losses to chrysanthemum flower. To control this pest, ordinary farmers use synthetic chemical pesticide. *Beauveria bassiana* is a fungus and it can acts as a biological control agent of many important pests.

Biorama application proved to be effective in controlling thrips main pest of chrysanthemum plants and aphids *M. sanborni*. The effectiveness of this bioinsecticide was comparable to the natural BVR and *Beauveria* suspension.

This bioinsecticide has a good potential to be developed as an eco-friendly bio-pesticide.



Tricompost

Inventor: Djanika, Wakiyah Nuryani,
Evi Silvi, and Hamudin
Indonesian Ornamental Plants
Research Institute

Tricompost is a biopesticide with active agent fungus *Trichoderma harzianum*. This biopesticide is effective to control soil borne pathogens, such as *Fusarium sp.*, *Phomopsis*, *Sclerotioides*, *Pythium*, *Rhizoctonia solani*, and *Sclerotium sclerotiorum* on ornamental plants, vegetables, fruit, and tree crops.

Tricompost is safe for the environment, and able to compete with synthetic fungicides.



Gliocid

Inventor : Anang Triwiratno,
Mutia Eri Dwiastuti, and Sri
Indonesian Citrus and Subtropical Fruits
Research Institute

Gliocid is biological pesticide with an active agent is *Gliricadium sp.*, developed to control scab (*Spaeloma fawcetti*) and Anthracnose (*Colletotrichum sp.*) diseases, and other fungus that cause leaf spot of citrus.

Gliocid is able to suppress or inhibit the growth of plant disease and source of inoculum. The application of Gliocid is safe for the environment, humans, and animals. Gliocid application does not cause resistance of target pathogens. The price of Gliocid is affordable to farmers and other users. The most appropriate time to apply this biopesticide is during the critical period when the plant produce buds.





Trichocid

Inventor : Sri Widyaningsih
and Murni Eri Dwiastuti
Indonesian Citrus and Subtropical Fruits
Research Institute

Trichocid is a biological pesticide contained *Trichoderma sp.*, developed to control soil borne pathogens of citrus crop. Aside as a biological pesticide, Trichocid can also acts as a decomposer.

Trichocid can inhibit source inoculum of the disease, protect seedling and roots of plants from infection, breed and spread in the soil, and safe for the environment, humans, and animals. The symptoms of soil borne diseases are (1) formation of root rot fungus mycelia on the surface of the root, and (2) formation of sporophore (mushroom) of *Armillaria* on the surface of roots above the ground.





Agriculture Spatial Referral Map

Inventor : A. Hidayat, D. Subardja, Nata Suharta, Hendro Prasetyo, Anny Mulyani, Herry Hartono, D. Djennudin, Suparto, Sukarman, Suratman, Kusumo Nugroho, and Sofyan Ritung

Indonesian Center for Agricultural Land Resources Research and Development

Agriculture Spatial Referral Map presents the identification and characterization of potential resources of land in 18 provinces. The characteristics and potential of the existing land resources presented in this map can be used as a source of reference and guidance in structuring the agricultural areas in the region.

This map is expected to assist in the utilization and management of agricultural land to make it more effective, efficient and environmentally sound. The map is available with a scale of 1:1.250.000 packed in 15 books with attachments of 144 images.



Land Suitability Map for Selected Agricultural Commodities

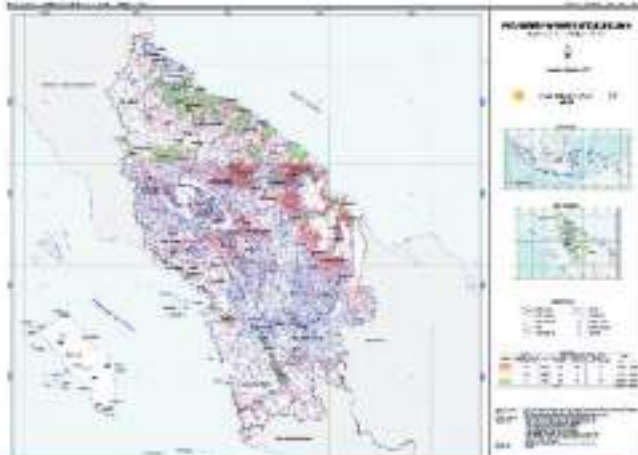
Land Suitability Map for Selected Agricultural Commodities provides information such as the identification and evaluation of land suitability for selected commodity, such as oil palm, rubber, cocoa, citrus and sugarcane in 9 provinces and 2 districts. The information in this map is useful to determine suitable commodities to be developed in a particular province. It can also be used to determine the technology, strategy and direction of various commodities development in each region.

The map is available with a scale of 1:1,250,000 packed in 11 books with attachment of 128 images.

Inventor :
D. Subardja, A. Hidayat,
Kusumo Nugroho, Nata Suharta,
Ahmad Fauzi Isa,
Chendy Tafakresnanto,
Hikmatullah, Suratman,
Henry Hartoni, Erna Suryani,
and Edi Yatho
Indonesian Center
for Agricultural Land Resources
Research and Development



Map of Phosphate and Potassium Fertilization



Inventor : Wiwik Hartatik, Diah Setyorini, Joko Purnomo, Irwan Nasution, Didi Ardi Suryadikarta, Gunawan Sjamsidi, Nurjaya, Djoko Santoso, Jojon Suryono, A. Kasno, Endang Hidayat, I.G.M. Subiksa, M. Al Jabri, Agus Sofyan, and Dedy Nursyamsi.
Indonesian Center for Agricultural Land Resources Research and Development

Potassium and Phosphate fertilization map presented information on P and K nutrient status of the rice fields in 18 provinces. This map can help the need in planning and distribution of fertilizer P and K in each province, including a site-specific fertilizer recommendation.

The scale of the map is 1:1,250,000, organized into 18 books with 36 images.. This information complement the current Minister of Agriculture decree to recommend the use and apply N, P and K fertilizer for rice. In addition to the above map, maps with a scale of 1:50,000 have been published. It was packaged in 8 books with 16 images contain site-specific fertilizer recommendations for rice in 8 districts.





Tutorial Map for Ricefield in Java and Madura

Indonesian Center for Agricultural Land Resources Research and Development

IPR Protection Status: Copyright No. 033 512

A digital map based on biophysical conditions of ricefield in all areas of Java and Madura is already established. This Geographics Information System (GIS) map provides complete information about the spread of primary and secondary rice fields throughout the region.

This map can be used by the central and local government as guidance in planning the extensification of rice fields, cropping intensity, harvested area, and prediction of rice production.

Map of Planting Calendar for Food Crops in Java



Inventor : Kusdi Subagyo, Haris Syahbuddin, Eleonora Runtuwun, Aris Pramudia, Nasrullah, Elza Surmanti, Kharnula Sari H, and Rizatus Shofiyati
Indonesian Agroclimate and Hydrology Research Institute

IPR Protection Status: Copyright No. C 00200803967

Map of Planting Calendar (Katam) illustrates the potential of pattern and planting time for food crops, especially rice. Katam map is drawn by utilizing information gathered from various sources on the potential and dynamic of climate and water resources, and current condition of planting time during three climate events, that is the wet, normal, and dry years.

The maps are packaged in the hard copy and digital form. The digital map can be updated periodically. Katam maps can be utilized by the central and local government, and private as a data base for planting time at a sub-district level. It is also useful to use this data base in anticipating the uncertain climate changes, reducing crop losses due to the anomaly of planting season. Katam maps can also be used in the distribution planning of production inputs such as seeds, fertilizers, pesticides, and agricultural machineries.





Atlas Indonesian Agricultural Climate Resources

Inventor : Popi Rejekiningrum, Yanto Sugiyanto, Aris Pramudita, Darmijati, Elza Surnaimi, Nurwindah Pujilestari, Adang Hamdani, Widiastuti, Nuryadi, Falmiza, and Hendri Antoro
Indonesian Agroclimate and Hydrology Research Institute

IPR Protection Status: Copyright No. 029 917

The atlas of Indonesian agricultural climate resources describe rainfall across Indonesia with a scale of 1:1,000,000. This atlas designed based on the compilation and correction of time series of rainfall data in the last 10-30 years contains recommendation of cropping pattern in each area.

The hard cover atlas is printed in a size of 72 cm x 52 cm and in 40 pages. This atlas can be utilized by the central and local governments, and private in planning the cropping pattern of various crops in the area of agricultural development.



Atlas of Indonesian Agroecological Zones

Inventor : Le Istiqlal Amien, Agnis B. Siswanto,
Hendri Sosiawan, Woro Estiningtyas, Popi Redjekningrum,
Tagus Vardari, Erni Susanti, and Eleonora Runtuwunu.
Indonesian Agroclimate and Hydrology Research Institute

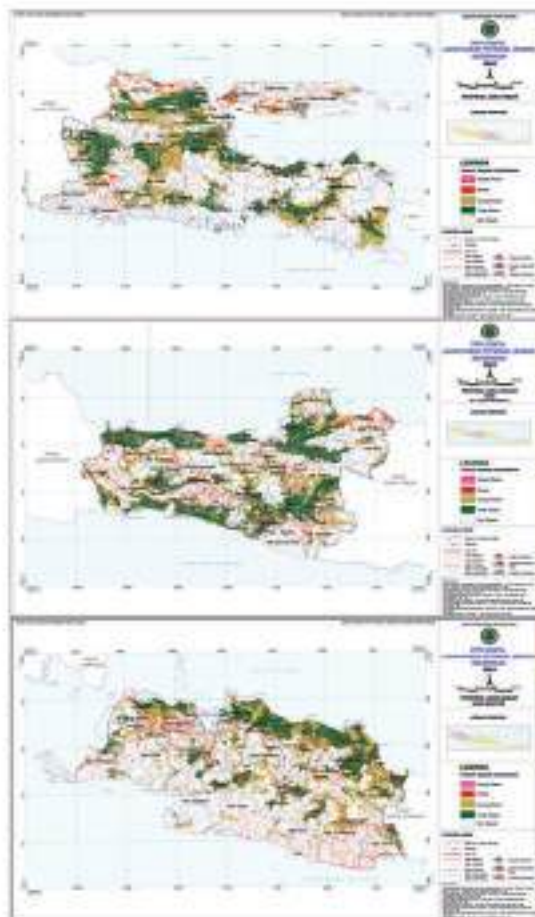
IPR Protection Status: Copyright No. 029 916



Indonesian agroecological zones are grouped based on the similarity of physical environmental conditions, in which crops and livestock variability are expected not to be significantly different. Atlas of a size 72 x 52 cm, packed in 48 pages and with hard cover. Agroecological Zone Atlas of Volume I covers areas of Sulawesi and Maluku with a scale of 1: 250,000.

The benefit of this atlas is that the central and local governments, and private alike can utilize the information contained in the atlas in planning the agricultural development, particularly in the grouping of food crops, plantation crops, and forestry based on the agro-ecological zones at provincial level.

Map of Drought Prone Ricefield



Inventor : Wahyunto, Widagdo,
Rizatus Shofiyati, Dwi Kuntjoro,
Wahyu Wahdini, Zainal Abidin, H.Y Deri,
Sri Retno Murdiyati, Wahyu Supriyatna,
Fitri Widiastuti, Hasyim Bekti, Ipin Saripin,
and Sunaryo
Indonesian Center for Agricultural Land
Resources Research and Development

IPR Protection Status: Copyright No. 033.515



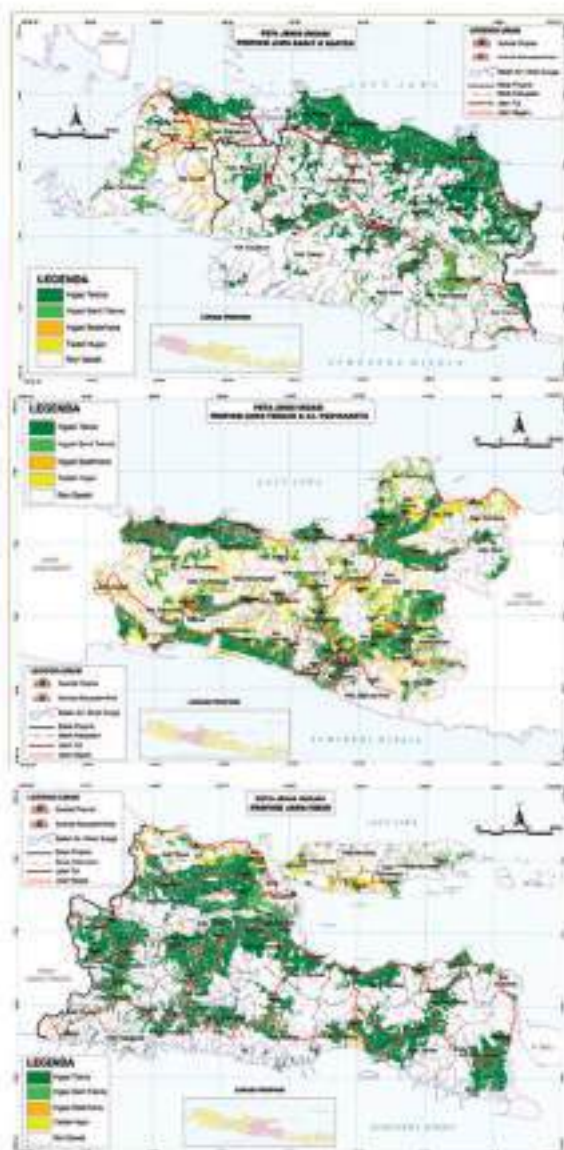
This map informs potential areas experiencing drought, and helps agricultural planners to assist in developing anticipatory measures to deal with drought, food security programs, and mitigate disaster caused by drought on rice fields in Java and Madura. This map may benefit the central and local governments, and private.

