

Consumer's