Digital Map of Wetland Rice Area in Java

Inventor : Wahyunto, Widagdo,
Rizatus Soliyati, Dwi Kuntjoro,
Wahyu Wahdini, Zaimal Abidin, H.Y Deri,
and Sri Retno Murdiy
Indonesian Center for Agricultural
Land Resources Research and Development

IPR Protection Status: Patent No. 033 638

A spatial digital map of raw wetland areas in Java and Madura was developed using GIS. These digital maps can be used as a basis for calculating acreage planted and harvested, as well as the production of rice in one growing season. Thus it will facilitate the provision of planning and distribution of agricultural inputs, including prediction of rice production and planning of rice stock in Java. This map is useful to the central government, local government, Bulog, and agro industry.





Watershed Runoff Model (MAPDAS)

Inventor : Budi Kariwa and Setyono Hari Adi
Indonesian Agroclimate and Hydrology Research Institute

IPR Protection Status: Copyright No. C 00200803968

MAPDAS is a simulation model of watershed runoff (DAS) with momentary interval close to real time. This model uses four main input parameters for simulation covering the surface flow coefficient (K_r), pause time, speed of hydrographic network flow, and the slope flow velocity.

MAPDAS also presents a map of rainfall across Indonesia. MAPDAS can be applied to simulate runoff of watershed in a micro scale (<100 ha) and macro scale (> 100 km²). The level of accuracy of this simulation is above 90%

This model can simulate watershed runoff in a number of scenarios of land coverage changes in order to develop a quick and accurate recommendation of cropping patterns.



SPLaSH Version 1.02

Inventor : Tagis Vadiani, Aidanah, Ralimah Dewi Yustika, Setian Marwanto,
Totry Budhiyastoro, and Moch. Alif
Indonesian Soil Research Institute

IPR Protection Status: Patent No. 046 489

SPLaSH Version 1.02 is a Decision Support System (DSS) developed to provide planner with ability to design a plan for soil conservation and water appropriately and swiftly according to the biophysics of land condition.

The advantage of this model is able to predict soil erosion, provide information related to the calculation of erosion activity, erosion ability, slope length factor, and crop and soil management factors. The modul also provides information on the correct land management practices in a wide scale. SPLaSH Version 1.02 helps planners in the region to take into account the erosion when making a land management plan.





Activated Charcoal Controlling Pesticide Residues

Inventor : Asep Nugraha Ardiwinata
Indonesian Agricultural Environment
Research Institute

IPR Protection Status:
Patent No. S00200900254

Agricultural waste product such as rice husks, coconut shells, corn stalks, and empty fruit bunches of oil palm can be utilized as activated charcoal that is capable to control pesticide residues in arable land.

Activated charcoal is capable to bind residues of organochlorine group of pesticides (lindane, aldrin, dieldrin, heptaklor, DDT and endosulfan) and organophosphate group (chlorpyrifos) presence in the soils so that it will not flow to the river.

Other advantage of this technology is to support the increase of useful microbial populations. The free pesticide soil is a good habitat for microbes that play an important role in the decomposition of pesticide residue which is trapped in active charcoal.

A technology to control pesticide residue was developed to address farmlands potentially contaminated by pesticide.

Urea Coating Using Activated Charcoal

Inventor : Asep Nugraha Ardiwinata
Indonesian Agricultural Environment
Research Institute

IPR Protection Status:
Patent No. P00200900630

Activated charcoal material is obtained from burning rice husks, coconut shells, corn cobs, and oil palm empty fruit bunch. Urea which is coated with active charcoal is non-volatile, not easy to melt when overheated, not sticky when it is touched, and is slow released when it applied in a broadcast. Urea that has been coated with activated charcoal has a moisture content of $\pm 10\%$.





Filter for Pesticide Residues



Inventor : Asep Nugraha Ardiwanata
Indonesian Agricultural Environment
Research Institute

IPR Protection Status:
Patent No. S00/200900258

The use of pesticides for rice and vegetable can leave pesticide residues in plants, soil, and water. The pesticide residues found in the water not only in the field, but also in the inlet and outlet.

The content of pesticide residues in the outlet should be prevented so as not to get into the flow of the river which would endanger human health and aquatic biota. The activated charcoal as a filter of pesticide residues is made from agricultural waste, such as rice husks, coconut shells, corncoobs, and oil palm empty fruit bunches.

The filter is packaged with plastic materials and placed it in a cylinder made of wire netting. The tool is lightweight and easy to carry. Filters can absorb residues of organochlorine insecticides (lindane, aldrin, dieldrin, heptachlor, DDT and endosulfan), organophosphates (diazinon and chlorpyrifos) and carbamate (carbofuran) in waterways.



MACHINERIES, BIOENERGY, AND AGRICULTURAL PRODUCT DEVELOPMENT



Atlas of Agricultural Mechanization Technology

Inventor : Agung Hendriadi, MJT Caturetno, Elita Rahmarestia,
Hendiarto, Agus Bambang Suwanto, Agung Prabowo,
FX Lilik Mulyantoro, and Adi Wiyono
Indonesian Center for Agricultural Engineering Research and Development

An atlas was created to guide agribusiness in identifying the type of equipment and agricultural machinery suitable for lowland and upland in Indonesia. The private sector can use this map (1) as a basis for planning a specific requirement for agricultural mechanization technology, and (2) to obtain optimum benefit from the technical point of view, kind, efficiency, and effectiveness, and feasibility in accordance with the site-specific agro ecosystems.

The atlas is presented in a scale of 1:1.250.000 and it is useful for developing a Geographic Information System (GIS) of agricultural mechanization for lowland and upland in Indonesia.

Manual Rice Planting Tool

Inventor : Marsudi
Indonesian Center for Agricultural Engineering
Research and Development



In general, rice seedlings planted manually by hand requires extensive labor of around 25-30 persons/ha. The dynamic of climatic change reduces the number of rainy days and shortens the time for rice cultivation. On the other hand, there is a requirement that planting of rice needs to be completed in a short period of time. The Indonesian Center for Agricultural Engineering Research and Development has developed a prototype of a manual 4 row planting machine with a spacing of 25 cm between rows.

The weight of the prototype is light of about 22 kg, it is made of corrosion-resistant materials, and is easy to operate. Another advantage is the increase of working capacity by six times as compared to planting by hand. The cost for transplanting was reduced by 50%. The presence of this technology could be an alternative way to hasten the planting time.

Quick Dryer Machine for Groundnut



Inventor : I.K. Triatna, Gatot S.A.P.,
Mugiono, and Wijayono
Indonesian Legumes and Tuber Crops
Research Institute

IPR Status: Patent
No. ID 0000788 S

The quick dryer machine intended to dry pods of peanut is made of two main components, namely the dryer drum provided with fins inside and out. This drier is designed by using the engine cradle equipped with wheels, steering, brakes, v-belt, and stamping feet that can be used to keep the machine mobile. The advantages of this dryer are fast drying, efficient, economical, can suppress fungal contamination, and improved quality of peanut pods.

This tool can be used to help farmers save groundnut yield during harvest in rainy season and at the same time speed up the drying process. The quick dryer machine for groundnut is prospective to be mass produced by local workshops.

Fruit Grader

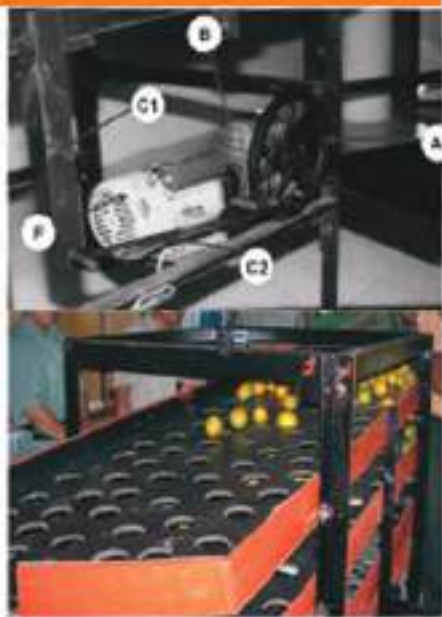
Inventor : Bestman Napitopulu

North Sumatra Assessment Institute for Agricultural Technology

IPR Status: Patent No. ID P-002269

The fruit grader consists of three layers of horizontal containers used to sort fruits of different sizes. The horizontal sorting containers move horizontally back and forth as a result of the rotation of pulleys associated with pedal and angle iron. The collision between the angle iron and a spring at the pole produces shocks on the sorting container. A diameter of the grading shaft is predetermined. It allows workers to get uniform size of fruits.

The advantages of this machine are practical, efficient and economical, uniform size of fruit, and can be used in the packaging warehouse owned by farmer groups or traders. This tool increases an added value of fruit with good quality.



Cuter for Banana Bunch

Inventor: Besman Napitupulu
North Sumatra Assessment Institute for Agricultural Technology

IPR Status: Patent No. P 00200600710



The advantage of this tool is that it can maintain high quality of banana fruit because of no cuts, scratches, and bruises. It can be used on all types and sizes of bananas. Because the tool is practical, it has a potential to be adopted by farmers to increase the added value for banana producers.

The cutter for bananas is used to release a bunch of bananas without causing any injury to the banana fruits. The traditional way to release a bunch of banana is difficult especially when the bunch arrangement of banana fruit is somewhat close to each other.



Polybag Filler

Inventor : Roswandi
Indonesian Tropical Fruit Research Institute

IPR Status: Patent P00200800842



The polybag filler is a handy tool used to speed up media preparation for growing plants in a polybag. This machine can be assembled for ease of work. The components of this machine consist of a box-shaped tub to place media, graduated cylindrical media, lattice density to cope with the media, and legs as a buffer of the polybag. The media, a mixture of different sources of materials, is poured into the box-shaped tub and will go down into the polybag. The amount of media that drops into a polybag is set by using several doors.

The advantage of this machine is to improve the efficiency of filling time of the media into polybags with equal amount of media. This machine can be used in a commercial nursery of fruit, trees, and other perennials plants.

Banana Plant Height Measuring Tool

Inventor : Roswandi, Catir Hermanto,
Eliza, and Mujinan
Indonesian Tropical Fruit
Research Institute

IPR Status:
Patent P00200800246



The idea to develop this tool came from researcher experience to overcome an obstacle in measuring the plant height of banana that exceeds the current available gauge.

The banana plant height measuring tool is rod-shaped and consists of three pipes of different diameters. The pipes are packed based on their size. The outer pipe is the larger one, the inside of the pipe is medium in size, followed by the third pipe which is the smallest. Each rod of pipe is marked with a measuring plant height.

The advantage of this tool is flexible, easy to operate, fast, and accurate, even able to measure the height of the banana plant up to 4.50 m. In addition to banana plants, this tool can also be used to measure the height of other plants. This tool is important equipment for the banana plantation and other perennial crops such as fruit.



Banana Picking Equipment

Inventor : Roswandi,
Catur Hermanto, Eliza, and Mujiman
Indonesian Tropical Fruit Research Institute

IPR Status: Patent S00200800245

The harvesting of bananas needs to be done carefully so that the quality of banana fruit is well maintained. The proper use of this tool can avoid disease contamination. The tool is simple and can be assembled in the form of a pole. At the end of the pole a plastic is attached to wrap the banana fruit while still on a standing plant. This tool is adjustable to meet the required plant height.

The working time can be speeded up, and the banana is safe from damage because the bunch of banana is wrapped up with plastic. Plastic is used to avoid disease transmission originating from infected plant sap of banana. Banana plantations, both small and large scale, will require this equipment.

Equipment for Wrapping Banana Bunches

Inventor : Roswandi, Catur Hermanto, Eliza, and Mujiman
Indonesian Tropical Fruit Crops Research Institute

IPR Status: S00200800247

This equipment is designed to wrap bunches of bananas easily and quickly from the ground without using stairs. The tool consists of a plastic for wrapping the banana, ring, and rope.

The advantage of this tool is ease of wrapping bunches of bananas according to banana plant height, although the slope of banana bunches varies from one bunch to another. Another benefit is to avoid infection by banana wilt disease that is transmitted by insects.



Cashew Nut Shell Peeler

Inventor : Edy Mulyono
Indonesian Spice and Medicinal Crops
Research Institute

IPR Status : Patent ID 000 0631 S

This machine is a refinement of the cashew nut shell peeler model of AE (KKU) 2 which was developed by Khon Kaen University of Thailand.

The principle difference of this tool with that of AE (KKU) 2 lies in the press twist mechanism, the model of bottom and top knife units, as well as the alignment of the spindle position.



This tool can peel the cashew nut shell efficiently and effectively. It is comfortable when it is in use. It can provide additional value for improving the quality of cashew nut. The cashew nut peeler has a minimum capacity of 2 kg of nut shells per hour per person, with a 85-90 % level of whole nuts, and does not require skilled labor.

Water Atomizer Bayonet Type

Inventor : Ridwan Thahir
Indonesian Center for Agricultural Engineering
Research and Development

IPR Status: Patent P002008008-11

The water atomizer is a tool used to generate water mist during the polishing process of rice milling that would produce rice which is white, clean, and shiny resembling a crystal. The cleaning process is conducted in conjunction with blowing air into the rice layer so that the increase of temperature can be stabilized.

The number of cracked and broken rice grains can be reduced. This technology is developed by installing a water injector. The position of this injector can be arranged in various positions and depends on the required volume of water mist.

It is compatible with different types of rice milling units (RMU). There is no need to buy a new rice milling machine. This innovation opens the opportunities for industry dealing with equipment of agricultural machinery to fulfill the demand of farmers to handle post harvest rice.





Sampling Tool for Greenhouse Gases

Inventor : Prihasto Setyanto
Indonesian Agricultural Environment
Research Institute

IPR Status: S00201100015

The new design chamber to collect greenhouse gas samples is made of materials such as acrylic sheet and aluminum post. These materials are easily obtained from a store that sells building materials. The acrylic sheet should be transparent in color which solar radiation could easily penetrate. Therefore, the plant inside the chamber during gas sampling could still grow normally.

The advantages of this chamber are it is easily delivered to the sampling site because of its light weight (less than 5 kg), the materials to develop such chamber are also cheap and easy to find, and nevertheless, the most important thing is that this type of chamber can be used several times with high accuracy data.

By using this chamber, researchers could obtain more gas samples during field sampling.



Sorting Machine for Citrus Based on Diameter

Inventor : Harsono
Indonesian Center for Agricultural Engineering
Research and Development

The sorting machine provides a solution for grading citrus and orange fruit based on diameter in size.

The machine consists of a 1 horse power (HP) driver component, conveyor belts, and four sizes of grader. The construction of this machine is simple and easy to operate. A working capacity of this machine is around 800 kg/hour.

With the help of this machine, farmers will find it easier to sort different sizes of fruit.



MPC-850: an Organic Fertilizer Machine

Inventor : Handaka, and Lilik Tri Mulyantara
Indonesian Center for Agricultural
Engineering Research and Development



It has a high mobility, produces finely chopped forages (1-3 cm), reduces greenhouse gas emissions, is easy to operate and is managed by an individual or group of farmers who own land area of 30 ha or 20 cattle.

The organic fertilizer machine performs to (1) chop and soften forage raw materials, (2) make an organic fertilizer, and (3) crush and mix cattle manures. The machine consists of an engine having 8.5 HP and a working capacity of 850-1000 kg/hour. The weight of machine is 180 kg equipped with wheels and sharp blades which are easy to replace.



Moveable Sprinkle Irrigation

Inventor : Teguh Wikan Widodo,
Koes Sulistiadji, Joko Pitoyo,
Maria J. Tyaturetna, and Ahmad Asari
Indonesian Center for Agricultural Engineering
Research and Development

IPR Status: Patent No. P 00200900054



The sprinkler irrigation tool is especially designed to be installed in the green house. It is also possible to be used in an open area with a necessary adjustment. The construction of this sprinkler is strong and the main frame can be moved back and forth. The sprinkler provides a mist of water with the right amount and time that will increase humidity in the green house.

This sprinkler is flexible so the height of it can be adjusted equal to the height of the plants. Therefore, the application of water for irrigation purposes can be more efficient.

This tool can benefit farmers and private operators growing high commercial value of agricultural products such as ornamental plants, fruits, and vegetables.





Mixing Tank Equipment for Fruit Juice



Inventor : Astu Unadi
Indonesian Center for Agricultural Engineering
Research and Development

The equipment is used to mix fruit juices to become homogeneous. The main components of this equipment are a mixer and vessel. The working capacity of this mixer is 100-200 liters per 10 minutes. This tool is equipped with a fan-shape mixer which is placed inside the tank. The equipment has an electric engine of 1 HP with a single phase electric and 1,450 rpm.

This juice mixer is easy to operate. The fruit juice is a hygienic product. This tool is useful for fruit processing industry.



Household Type of Biogas Production

Inventor : Muryanto, Agus Hermawan, Muntolha, M. Widagdo, and Rujitno
Central Java Assessment Institute for Agricultural Technology

The biogas production unit is equipped with a gas gauge (manometer) and LPG gas burner that have been modified to fit to the biogas unit. The machine contains components that can be easily assembled. The advantage of this mini sized gas production unit is that the unit (inlet - digester - outlet) is easy to install and be ready for use in a relatively short time and also is moveable.

The farmers who own 2-4 cattles will be able to provide energy for cooking and other household purposes. In addition to the biogas production, cattle manure serves as an organic fertilizer. The energy is obtained from methane gas released from the fermented cattle manure.

This technology is useful for households in villages to be self sufficient in gas as a source of energy.



Ground Water Tugging Plumpung Model

Inventor : Suhowo
Indonesian Soil Research Institute

IPR Status: Patent P00201000066

The ground water tugging plumpung model is designed to draw water in sandy soil and make it available for plants. Plumpung (local name) is a pottery made from clay, a cylinder type, and void inside. It has many holes arranged vertically or slantwise. Unlike the clay soil, the sandy soil does not have a strong pulling matrix, so that the ground water will be retained underneath.

Installing plumpung by burying in sandy soil serves to draw water from the ground to the surface of soil in a natural mechanistic way and make water available for plants.

Under conventional farming, irrigation water is supplied through the soil surface. This system is ineffective and inefficient if the texture of soil is sandy.

The installment of plumpung can overcome the shortage of water for crops in sandy soil. Irrigation system of this kind can prevent a loss of water by evaporation and loss of fertilizer by leaching.

Seed Planter Machine

Inventor : Joko Pitoyo, Harjono,
and Novi Sulistyosari
Indonesian Center for
Agricultural Engineering Research and Development



Planting seeds is one of the important cultural practices. Traditionally, seed is planted by using simple equipment such as a dibble which is made of wood. By using GS-JP-FL/01 seed planter machine, sowing activity, dropping seeds and cover them with soil can be done at once.

The advantages of this seed planter machine, among others, are (1) robust that can be coupled to the two-wheel tractor or four-wheel tractor, (2) lightweight and compact in shape, (3) easy to use in the sloping area because the machine is equipped with a flexible swing arm, (4) easy to adjust the plant spacing between row and within row, and (5) high in working capacity of about 2.5 hours per hectare.

When the planter machine is pulled by the 2 wheel tractor designed for three-furrow spacing, then the working capacity of the machine will be 4 hours per hectare. With using a 2 wheel tractor, the breakeven point is 61 hectares per year with an operational cost of Rp. 250,000 per hectare.



Fertigation Machine

Inventor :

Harmanto, Agung Prabowo, and Joko Wiyono
Indonesian Center for Agricultural Engineering
Research and Development

IPR Status: Patent No. P 002009000055

The fertigation (fertilizer-irrigation) machine is designed to apply fertilizer through an irrigation system. Fertigation can be applied in a micro irrigation network, both in the green house and field. This machine consists of nine main components with special characteristic on the venturi pipe that functions to suck thick liquid fertilizer.

The fertilizer will be applied to the plant through the irrigation water so that the efficiency of fertilizer is increased.

This technology can mix more than one liquid fertilizer with irrigation water. This technology can automatically adjust the pH of the distributed irrigation water. In addition, it has potential to be developed for micro irrigation networks both inside (more than 8 m x 30 m) and outside the green house (0.25 ha) with irrigation capacity of 4m³/hour.

The commercial opportunity for this technology is for farmers or private operators who produce high commercial value of agriculture commodities such as ornamental plants, fruits, and vegetables crops.

Unpeeled Corn Sheller

Inventor : Rudy Tjahjohutomo, Harsono,
Uning Budiarti, Lilik Tri Mulyantara,
Ahmad Asari, and Wahyono.
Indonesian Center for Agricultural Engineering
Research and Development

IPR Status: P00200900536



The machine is able to peel corn without peeling the cornhusk from the cob. Corn Sheller is driven by 6 - 7 horse power diesel engines. The other main component is a cylindrical husker that has different peeling gears to ease the peeling process. The cylindrical husker is also equipped with a plat that functions as the cornhusk caster. This machine is equipped with a sieve that separates corn grain from cob and corn husk. The sieve can be adjusted for its slant, so then the machine can remove corn grain from the corn husk.

The superiority of this machine is that the peeling process is efficient as it reduces time and damage to the grain (<1%). The cornhusk can act as a pad during the husking process. In addition, it has a high capacity of 3.6 tons shelled corn for seed/hour and one ton shelled corn for seed/hour with 99% cleanness.

Double-wing Plow Type of Power Weeder

Inventor : Gatot S.A.F., Mugiono, and Wijayono
Indonesian Legume and Tuber Crops Research Institute

IPR Status: Patent No. P 00200800294

The power weeder with double wing plow consists of three main components, namely propulsion engine, transmission system, and plow. The machine has several functions namely to cut and reverse the soil, and clean from weeds. Using a stand, the machine can be assembled and disassembled. The working operation time for this plow is 2 hours for a hectare. This tool can speed up weeding and subsequently reduce labor costs. The plow is light and therefore is easy to carry.

The adoption of this double-wing plow type of power weeder offers a chance for farmers to increase their income. Hence, it is an opportunity for the private sector to develop this equipment on a wide scale.





Small Scale Coconut Fiber Machine

Inventor : Lay Abner, Oskar Saka, and Maximilian Lesawengan
Indonesian Palm Crops Research Institute

IPR Status : Patent No. S-20000219

The coconut fiber machine consists of two units that are designed to be one processing system. These units are (1) pulverizer and coconut fiber separator, and (2) fiber dust collector. The whole process is under a wet method. The advantages of this machine are (1) a design is simple and practical to operate, (2) high capacity of about 400 coconuts per hour or equivalent to 240 kg of coir, (3) water content and fiber length meet the export quality requirements, (4) increased in value-added, and (5) improved the sanitation of environment.

The coconut husk is generally considered as a waste product and through this approach the small scale coconut fiber machine can create job opportunity.



Sago Processing Machine

Inventor :

Lay Abner, Oskar Saka,
and Maximilian Lesawengin
Indonesian Palm Crops
Research Institute

IPR Status:

Patent No. ID 0 000 367S

The construction of this machine consists of three components incorporated into one operating system, namely (1) grinding unit, (2) extraction unit, and (3) deposition unit. The machine can grind the soft core of sago palm tree, extract, and precipitate the wet sago simultaneously and continuously. The processing capacity of this machine is 190 kg sago pith per hour run by 3 operators.

The rendement of sago flour is 24-25%, yield lose is 2.4-3.2% and is efficient in using water of only 4-5 liters per kg of sago pith. This machine has been tested for use in the field. It is recommended to mass produce this machine to support the development of sago flour in Maluku, North Maluku, Papua, and West Papua.

Corn Sheller Machine

Inventor : I.K. Tastra, Gatot S.A.F.,
Mugiono, and Wijiyono
Indonesian Legumes and Tuber Crops
Research Institute

IPR Status:
Patent No. ID 0000/L16 S

This machine consists of two main components, namely (1) a cylinder sheller with a gear strengthen by a steel plate of 4 mm thickness, and (2) a vibrating sieve suspended by four rubber springs and powered by a 7 HP engine.

The advantages of this machine are the peeling capacity is higher than the local sheller machine, the level of grain damage is lower, the efficiency of energy use is high, the equipment is less expensive, and the level of broken cobs during the processing is low. The corn sheller machine is likely to be developed and commercialized by the local workshop or farm machinery industry.





Milk Chiller Machine

Inventor : Harmanto, Aging Prabowo, and Joko Wiyono
Indonesian Center for Agricultural Engineering Research and Development

IPR Status: Patent No. P00200900056

The milk chiller machine has a storage capacity of 50 liters per hour. The temperature of milk in the chiller will drop from 23.8 °C to 6 °C in 25 minutes. A rate of temperature decrease is 0.71 °C per minute. The efficiency of the ice bank system is 21%.

The engine uses a fin type of heat exchanger. It consists of a tool which can work on the process of moving the heat exchanger from water liquid medium with low temperature to medium temperature of milk liquid with a higher temperature without any fluid contamination.

The machine with an ice bank system is able to reduce the rate of growth of bacteria that can damage the quality of the milk. The process of cooling water can reach -3 °C. Water was added with antifreeze liquid. Cold water is transferred to the milk through a heat exchanger mechanism, so that the temperature of the milk that will go into the cooling unit has reached 3 °C. In this condition the bacteria contained in the milk will stop growing.

Fruit Porridge Maker

Inventor : Astu Unadi
Indonesian Center for Agricultural Engineering
Research and Development



This machine is designed to make porridge from the whole, chopped, or unpeeled fruit. The fruit can be guava, mango, sirsak, orange, mangosteen, sugar apple, and marquisa. The component of Fruit Porridge Maker consists of a container for fruit, the main shaft, conveyors, brush, and filter.

The advantages of this machine is able to separate the seed from the flesh of fruit, affordable, easy to operate, material is stainless steel that will not become rusted, and high production capacity ranging from 300-600 kg/hour. This technology is very useful for the agro-processing industry.

Fruit Porridge Maker

Inventor : L.K. Triastu, Gatot S.A.F., Mugiono, and Wijiyo
Indonesian Center for Agricultural Postharvest Research and Development

IPR Status: Patent No. ID 0/0008815



The Fruit Porridge Maker is used to separate the fleshy portion of a fruit from the seed and skin. A fresh fruit is placed in a container, moved by means of a conveyor into a brushing room. The separation of fruit flesh from the skin and seeds of different fruit can be maintained by adjusting the spring at the outlet.

The speed of a fruit forage maker ranges between 200-400 kg of fruit per hour. This machine is part of the initial process to produce juice, puree, and dodol (taffy made of a sticky rice, coconut milk, palm sugar, and flesh of fruit).

Fruit Squeezer Machine

Inventor : Rafli Paramawati, Mardison, and Suparlan
Indonesian Center for Agricultural Engineering Research and Development

IPR Status: Patent No. S 00200600028

The fruit squeezer machine can separate the liquid fraction or fruit juice from the solid fraction or waste and seeds. The separation mechanically squeezes the flesh of the fruit that contained seeds which is followed by the separation of the liquid and solid fractions.

The superiority of this machine is that it is able to produce in a shorter time a more efficient squeezing process compared to the manual technique using filter cloth or stationary extractor machine that works in a batch system and it can be operated continuously. This machine can be used for fruits such as mangosteen, guava, and sirsak fruit. This machine has a potential to fulfill the needs of a household and the fruit processing industry.





Fruit Juice Strainer

Inventor : Astu Unadi
Indonesian Center
for Agricultural Engineering
Research and Development

The fruit extract filter has the function to filter the slurry and obtain an extract of fruit juice. This tool consists of a filter, rotating brush, stainless steel strainer and electric motor of 1 HP, 220 V.

The advantages of the fruit extract strainer is to separate the fruit juice from the skin and seeds, it is easy to operate, moveable, affordable price, the filtering capacity of 600-700 liters per hour.

This technology is useful for the food and beverage industries.

Pepper Parer Disc Type

Inventor : Rislaheri, Tatang Hidayat, Nanam Nurdjannah, and
Pandi Laksamanahardja
Indonesian Spice and Medicinal Crops Research Institute

IPR Status: Patent No. ID 0 00088358



The function of the pepper fruit parer disc type is to release pepper seed from the pods. The stripping mechanism is by rolling the pepper pods between two disc peelers pressured through a high elasticity of rubber attached to the surface of the disc. The pepper pods peeler disc type has a specific size and structure. The distance between the two discs can be adjusted according to the size of pepper pods to be peeled. Among other advantages of this technology, it has a high stripping capacity (400-450 kg pods per hour) with a shorter pepper pod soaking time (5-6 days).

It is efficient because it needs less water soaking. The off flavor can be minimized. The rate of loss due to runoff can be reduced. The level of contamination of microorganisms on products is low.

The commercial feasibility of the pepper pod peeler is encouraging.



Pepper Pods Thresher

Inventor : Risfaheri, Tatang Hidayat, Nanan Nurdjannah, Pandji Laksamanahardja
Indonesian Spice and Medicinal Crops Research Institute

IPR Status: Patent No. S-00200200131

The pepper pod thresher releases pepper fruit from a tree. The threshing mechanism is through an axial system which can overcome some of the weaknesses of the traditional threshing. The thresher machine is simpler than that developed previously.

The advantage of this threshing machine is a high rate (650-700 kg per hour), there are no broken pieces and the skin of the pepper is peeled. The pepper fruit loss rate due to runoff can be reduced. The cost of threshing is low.



Vegetable Drying Machine with Far Infra Red Technology

Inventor : Ridwan Rachmat, Syafaruddin Lubis,
and Mulyana Hadipernata
Indonesian Center for Agricultural Post Harvest
Research and Development

IPR Status: Patent No. S 00200100184



The dryer machine adopting Far Infrared Red (IFR) technology can be used for various types of vegetables. The vegetable that is being processed is able to adsorb long wave radiation on the FIR span which could maintain good quality of vegetables.

The machine consists of propulsion equipment, drying tunnel, and the frame. Framework of such device is equipped with speed control devices, heaters or radiators of FIR, conveyor belts, and a spacer between the heater and the material. The whole dryer aisle is covered with aluminum plate and on the bottom is mounted a vacuum vapor fan. The fuel used is Liquid Petroleum Gas (LPG).

This machine has the superiority in producing dried vegetables with better quality and hygiene, longer storage, stabilized nutritional value because of the minimal physical and chemical characteristic changes. FIR technology is highly efficient because the radiation heat emerges directly through the molecule and breaks the molecular bonds of water molecules in the material without going through an intermediary medium (air) as well as on the process of convection and conduction.



Multipurpose Chopper Machine

Inventor : Rafli Paramawati
Indonesian Center
for Agricultural Engineering
Research and Development

The multipurpose chopper machine can be used for chopping medicinal, spices, and root crops. The machine is composed of stainless steel materials. The size of the tool is 75 x 50 x 95 cm. It is powered by an electric motor of 1 HP, which is run by the two operators.

The characteristics of the machine are having horizontal chopper, adjustable thickness of the cut, working capacity of 500 kg per hour for a thickness of 2-4 mm, or 200 kg per hour for a thickness of a cut of 5-7 mm, the cut can be lengthwise and round shape.

This multipurpose chopper is useful for farmers and individuals who are making business on medicinal tubers.

Pasteurizing Machine

Inventor : Astu Umadi
Indonesian Center for Agricultural Engineering
Research and Development



The pasteurising machine is horizontally cylindrical, equipped with pipes to heat the juice, purée or milk. It is also equipped with a packaging container. Water used as medium is heated by gas or kerosene stoves. To pasteurize liquid foodstuffs such as fruit juice, juice, purée or milk, the engine is operating at temperatures between 90 - 100 °C.

The product is free of bacteria and other microbial agents. The machine is very useful to improve the quality of food stuff and lengthen its storage time.

Rice Harvester



Inventor : Toko Pitoyo
Indonesian Center for Agricultural Engineering
Research and Development

The rice harvester is a modification of a carried lawn mower. The new model was changed to a "direct couple". This machine can replace a sickle, the rice cutter. The working speed of this machine is 0.57 km per hour, the width of working area is 100 cm or 4 lines with a plant spacing of 25 cm between lines, less expensive, working capacity of 18-20 men hours per hectare.

It is eight times faster than the manual tools. This machine can be used to harvest soybeans, grasses, and maize.

Threshing Machine

Inventor : Koes Sulistiadji

Indonesian Center for Agricultural Engineering Research and Development

The threshing machine is the updated model of the pedal thresher. The machine is powered by an engine of 5.5-7.5 HP, weight of 100-150 kg, uses gasoline, and is easy to carry. The advantage of the threshing machine is having a capacity of 500-700 kg per hour. The separation is of 98%, cleaning of 94%, and percentage of grain damage is less than 2%, efficient use of gasoline.

This technology can accelerate the development of grain threshing having a low percentage of shrinkage.



Rice Seeding Machine



Inventor : Harjono, Koes Sulistiadji, Joko Pitoyo, D.A. Budiman, Marsudi, C. Yusup Purwanta, Andri Gunanto, Novi Sulistyosari, and Rosmeika.
Indonesian Center for Agricultural Engineering Research and Development

The rice seeding machine is operating by means of a conveyor belt wherein the empty seed box which is placed on the belt will pass under a place that releases soil and spreads seeds. The first step is to fill the box with soil for as much as 2 kg, then spread 150 grams of seeds evenly over the soil surface in the box. A thin layer of soil was poured to cover the seeds. Machine is powered by electric motors. After passing through the conveyor belt, seed boxes are ready to be moved into a nursery for further seedling maintenance. Boxes are arranged in rows and shelves measuring 3.00 x 1.25 x 1.50 m.

Boxes are placed in five levels which hold a total of 100 boxes. The rack is equipped with 10 sprinklers at each level. The water flow is controlled automatically by a pump with capacity of 30 liters per minute. Watering time and the amount of water can be adjusted as required. The 14 day old seedlings are ready to be transplanted.





Rice Weeder Machine

Inventor : Joko Pitoyo
Indonesian Center for Agricultural Engineering
Research and Development

IPR Status : ID S0001039

The rice weeder machine is operated using gasoline fuel, and powered by 2 HP of two-stroke engine. The working width of this weeder machine is two lines for a plant spacing of 20 cm or 25 cm. The weeder machine can be operated in the field until the rice plants are 40 days old.

The capacity of this weeder machine is three times larger than that the ordinary manual rice weeder. The other advantages are low cost, weeder working time of 15 hours per hectare for one-way, or 27 hours per hectare to two crossed way, is lightweight with a weight of 21 kg, and run by one operator. The use of this machine can speed up the weeding and subsequently reduce cost.





Static Lights Pest Trap So-Cell

Inventor : Baehaki
Indonesian Center for Rice
Research and Development

The Static Light Trap So-Cell is used to monitor pests. This light trap is operated for 12 hours at night using 20 watt light bulbs. The Static So-Cell is equipped with four plastic rolls to be spread with eugenol to catch fruit flies.

After a number of insect pests were caught by the light trap they must be counted. If the population of insect pests reaches the economic threshold level, 4 days later the pest in the rice field must be controlled by applying recommended insecticides.

Static Light Trap So-Cell is licensed by PT. Sainindo Kurniasjati with a contract for a period of 5 years, from 2012 to 2017.

Pest Trap Electric Lamp GB-3

Inventor : Baehaki
Indonesian Center for Rice
Research and Development



The light trap using a 100 watt lamp is mounted at a height of 150-250 cm from ground level. The number of insects caught by the light trap in a single night can reach up to 400,000 insect hoppers, or in a month up to 1,069,977 hoppers, or 2,634,268 hoppers per year.

The follow up after the insect pests are caught is to observe the pest on the rice plant. When the population of pests reaches the economic threshold level, it is recommended to undertake a control measure for the rice pests 4 days after the peak of pest population is observed.



Pesticide Applicator



Inventor : Otto Endarto, Nurhadi, Suparlan,
and Mardison
Indonesian Citrus and Subtropical Fruits
Research Institute



The pesticide applicator is designed for use on woody plants. The chemical is sprayed onto the plant through the bark of the tree. The applicator is lighter (approximately 4 kg) compared to that of a knapsack sprayer which is about 14 -17 kg in weight. The equipment consists of a nozzle that regulates the discharge of pesticide based on the angle of the spray (40-55 degrees).



The volume of the tube of the applicator is 2 liters, and the pesticides can be used to spray 500 plants. This applicator only uses systemic pesticide because the chemical is applied through the bark of a tree. The chemical is transported to different parts of the plant. Therefore, this method of pesticide application is considered efficient and environmentally safe.

It uses less amount of pesticide and less number of labors as compared to other chemical methods for controlling plant pests. The chemical pesticide persists in the plant for a longer time. This tool can also be used to control pests of horticultural crops and other woody plants, especially on aphids, fleas, and Diplodia.



Potato Planter Machine

Inventor : Teguh Wikan Widodo,
Yanyan Ahmad Hoesen, Joko Pitoyo,
Marsudi, Koes Sulistiadji, and
D. A. Budiman.
Indonesian Center for Agricultural
Engineering Research and Development



Currently, planting seed of potatoes requires a lot of labor. For one hectare of land requires 1.25 to 1.50 tons of seed potatoes. When the potato seed is planted with the help of labor, it is going to be costly.

The use of planting machine can reduce the number of laborers required. Before planting, potato seeds were weight converted based on three dimensions (x, y , and z) and deviation value. Afterward the potato seeds are classified based on the seed class { SS - 80 -100, S - 30 , M - 25 -30, L - 10 -12, and XL - 8 (tuber/kg) }.

This planter machine is equipped with a bag having a capacity of 35 kg of seed with L size. The line spacing is 0.3 m with a distance of 0.75 to 0.80 m. The working capacity is 8 men hours per hectare at a speed of 1.7 miles per hour.

The adoption of this machine can reduce the operations cost by 40 % compared to the manual planting method.





Potato Harvester

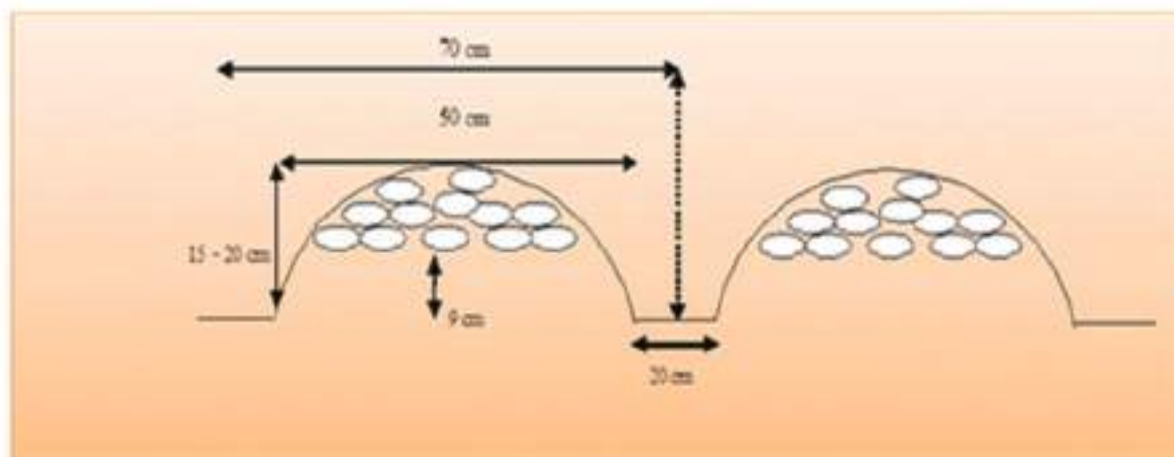


Inventor :

Teguh Wikan Widodo, Yanyan Ahmad Hoesen, Joko Pitoyo, Ahmad Asari, M. Hidayat, and Diana Atma Budiman.
Indonesian Center for Agricultural Engineering Research and Development



Quite many labors are required to harvest potatoes. In certain areas there is a shortage of labor. Therefore, it is urgent to develop an efficient potato harvester machine. AARD has designed a potato harvester machine that can be operated on a wide scale. Technology development requires support from various parties, especially the agricultural machinery industry.



Rice Legowo Plant Spacer Sunjang Model

Inventor : Sunjaya Putra, Karsidi Permadi, Hasan Wiratma,
Nana Sutrisna, Nadimin, and Nandang Sunandar
West Java Assessment Institute for Agricultural Technology

The legowo Plant Spacer Sunjang Model is a method of planting of rice according to a specified plant distance between and within rows. The legowo plant spacer was designed to create a double row line showing a required plant distance. The Legowo plant spacer is made of wood and PVC.

A pair of disc shape type of wheel made of wood is connected to a wooden rod that serves as an axis. This wooden rod is attached to a square frame at the two ends for support and towing.

Creating plant spacing of double two rows and spacing within these two rows can be done at once. The use of legowo plant spacing can speed up the adoption of legowo rice planting technology. The spacer can be modified according to the available materials and land conditions.





Squeezing Milk Compatible with Cooling Units

Inventor : Ana Nurhasanah

Indonesian Center for Agricultural Engineering Research and Development

The advantages of this machine are mobility, reduction of bacterial contamination by 50%, simple and efficient use for farmer of 10 cows scale, maintained hygienic and good quality of milk up to a dairy collector, and relatively affordable price.

Engine specifications

- (1) Overall dimensions : (2.000 x 1.400 x 1.500) mm,
- (2) Machine Dimensions : (1.200 x 750 x 1.100) mm,
- (3) One unit of gasoline generator with a capacity of 2,800 watts and is used to supply cooling units of 750 watts and dairy milking unit of 750 watts,
- (4) Capacity of milking equipment : 2.9 liter/min,
- (5) Tank coolant capacity : 50 liters of milk,
- (6) Cooling water temperature : 2 C,
- (8) Temperature decreased of milk in the refrigerator: 15C/hour, and
- (9) Fuel consumption : 1 liter/hour.

Grain Dryer Machine Circulation Type



Inventor : Suparlan, Joko Wiyono,
Yanyan Achmad Hoesen, and Mardison
Indonesian Center for Agricultural Engineering Research and Development

This machine functions as a grain dryer (rice, corn, and soybean) by circulating or moving material continuously through a drying zone to obtain the desired moisture content.

Engine specifications

- | | |
|------------------------|---------------------------------|
| (1) Dimensions | : (2,400 x 1,100 x 3,200)
mm |
| (2) Capacity | : 2 ton / processes |
| (3) Fuel | : LPG |
| (4) Drying time | : 10-12 hours |
| (5) The rate of drying | : 1 hour |
| (6) Heating system | : direct |



Husk Cleaning Machine

Indonesian Center for Agricultural
Engineering Research and Development

This machine has a function to clean grain and separate the clean grain from empty grain and dirt under dry conditions.

Engine specifications

- (1) Type : terraced sieves
- (2) Total Dimensions : (1500 x 800 x 2140) mm
- (3) Engine : 1.5 HP electric motor or gasoline engine of 5.5 HP
- (4) Cleaner Fan : centrifugal type (2 pieces)
- (5) Fan Diameter : 400 mm and 500 mm
- (6) Input capacity : 400-500 kg / hour (depend on the initial grain quality)

Semi Automatic Balance for Rice Seed



Indonesian Center for Agricultural Engineering Research and Development

The semi automatic balance for rice seeds serves to weight a package of rice seed. The weight of a package of rice seeds is 5 kg. The weighting time is short and the precision of scale is high.

Engine specifications

- (1) Type : Semi Automatic Scale
- (2) Dimensions : (700 x 450 x 1800) mm
- (3) Capacity : 80-100 packs / hour
(depend on the operator)
- (4) The accuracy
of the weighing : 92-98%
- (5) Power : Electric motor of 1 HP



Seed Packaging Tool

Indonesian Center for Agricultural Engineering
Research and Development

The small scale of seed producer is constrained by the unavailability of equipment and machinery such as dryers, cleaners, scale, and packaging unit. Therefore, a small scale seed processing unit is required to produce good quality seed and maintain a stable seed production capacity.

The seed packaging tool functions to fill a bag with seed, seal the bag, weight according to the size of the package.

Seed packaging specifications :

- | | |
|------------------------|---|
| (1) Dimensions | : (440 x 250 x 1.360) mm, |
| (2) Packaging system | : electric sealer and pedal stomp, |
| (3) Power | : 300 watts, |
| (4) Capacity | : 80-100 peaces/hour
(depend on the operator), |
| (5) Weight of the seed | : 5 kg/package |

Electronic Tensiometer for Automatic Irrigation Scheduling

Inventor : Yoyo Sulyo, Harmanto, Ana Nurhasanah,
and Muhdar Soedarjo
Indonesian Ornamental Plants Research Institute



The electronic tensiometer is an instrument that is used to measure the potential of water in the soil. To absorb water from the soil, plants must cope with water retained by the soil. The legible numbers on tensiometer shows the water content at depths where the instrument is installed.

The tensiometer consists of a porous cup, connected through a rigid body tube to a vacuum gauge. For the purposes of automatic irrigation, tensiometer which is already assembled can be fitted with a sensor or transducer vacuum. If the tensiometer is going to be used to control irrigation in large areas, the water pump should be mounted with large power pump (1 HP or more). It is necessary to set a magnetic contactor with the appropriate weights.

The usefulness of this instrument is directly related to measure the ability of plants to extract water from soil. A major advantage of this electronic tensiometer is that it can be instrumented to provide automatic control of irrigation scheduling, that is the provision of water at the right time and the amount of water in order to achieve an appropriate level of water required by the plants. The application of this system can conserve water, prevent plant stress, prevent leaching of fertilizer and reduce cost for irrigation.





Aflatoxin B1 ELISA Kit

The ELISA kit is a rapid detection technique for aflatoxin B1 (AFB1) using specific polyclonal antibodies. This kit can be used to analyze aflatoxin presence in agricultural products such as corn, peanuts, animal feed, animal products (eggs, liver, and meats). This kit is working based on the principle of the antibody coated micro plate, addition of enzyme conjugate and addition of sample solution. In this reaction there will be a competition between the aflatoxin B1 and conjugate. In the final stage after washing there will be a color formation. The cross reactivity occurs as follow, AFB1 100%, AFB2 0.9%, AFG1 3.1%, AFG2 11.2%.

Inventor : Sri Rachmawati
Indonesian Research Center
for Veterinary Sciences

The ELISA kit is able to perform analysis using simple extraction sample, analyzing time is fast (15 minutes), sensitive and specific (detection limit of 0.3 ng/g), accurate (consistent with the results of HPLC method) to a range of 0.3 to 30 ng/g, and can analyze 40 samples (duplicate) all at once. The ELISA Kit for detecting aflatoxin can be developed commercially by the food and feed industry in an effort to prevent the entry of aflatoxins into food and feed that are dangerous to human and animal health.

Automatic Weather Station (AWS) Telemetry



Inventor : Astu Unadi, Aris Pramudya,
and Bayu Budiman
Indonesian Agroclimate and Hydrology Research Institute

IPR Status: P00201000803

The Automatic Weather Station (AWS) Telemetry is a tool that serves to record weather data. Data recording is done for a moment (6-59 min interval) at every hour. The data are sent periodically via SMS and then stored in the processing center. This communication is facilitated by using a package of GSM digital weather sensors, data logger and GSM modem, power management, and support wiring panel.

The AWS can record data in an efficient and practical way. It has potential to be developed commercially. This tool can be used by the Central and Local Government, watershed projects in order to record climate data quickly, accurately, and timely.

Currently, the production of the recorder of AWS is licensed by PT. Image Indocommit Mahardhika. The license period is for 5 years, from 2011 to 2016. Thirty seven units have been produced in 2012 and distributed to the users. This equipment is marketed in Sumatra, Java, Lombok, Kalimantan, Sulawesi, Ambon, and West Papua.



Sugarcane Leaves Test Kit

Indonesian Soil Research Institute

The device is used to test the nutrient status of sugar cane leaves. This instrument is equipped with a liquid chemical formula to determine the nutrient status of N, P, K, and S in the leaves of sugarcane.

Measuring nutrients in the sugarcane leaves is done by staining methods. The working principle is to extract nutrients from the leaves of sugarcane plants to determine the status of N, P, K and S. Results of the test are available immediately.

Using this test kit site-specific fertilizer recommendation for sugarcane can be determined. This test kit is simple, is packaged in a small bag, and the chemical can be refilled. The kit is easy to carry to the field by extension specialists.



Fertilizer Test Kit

Indonesian Soil Research Institute
IPR Status: Merek No. D 00.2008.029431

The fertilizer test kit is a tool to determine the nutrient levels presence in inorganic fertilizer. The authenticity of inorganic fertilizer is tested to ascertain the fertilizer contains nutrients as stated on the fertilizer bag. The kit was developed in anticipation of the release of fake fertilizer that will cause losses to farmers. This rapid test kit consists of a tool and formula of liquid chemical.

The working principle of this test kit is to extract the nutrients in inorganic fertilizers. The extract is placed in a tube with a formula of liquid chemical. Results of this reaction can be obtained instantly. The chemical reactant can be refilled. The kit is placed in a handy bag.

This kit is important for use by field workers and agricultural extension specialists.



Soil Test Kit for Upland



Indonesian Soil Research Institute

IPR Status :

Merek No. D 00.2008.029429

The Soil Test Kit for upland crops is an analytical tool to determine qualitatively the status of the nutrients N, P, K, and the pH of the soil. This kit is handy to carry to the field. The nutrient status of the soil is measured based on a colorimetric reaction between extract of soil and a formula of liquid chemical and compared to a color panel or chart. The chemical in the kit can be refilled.

The test is simple and rapid so an individual can get the results of a soil nutrient test promptly. A guide to determine the recommended rate of fertilizers for a specific site is provided.

A field extension worker can help farmers in a group to analyze the soil nutrient status in a specific location and determine a proper fertilizer rate recommendation for upland rice, maize, and soybean.

Soil Test Kit for Irrigated Rice

Indonesian Soil Research Institute

IPR Status:

Merek No. D00.2008.29427



The Soil Test Kit for lowland rice field is an analytical tool to determine qualitatively the status of nutrients N, P, K, and the pH of the rice field. This kit is handy to carry to the field. The nutrient status of the soil is measured based on a colorimetric reaction between an extract of soil and a formula of liquid chemical.

The nutrient status of the soil is measured based on a colorimetric reaction between extract of soil and a formula of liquid chemical and compared to color panel or chart. The chemical in the kit can be refilled. The test is simple and rapid so an individual can get the results of a soil nutrient test promptly. A guide to determine the recommended rate of fertilizers for a specific site is provided.

A field extension worker can help farmers in a group to analyze the soil nutrient status in a specific location and determine a proper fertilizer rate recommendation.

Soybean Quick Dryer

Inventor : I Ketut Tastra

Indonesian Legumes and Tuber Crops Research Institute

IPR Status: Patent S00200300111

The soybean dryer is a combination between the regular dryer using kerosene and moveable rack of wet soybean seeds. This dryer is equipped with a drum wherein two kerosene stoves are installed as a heat source. A blower will suck air and blow hot air through a conduit into the drying component.

This tool is able to speed up the drying process and can improve the quality of soybean seed. It is more versatile as compared to conventional dryer. Using this dryer, the soybean germination rate that can be achieved remains high at about 90%.

The drying time is reduced from 8 days with the conventional method to only one day. The application of drying machine therefore prevents a decline of soybean seed quality.

Rural Scale of Jatropha Oil Extraction

Inventor : Elita Rahmarestia, Mardison,
Harmanto, Agung Prabowo, Joko Wiyono,
and Agung Hendriadi
Indonesian Center for Agricultural Engineering
Research and Development

An effort to seek alternative fuels as substitute to petroleum continues. One of the alternatives is to explore jatropha (*Jatropha curcas*) oil seed. Jatropha can be grown in marginal land with minimal fertilization.

The most important part of Jatropha oil production is the oil extraction from the seeds. The oil processing unit consists of fruit peeler, pressing machine (a modified peanut pressing machine from China), and filtration unit.

The Jatropha seed processing unit uses a 10.5 HP diesel engine to operate the peeler and screw press component alternately. At the household scale, this extraction machine can produce 0.5 ton of Jatropha oil per day.



Cattle Manure Biogas Reactor



Inventor : Teguh Wikan Widodo,
Ahmad Asari, and Ana Nurhasanah
Indonesian Center for Agricultural
Engineering Research and Development

Biogas is one of the renewable energy sources with organic fertilizer as a byproduct. The main component of the biogas reactor is a concrete tank of dome type with a capacity of 18 cubic meter, that can accommodate 90 kg of cattle manure per day (coming from 10-20 cattle) with a retention time of 45 days.

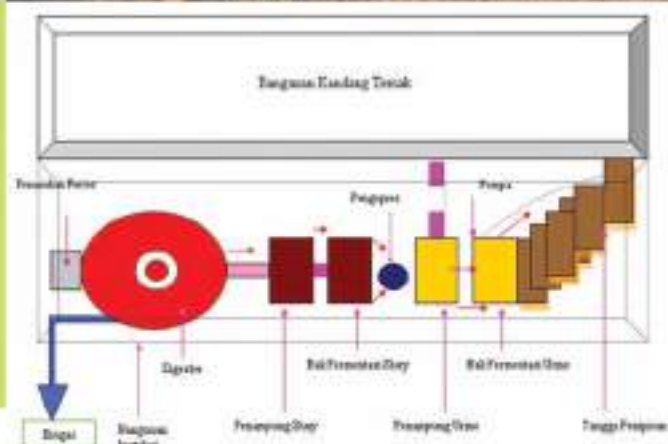
The reactor is capable to produce as much as 6 cubic meters of biogas per day. The biogas is used as an energy source for gas stove, gas lamp, and household electric generator. This gas reactor is economically feasible. The life span of this reactor is 20 years.

Biogas technology has a great potential to be developed in rural areas wherein a variation of energy sources is limited. The use of unprocessed cattle manure as a source of organic fertilizer can create an environment problem because of the methane gas emission.

Livestock Waste Processing

Inventor : Suprio Guntoro, Sriyanto,
I Made Asta Gunawan,
I Made Londra, A.A.N. Badung
Samudra Dinata, I Wayan Sudarma,
and Desak Made Rai Puspa
Bali Assessment Institute for Agricultural
Technology

IPR Status: Patent No. P00200800296



Livestock waste processing is associated with the production of biogas, liquid organic fertilizer, and feed. This technology can utilize livestock waste for energy, fertilizer and feed. There is no waste left, either in solid or liquid form. The liquid fertilizer contains relatively high N nutrients. The feed can be used especially for ruminants.

Another advantage of this technology is to keep the environment clean. Livestock waste which is not managed properly will cause serious environmental pollution. The technology is potential to be commercialized by the livestock agro industry.

Sanitizer

Inventor : Joni Munarso

Indonesian Center for Agricultural Post Harvest Research and Development

IPR Status: Patent No. S00200600207

The fresh vegetables for domestic consumption and export require careful management of food quality and safety aspects. Safe use of chemicals for removing contaminants, either in the form of pesticides or microbial residues in fresh vegetables is necessary because the use of water alone is not optimal in reducing contaminants.

The formula of Sanitizer is a liquid chemical that consists of two active compounds that work synergistically to eliminate microbial contaminants and pesticide residues in fresh vegetables. This technology can be developed by the vegetable industry in order to meet food safety standards by supplying fresh and clean vegetables.



Fuel Hybrid Biodiesel Reactor

Inventor : Dibyo Pranowo, Maman Herman, Yulius Ferry,
and Ibrahim Syahanuddin.
Indonesian Sweetener and Fiber Crops Research Institute

The hybrid biodiesel reactor technology can reduce the cost and time of production, processing of all types of vegetable oil, and lower the free fatty acids. This technology has a double condenser capable of processing all types of vegetable oils with little use of a catalyst at a maximum temperature of 125 °C. The reactor produce yield with a rendement of 87-92%, has a capacity of 100-5.000 liter, and can process free fatty acids by 90%.

This technology can support the development of bioenergy and renewable fuel industry.



Essential Oils Bioadditive

Inventor : Ma'mun, Sriyadi, and Hikmat Mulyana
Indonesian Spice and Medicinal Crops Research Institute

The form of essential oil that serves as a bioadditive is a liquid, clear, colorless, soluble in fuel oil, not soluble in water, and will not freeze at low temperatures. This bioadditive is formulated from plant-based ingredients, making it safe for the environment.

The advantage of this technology is that it can improve the combustion process of gasoline and diesel fuel. It save fuel, provide the engine with a greater power, clean carbon deposits that contaminate the engine, reduce cost for engine maintenance, and can reduce exhaust emissions. This technology is useful for users of motorbikes and cars because it can save fuel and it is environmentally safe. The essential oil can be developed on a large scale.





Jatropha Oil and Cake

Inventor : Djaveng Sumangat, Niken Harimurti, Risfaheri, Mulyana Hadipernata, Sri Yuhani, Tatang Hidayat, Agus Supriatna, Edy Mulyono, and Hernani
Indonesian Center for Agricultural Post Harvest Research and Development

Jatropha oil can be processed into biodiesel through a trans-esterification process with methanol reagent (MeOH - oil molar ratio of 6:1) and 1.5 % KOH alkaline catalyst. Reactions are performed in a large kettle provided with a stirrer and with a stable heating temperature at 65 °C.

In the process of technology development, a prototype of a press has been designed with a capacity of 5 kg of Jatropha seeds (40 kg seed per day of oil equivalent of 14 liters/day). The kettle unit has a capacity of 20 liters of oil (80 liters of oil per day, or a rough equivalent of 64 liters of biodiesel per day). The residue produced is an oil cake which is pressed into a briquette. A dry oil cake is used as fuel for the furnace.

Advantages:

- (1) The oil extraction technology using hydraulic press is relatively simple that produces oil with a rendement of 35% and oil cake of 1-1.5 %.
- (2) The trans-esterification technology of Jatropha oil produces crude biodiesel with a rendement of 78 % which does meet the standard of quality requirement.
- (3) A rough biodiesel can be used as a substitute fuel for the kerosene stove with equal heating energy.
- (4) The dry Jatropha oil cake is good as a source of energy.

Bioethanol from Empty Bunches of Oil Palm

Inventor : Nur Richana, Tatang Hidayat, and Bambang Prastowo
Indonesian Center for Agricultural Post Harvest Research and Development

The empty fruit bunches of oil palm are a waste product of palm oil production and have a fairly high lignocellulose content that can be degraded into a simpler forms that is glucose which serves as a bioethanol feedstock. The empty fruit bunches are collected and sun dried for 1 day, pounded into a powder, then sieved using a 60-80 mesh size sieve machine.

The benefit of this technology is the availability to bioethanol processing technologies that converted palm oil waste into bioethanol which serves as a gasoline substitute. The utilization of oil palm waste for bioethanol helps overcome environmental pollution, increases competitiveness and value-added of palm oil waste.





Mangosteen Puree

Inventor : Kasma Iswari

West Sumatera Assessment Institute for Agricultural Technology

IPR Status: Patent No. P00200600766

The mangosteen puree is from the fleshy portion of the fruit that has been processed to become porridge. This puree can be further processed into the desired products such as beverages. Mangosteen puree from West Sumatra has been exported to many countries because of its distinct flavor and freshness which is favored by lovers of fresh drink in foreign countries. The puree contains xanthonenes which is high in vitamin C, high in calcium and minerals, nutritious for health so it can be categorized as a healthy drink.

Mangosteen puree processing is a promising business for both farmers and private industry and subsequently increase the income of farmers. This technology is economically feasible for development by the food processing industry. The mangosteen puree technology has already been developed in collaboration with the Snow Queen Business Group, facilitated by the Local Government of Sawah Lunto District.



Mangosteen Juice

Inventor: Kasma Iswari, Farida Artati, and Edial Afdhi
West Sumatera Assessment Institute for Agricultural Technology

IPR Status: Patent No. P00200600767

The mangosteen juice is a nutritious refreshing drink containing vitamins, minerals, and xanthones (3.55 mg/100 ml). The juice is kept in plastic bottles and can be stored for 3 months at temperatures between 4-8 °C, and not exposed to direct sunlight. If the mangosteen juice is kept in glass bottles, it remains fresh and drinkable up to 8 months.

The mangosteen juice has been granted a patent of 'Mangosteen Juice Formulation and Its Processing'. This technology was developed in collaboration with the Snow Queen Business Group, facilitated by the Government of Sawah Lunto District. The processing of mangosteen juice can also be done by households as a home industry.



Mangosteen Syrup

Inventor : Kasma Iswari and Harnel Azman

West Sumatera Assessment Institute for Agricultural Technology

IPR Status: Patent No. P00200600764

Mangosteen syrup is free of artificial dyes. The maroon red color of the syrup is derived from the mangosteen peel extract. The bark extract from the mangosteen tree is mixed with the flesh of the mangosteen fruit to improve the content of Xanthones in syrup (104.05 mg/100 ml). Mangosteen syrup is a nutritious and healthy beverage because it contains beneficial Xanthones as antioxidants to prevent human diseases.

The mangosteen syrup can last a long time if it is packaged in bottles and stored at cold temperatures. Mangosteen syrup processing technology can be developed by domestic industry. This technology was developed in collaboration with the Snow Queen Business Group, facilitated by the Government of Sawah Lunto District.



Mangosteen Xanthonex

Inventor : Kasma Iswari
West Sumatera Assessment Institute
for Agricultural Technology

IPR Status:
Patent No. P00200600765

Xanthonex are substances contained in the mangosteen skin that can be extracted and are useful as an antioxidant to prevent breast cancer cells. Mangosteen peel extract contains Xanthonex 123.97 / 100 ml, vitamin B1 (20.66 mg), vitamin B2 (1.79 mg), vitamin B6 (0.948 mg), and vitamin C (17.92 mg). The storing time of mangosteen Xanthonex can reach 10 months if it is packed in dark glass bottles and kept at cold temperature. A domestic industry can produce Xanthonex from mangosteen because the processing technique is simple.

This technology was developed in collaboration with the Snow Queen Business Group, facilitated by the Government of Sawah Lunto Districts.

Low Caffeine Coffee



Inventor : Sri Mulato and Sukrisno Widyotomo
Indonesian Coffee and Cocoa Research Institute

Coffee contains caffeine that has negative side effects causing increased heart rate, blood pressure, and blood flow to the muscles. In the metabolism process, caffeine also increases glucose thereby increasing the mobility of fat and the use of glycogen.

Decaffeinating technology is able to reduce levels of caffeine in coffee Robusta to below 1%. The average caffeine content of coffee before it is decaffeinated ranges from 2 to 2.3%. The average caffeine content of Arabica coffee after decaffeinated is 1% .

The normal average content of Arabica coffee ranges from 1.2 to 1.8%. A coffee with a minimum caffeine is named as 'Comics' and it has been widely commercialized in the market in collaboration with SEKAR Cooperative in Jember, East Java. The average production of 'Comics' is 1,000 boxes per week.



Erexa

Inventor : Sri Mulato
Indonesian Coffee and Cocoa
Research Institute

Erexa is a ready-to-drink coffee mixed with ginseng extract. The combination of coffee and ginseng extract is very good for health. Erexa Coffee is rich with fine aroma and good for relaxation. This instant beverage technology is ready to be licensed by private businesses.

In addition, this technology also produces snack products with coffee flavor such as bread coffee cake (Robokop). Both Erexa and Robokop are being registered for a patent.



Citrus from Sambas

Inventor : Setyadjit, Yulianingsih,
Ermi Sukasih, Dondy ASB, Suyanti, and Iceu Agustinisari.
Indonesian Center for Agricultural Post Harvest Research and Development

IPR Status: Paten No. S 00200700110

District of Sambas, West Kalimantan Province, is known as Siam orange producing center. Extensive citrus cultivation in the region reached 12,500 hectares with an average production of 250.00 tons per year. Unfortunately, at every harvest time there is at least 35% of orange juice which cannot be sold because of a low grade (D and E) quality.

Siam orange has a bitter taste caused by limonin and naringin. Removal of the bitter taste can be accomplished through the lye peeling process. This peeling process consists of several steps such as adding a chemical formula that can dissolve compounds that cause a bitter taste of Siam orange. The formula used to remove a bitter taste of orange juice was tested in a pilot project on citrus processing in Sambas.

There is a collaborative project between IAARD and the provincial government of West Kalimantan that supports development of citrus from Sambas.



Kuini Dodol

Inventor: S.S. Antarlina, Zohrotul Hikmah,
and Susi Lesmayani
South Kalimantan Assessment Institute
for Agricultural Technology

IPR Status: Patent No. P.00200600768

South Kalimantan is one of the kuini mango production centers. During harvest time, kuini fruit is abundant and much of it is wasted because of limited fresh fruit consumption. One way to increase the value added to this fruit is to process the kuini fruit to become dodol. Dodol is taffy made of sticky rice, coconut milk, palm sugar, and mixed with kuini fruit. It is sweet-sour and has a rich kuini fruit aroma.

The processing technique of Kuini Dodol is simple so it can be produced by a home industry. Kuini dodol can be a superior product having a long storage time. Kuini Dodol has a unique and distinct taste and with attractive packaging it will expand its market to outside Kalimantan.

Bitter Test Removal Technique for Citrus

Inventor : Setyadjit, Erni Sukasih, Yulianingsih, Ridwan Thahir, and Suyanti
Indonesian Center for Agricultural Post Harvest Research and Development

IPR Status: Paten No. S 00200700153

Orange juice is one of the processed citrus products. The main constraint to its use is the bitter taste caused by limonene and naringin compounds.

There are two bitter taste removal formulas for orange juice. Formula A-1 is for peeled orange. Formula A-2 is to be applied for one minute after washing the orange under the water flow, mixing sugar with the fruit after becoming juice or adding formula B.

The superiority of this technology is easy to use, cheap, and can remove the limonene compound from 13-14 ppm to less than 7 ppm when it is already in the juice form. This technology has a good prospect to be developed and commercialized by home industry.



Rice with Low Glycemic Index

Inventor: Sri Widowati, B.A.S. Santosa,
and Made Astawan
Indonesian Center for Agricultural
Post Harvest Research and Development

IPR Status: Patent N. P 00200900288

Rice with a glycemic index (GI) is produced through a series of processing, including soaking dry harvest rice grain with warm water, draining and finally steaming the rice grain. The steamed rice grain is dried in two stages, namely at a temperature of 100 °C for 1-2 hours and at a temperature of 55-65 °C for 25 min. It is then milled to become precooked rice having low GI of rice with milling degree of 95%.

Low GI rice has a better taste which is more delicious. Low GI rice contains more ash, amylose, and dietary fiber, but the digestibility of starch is decreased. Low GI rice can help control blood glucose levels for people with diabetes mellitus problem. This technology has been licensed by PT PKG with production of 1.71 tons of low GI rice in 2011 and 4.64 tons in 2012. The license period is for 5 years from 2011-2116.

Starter Bimo CF

Inventor : Misgiarta and Suismono
Indonesian Center for Agricultural
Post Harvest Research and Development

IPR Status: Patent P - CF 00200900053



The Bimo CF starter is used to make biological modified cassava flour. It contains a carrier and lactate acid bacterium as an active agent. The starter is made of flour added with nutrient materials to improve the effectiveness and stability of lactic acid bacteria. In addition, Bimo CF produces more white cassava flour and eliminates the bitterness of the cassava flour.

This application of this technology is simple. It can be done in one step by spreading the starter directly into water where the cassava is being submerged. The dosage of one kg of Bimo CF is for 10 tons peeled cassava through a relatively short fermentation time of around 12 hours.

The modified cassava powder is suitable for various food products such as cakes, cookies, noodles, with competitive prices compared to that of wheat flour or other flour. The cassava powder can be used to substitute some portion of wheat flour.



Instant Mangosteen Skin Powder

Inventor : Asep Wawan Permana
Indonesian Center for Agricultural Post Harvest
Research and Development

IPR Status : Paten No. P00201000386

The mangosteen is a fruit crop that grows in tropical regions and is known as the queen of fruit.

The fruit has many advantages. In addition to its delicious taste, the mangosteen can also be used as an additive in instant beverage products, food supplements, herbal medicines, cosmetics, preservatives, and food coloring.

The raw material of mangosteen powder is the dry skin of mangosteen. The instant powder of mangosteen skin is prepared by using a spray drying technique. The stages of a process to produce instant Mangosteen Skin Powder include making the mangosteen skin flour, extraction, dilution with water or alcohol, and spray drying the flour. The mangosteen powder is easily soluble in water and fine in texture.

Luwak Coffee Probiotic

Inventor : Suprio Guntoro
Bali Assessment Institute
for Agricultural Technology

IPR Status : Patent P00201000346



The luwak coffee has a distinct flavor and aroma due to the influence of probiotic microbes found in the digestive tract, intestinal organs and caecum of mongoose (Luwak, animal).

The luwak coffee production is conventionally done by providing opportunities to the mongoose to eat the ripe coffee cherries. However, this method is expensive and the product is limited in supply. A breakthrough has been made through the use of probiotic microbes isolated from the digestive tract to add to the coffee beans during fermentation.

The final product has a coffee flavor and aroma of the original coffee fermented inside the intestinal organ of the mongoose.

Other advantages of Luwak coffee are low in production costs, high productivity, and is more hygienic. Probiotic Luwak coffee production technology has been licensed by PT Industry and Cooperatives Zeoprima Satmakura. The license is for 5 year period, from 2012 up to 2017.



Asitaba Herbal Drinks

Inventor : Bagem Sofiana Sembiring
and Nurliani Bernawie
Indonesian Spice and Medicinal Crops
Research Institute

The Asitaba herbal drink is formulated from asitaba ingredients (Tomorrow's leaf or *Angelica keiskei* Koidzumi), gotu kola or broken copper coin (*Centella asiatica*), red ginger, and ginger. Asitaba extract is derived from the leaves, stems, and tubers. This herbal drink can boost the immune system and accelerate blood circulation, and contains natural antioxidants to neutralize free radicals. Effectiveness of Asitaba herbal drinks is equivalent to Zymosan A and formula dose of 12.5 to 15 g/sachet/cup.

Asitaba enriched herbal drink in Indonesia has the prospect of being developed by the beverage and jamu (tonic made of medicinal herbs) industries.



VCO Ice Cream

Inventor : Rindengan Barlina, Stevie Karouw, and Patrik M. Pasang
Indonesian Palm Crops Research Institute

IPR Status: P00201100117



This ice cream is made from Virgin Coconut Oil (VCO) which is a vegetable oil that does not undergo hydrogenation, in which the acid produced is easily absorbed by the body. VCO ice cream is preferred by consumers as the main source of medium chain fatty acids and is safe to consume.

VCO Ice Cream is beneficial to health, especially in liquid form. This technology has a good prospect to be developed further by the food and pharmaceutical industries.

Instant Mushroom Soup

Inventor : Resa Setra Adiandri, Ridwan Rachmat,
and Diana Dameria Tarigan
Indonesian Center for Agricultural Post Harvest
Research and Development

Instant mushroom soup is produced from fresh mushrooms. Mushrooms are sorted, then cut and steamed. Steamed mushrooms are then dried with Far Infra Red technology (FIR), then packed with extra seasoning which becomes an instant mushroom soup product.

Instant mushroom soup can increase the -added-value of the mushroom as a business opportunity, practical and easy to be served, nutritious and healthy. Instant mushroom soup production costs are cheaper and can be stored for one year.



Artificial Luwak Coffee

Inventor : Mulyana Hadipernata
Indonesian Center for Agricultural
Post Harvest Research and Development

Luwak coffee or civet coffee, refers to the beans of coffee berries once they have been eaten and excreted by the Asian palm civet (*Paradoxurus hermaphroditus*). This coffee has a distinctive flavor that has a high price, but the original civet coffee might also be contaminated by *E. coli* and *Salmonella* which affect its safety for consumption.

Luwak coffee can be produced artificially with bioreactor technology and mongoose gastric bacterial isolates. Bioreactor is a device that provides a biological environment to support the occurrence of biochemical reactions involving organisms or biochemically active components derived from the organism. Artificial Luwak coffee has volatile compounds that have similar or identical characteristics to the original Luwak coffee and belong to the class of specialty coffee.

Fermentation process of the coffee beans in the bioreactor can be controlled in accordance with the conditions within the civet, e.g. pH, temperature, length of fermentation and enzyme and peristaltic movements of the mongoose digestion.





Low Glycemic Indexed Vermicelli

Inventor : Sri Widowati, Hoerudin,
Heti Herawati, Prima Luna, Zahiratul
Hikmah Hasan, and Tjalyo Muhandri,
Indonesian Center For Agricultural
Post Harvest Research and Development

Vermicelli is a widely known food. Vermicelli with low glycemic index (GI) is suitable for consumption by people with diabetes mellitus (DM) and obese patients. Vermicelli raw materials that have a low GI can be either sweet potato or broken rice. Vermicelli with low GI is classified as a functional food, low starch digestibility, and high levels of dietary fiber. Sweet potato vermicelli has antioxidants that are beneficial to health.

Rice Bran Oil

Inventor : Mulyana Hadipernata,
Agus Budiyanto, and Sari Intan Kaulaku
Indonesian Center for Agricultural
Post Harvest Research and Development



Rice bran oil is oil extracted from rice bran after going through a process of stabilization and purification. Bran oil not only has a good aroma and appearance but also contains vitamins, antioxidants, nutrients, and can reduce the level of cholesterol.

Potential qualities for the development of rice bran oil include:

- (1) The rice bran is abundant,
- (2) The oil content is high (14-19%),
- (3) The antioxidant content (tocopherol, tocotrienol, and oryzanol) is high,
- (4) The rice bran dregs after extraction can be used again as feed (high protein content),
- (5) The utilization of rice bran as high-quality cooking oil,
- (6) The product development of bran oil as a food supplement and antioxidant drinks, and
- (7) The product diversification of rice which will increase value-added of the products.



Instant Corn Flour

Inventor : Nur Richana, Ratnaningsih, Winda Haliza; and Maulida Hayuningtyas
Indonesian Center for Agricultural Post Harvest Research and Development

Instant corn flour is processed through the stages of immersion using a microbial starter, then processed into flour and sieved to 100 mesh size. Through microbial immersion, the fermentation process is under control, so that corn flour quality will be consistent. The fermentation process will increase breads product development and product quality improvement.

Advantages:

- (1) Durable
- (2) Easy to be processed into various products
- (3) Easy fortified
- (4) Practical (just add hot water)
- (5) Easily blended with other ingredients (composition)

Benefits:

- (1) Increase the added-value of corn
- (2) Reduce import of wheat
- (3) Encourage the growth of corn-based food products industry



Pre-cooking Polished Cooked Ground Corn

Inventor : Nurichana, Maulida Hayuningtyas, and Abdullah bin Arrif
Indonesian Center for Agricultural Post Harvest Research and Development

This product is generated from corn that has been polished and broken up into smaller granules, and then processed through immersion using microbial starter. By microbial soaking a controlled fermentation occurs, so that the quality of Cooked Ground Corn will be consistent. The fermentation process will increase the value of starch digestibility of the product and accelerate the duration of corn cooking.

Advantages:

- (1) No sour taste,
- (2) High digestibility value so it does not cause a feeling of obstruction in the stomach,
- (3) Fast cooking duration (20 minutes) similar to that of milled rice cooking, and
- (3) Suitable for diabetes patients because it has a low glycemic index (<40).

Benefits: Increase the value of corn by producing non-rice products, which is expected to reduce rice consumption, encourage the growth of corn-based food products industry.





Instant Porridge Taro Flour

Inventor : Ermi Sukasih, Setyadjit,
Sumarnani, and Sri Yuliani
Indonesian Center for Agricultural Post Harvest
Research and Development



Instant porridge can be obtained through the processing of a component of the slurry. The instant process can be accomplished by cooking the materials in the form of flour to become raw dough, and by drying. Manufacture of instant porridge from composite taro flour is carried out in a drying drum.

Making process:

Instant Porridge is an instant powder made from composite taro flour. Seasoning, milk powder, and salt are added to the slurry to produce savory and delicious flavors, and it can be served quickly without mixing or served with shredded chicken, chopped celery, and crackers.

Benefits: Increase the value-added of taro, taro processed diversification, and encourage the growth of taro-based food industry.

Taro of Composite Taro Flour

Inventor : Setyadjit, Ermi Sukasih ,
Sunarnani, and Sri Yulianti
Indonesian Center for Agricultural
Post Harvest Research and Development

The processing of composite taro flour into taro crunch uses extrusion technology. This product is made from composite taro flour 47.5% mixed with corn flour 47.5% and tapioca flour 5%.

Advantages: This product is a breakfast fast food, like coco crunch, which is directly consumed or diluted with hot water. Taro of taro flour contains 1.12% protein, 1.24% fat, 88.36% carbohydrate and crude fiber 2.08%.

Benefits: This technology is able to increase the added value of taro and encourage the growth of taro-based food industry.





Biofoam

Inventor : Evi Savitri Iriani,
Tini Tedja Irawadi, Nur Richana, Tiú C.
Sunarti, and Indah Yuliasih
Indonesian Center for Agricultural
Post Harvest Research and Development

The biofoam is an alternative to a styrofoam packaging, made from natural raw materials such as starch with the addition of fiber to strengthen the structure. Thus this product is not only biodegradable but also renewable. Biofoam manufacturing process does not use harmful chemicals such as benzene and styrene which are carcinogenic, but is made by taking advantage of the ability of the starch to expand due to heat and pressure processing.

Biofoam can be made in various shapes and sizes as required. Thermo pressing manufacture technology is used in the process, where the dough starch, fiber, and other additives are mixed with a certain composition and subsequently molded at temperatures of 170-180 °C for 2-3 minutes.

Biofoam has a better strength than styrofoam (31.80 N/mm²). For the time being, the level of hydrophobicity is still low compared to styrofoam, so the specific application is for packing products with low water content.

Banten Taro, Potential Local Food

Inventor : Sri Yuliani, Sulusi Prahawati,
Miskiyah, and Djajetig Sumangat
Indonesian Center for Agricultural
Post-Harvest Research and Development



The processing of Banten taro also known as talas bereng (*Xanthosoma undipes* K. Coch) into flour and processed products will prospectively support food security. Banten taro uses parts of the plant that can be consumed in large quantities. More than 2- year old stem tubers, reaching 120 cm long and weighing 42 kg with a 50 cm outer circumference. Banten taro has a relatively high level of protein, minerals, and dietary fiber.

Reduction of the oxalate content of taro to 90% is carried out gradually through the mild process to maintain taro starch characteristics and minimize the occurrence of browning.

The generated flour has low oxalate levels and is brightly colored. Several formulations of refined products from taro flour, such as brownies, stem buns, and cookies have been generated.



Premium Breadfruit Flour

Inventor : Sri Widowati

Indonesian Center for Agricultural Post Harvest Research and Development

Breadfruit is a climateric fruit with a consumption period of up to 4 days and utilization is still limited to products fried, steamed, and or made as chips.

The productivity of breadfruit is 200-300 fruits per season or 16-32 tons per hectare. Breadfruit contains tannin, HCN, and phytic acid which cause a bitter taste. Processing breadfruit into flour will increase the added value of this commodity.

Advantages:

(1) breadfruit flour has a specific taste and is not bitter, (2) can be stored to 1 year, the degree of flour fineness is 100 mesh, (3) a low glycemic index, (4) does not contain gluten.



Benefits:

Alternative energy sources of carbohydrates or as a companion of rice/wheat. Raw materials for vermicelli noodles, porridge, cakes and breads, can be used to substitute for wheat flour as raw material for processed food cake.

Pineapple Papaya Extract Fruit

Inventor : Suyanti and Abdullah bin Arif
Indonesian Center for Agricultural
Post Harvest Research and Development



Fruit extract is a product that has a relatively long storage life. Products of fruit extract are not only made from one type of fruit but can be combined with other horticultural commodities.

Papaya pineapple extract is one example of the two horticultural fruit combinations. Papaya pineapple extract has several advantages, among others, it has a distinctive flavor, it can be stored over a relatively long time, and has a fairly high nutrient content.

This product can be commercially developed to increase the value-added to pineapple and papaya which will quickly perish if not processed into other forms.

Salak Fruit Extract

Inventor : Suyanti and Abdullah bin Arif
Indonesian Center for Agricultural Post Harvest Research and Development



Salak or snake fruit is a tropical fruit that has a brief storage time. The popular varieties of salak include Manonjaya salak, Enrekang salak, Bali salak, and Pondok salak. The salak flesh contains minerals, vitamins, and tannins that cause astringent taste. Salak extract is a beverage that fits perfectly with the Indonesian tropical climate. Its taste is fresh and sweet with a distinctive aroma like the original salak fruit.

Advantages:

The technology of salak extract can be applied at the household or small enterprise levels.

Benefits:

Processing of salak fruits into extract will extend the storage time besides increasing its added value.

Fruit Extract of Pineapple-Cempedak

Inventor : Suyanti and Abdullah bin Arif
Indonesian Center for Agricultural
Post Harvest Research and Development



Cempedak (*Artocarpus integer*) is a climateric fruit that has a short storage time. It has a sweet taste, fragrant aroma, and high vitamin C content, ranging from 75-101 mg per 100 g of material. Mixing cempedak into pineapple extract produces a delicious fruit juice.

Advantages:

Improve the nutritional content of fruit extracts and more attractive, flavorful and tasty and it can be processed with simple technology.

Benefits:

Increase the added value of cempedak and pineapple and provide business opportunities for farmers and fruit traders.



Rambutan Fruit in Syrup

Inventor : Sunarmani and Erni Sukasih

Indonesian Center for Agricultural Post Harvest Research and Development



The rambutan is a tropical fruit which is seasonal and perishable. Rambutan fruit has a high fiber content and is good for the diet. In order for the rambutan fruit to be available throughout the year, it is necessary to process the fruit by adding syrup and storing in a can or bottle.

Advantages:

- (1) Extend the storing time of rambutan,
- (2) Increase the added value of rambutan, and
- (3) Expand the market distribution.

Drying and Storage of Shallot

Inventor : Sigit Nugraha and Ridwan Rachmat

Indonesian Center for Agricultural Post Harvest Research and Development

The room used to dry and store shallots has a capacity of 15 tons and it is equipped with an air ventilation system. Drying red shallots in storage will produce shallots with a better quality than the conventional drying by farmers. By applying this technology, farmers can delay their sale until the price of red shallot is considered beneficial to the farmers. At the same time shallot seed is available for farmers. This technology has been developed by farmers' group Tunas Harapan in Brebes.

The advantages of this technology: (1) can reduce damage of shallot from 20% to 10%, (2) maintain the original color, texture, and VRS, and (3) storing time can be much longer from 4 weeks to 2-3 months. A longer storing time will help farmer overcome the problem of drying red shallot during wet season.





Patchouli Oil Extraction

Inventor : M. Panji Laksamanaharja,
Djajeng Sumangat, Risfaheri, Sofyan Ruslin,
Nahani Nurjanah, and Christina Winarti
Indonesian Center for Agricultural
Post Harvest Research and Development

The patchouli oil is one of the essential oils and an important Indonesian export commodity. The demand for patchouli oil by the perfume and cosmetic industries is relatively stable and there has been no synthetic product for substitution. Patchouli oil is extracted through a process of distilling leaves of patchouli (*Pogostemon cablin* Benth).

To improve the yield and quality of patchouli oil, a technology has been engineered that consists of equipment, distillation processes, and post-harvest handling of patchouli leaves. This technology has been applied in the patchouli oil production centers in Indonesia.

The advantages of this technology are (1) the rendement of alcohol of the patchouli oil is high and meets the national and international quality standard, (2) can use the biomass as a source of energy for the boiler, and (3) is technically and economically feasible.

Microencapsulation of Ginger Oleoresin

Inventor : Sri Yuliani, Niken Harinanti,
and Lani Sri Yuliani
Indonesian Center for Agricultural
Post Harvest Research and Development



Oleoresin is a substance extracted from a spice and acts as a flavoring agent. It is obtained by extracting dried ginger herbs with a solvent. The resulting substance is a sticky viscous liquid in a concentrated form of 20-40 times that of the substance present in the fresh herb. Oleoresin contains volatile (essential oils) and non-volatile (resin and gum) substances, each of which plays a role in determining its aroma and flavor. It is free from microbial contamination and therefore it can last for a long time.

The technology of encapsulation can conserve the liquid form of oleoresin in a powder form by wrapping up the liquid in a capsule of very small size. The release of the active ingredient from the microcapsule can be controlled so that the activities can be tailored to the needs of whether it is a slow-release or controlled release mechanism. Microencapsulation technology makes handling and application of oleoresin easy.

Pepper Processing Technology

Inventor : Rislaheri, Tatang Hidayat,
and Nanan Nurdjanah
Indonesian Center for Agricultural
Post Harvest Research and Development



White Pepper Processing Technology

The white pepper processing technology involves two mechanisms. The first mechanism is a mechanical process dealing with the stripping and threshing of the pepper fruit. The second mechanism is a chemical process using organic acids to reduce browning of pepper.

Black Pepper Processing Technology

The technology is implemented during the process of threshing of pepper fruit combined with pre treatment with blanching chemical before a drying process.

The advantages of this technology:

Processing of white pepper

(1) complies with the standard of quality, (2) it saves water by a shorter soaking time, (3) it reduces processing cost up to 20%, (4) low microbial contamination, and (5) maintain good aroma.

Processing of black pepper

(1) complies with the standard of quality, (2) drying process is faster, (3) pepper color is black, shiny, and uniform, (4) low microbial contamination, (5) no ruptured pepper, and (6) reduce processing costs up to 30%.

Cashew Processing

Inventor : Edi Mulyono, Abubakar, and Risfaheri
Indonesian Center for Agricultural
Post Harvest Research and Development



The cashew nut is rich in nutrients and energy. Cashew nuts can help prevent human kidney and gall stones disorders. The cashew nut is rated as the World's Healthiest Food.

A bunch of cashew fruit underwent a dry steaming process before the nut skin is peeled. The nut is flexible after it passed through dry steaming - the process that makes the nut skin easier to peel. The recovery of whole cashew nuts produced by applying this technique is around 85-90%, a good quality for export. The use of this technology can improve the quality and efficiency of cashew nut processing.

This technology produces three kinds of products: (1) cashew nuts, (2) nut shell oil (Cashew Nut Shell Liquid/CNS), and (3) Cardanol (main phenolic compound of CNSL).

The advantages of this technology are (1) the percentage of intact kernel is higher (85-90%) than traditional treatment (65-75%), (2) kernel color is bright, (3) quality of kernels is grade 1 (moisture content of maximum 6 %) based on SNI, and (4) waste of cashew nut shell can be utilized for other valuable and economical products.

Sago Noodle Processing Technology

Inventor : Endang Yuni Purwani and Agus Budyanto
Indonesian Center for Agricultural Post Harvest Research and Development



The sago noodle is made from sago starch. Retrogradation of starch during the manufacturing process enables the formation of 'resistant starch', i.e. fraction of the starch that is not digested by enzymes in the digestive tract.

The presence of undigested starch provides health benefits to the consumers. The resistant starch present in a noodle serves as probiotics that can lower the glycemic index.

The probiotics are microorganisms that live in food supplements that contribute to human health. The benefits of this technology are (1) having gut effect, (2) prevent constipation, (3) prevent colon cancer, and (4) rapid increase in blood glucose levels (sago noodle belongs to a group of low glycemic indexed food) making it suitable for people having diabetes mellitus problem.

Probiotic Fermented Milk



Inventor : Sri Usmiati, Hadi Setiyanto, Miskivah, and Juniawati
Indonesian Center for Agricultural Post Harvest Research and Development

The dried fermented milk is prepared by mixing several components, namely the total solids of fresh cow's milk, starter, and sugar.

The advantage of probiotic fermented milk are: (1) fermented milk from dairy cows is delicious, not too sour, solid form resembling a tofu, and (2) rich of probiotic bacteria (*Lactobacillus plantarum*, *Lactobacillus casei*, *Bifidobacterium longum*) which can be stored for 7 days at room temperature, and in the refrigerator for 20-21 days.

The benefits of probiotic fermented milk are: (1) reduced harmful bacteria in the gut, (2) can be made from cow's milk, added with a starter of probiotic lactic acid bacteria and bacteria modifying flavor, and (3) it can be produced at the household level.



Yogurt Processing Technology



Inventor : Sri Usmiati and Abubakar
Indonesian Center for Agricultural Post Harvest Research and Development

One of the dairy products that popular in the cities is a probiotic milk, such as yogurt or fermented milk.

Milk yogurt is made by adding a starter, mixture of *Streptococcus thermophilus* (ST) and *Lactobacillus bulgaricus* (LB). *S. thermophilus* is a spherical bacterium that is thermo uric. *L. bulgaricus* require a temperature of 45 ° C and pH of 5.5 for growth.

Yogurt is a dairy processing product that has high nutritional value and is good to be consumed by people having Lactose intolerance problem.

The recipe for producing yoghurt varies but the main goal is the same that is to eliminate the pathogenic bacteria and reduce the water content. A process of producing yogurt must be hygienic in order to obtain a good quality product. The composition of 1: 1 between ST : LB will produce higher yogurt of 3 % with good acidity and pH, the quality that is accepted based on SNI.

The benefits of consuming yoghurt are, (1) reduced Lactose intolerance causing diarrhea, bloating, and abdominal cramping, and (2) source of probiotic is good for health .

Processing of Iodinated Rice

Inventor : Safarudin Lubis, Ridwan Rohut, Sudaryono,
and Ridwan Thahir
Indonesian Center for Agricultural
Post Harvest Research and Development



The iodinated rice is fortified with iodine and is expected to address health problems caused by iodine deficiency. Iodine deficiency can cause thyroid disease in the early stages and in the long term will reduce intelligence, and will increase physical and mental disorders of children.

The principle of fortification technology is to take advantage of the nature of iodine that can easily bind to amylose of rice.

The fortification with iodine is done by adding a binder applied using a pressure atomizer which is embedded in the polishing devise of the rice mill.

The content of iodine in the fortified rice is 7.47 ppm, while in the non-iodinated rice is 4.60 ppm. Iodized rice is clear-white and better appearance than that of ordinary rice. The production cost of iodine fortification is only 3 - 5 rupiah per kg of rice. This technology is being developed to be applied at the milling of rice.

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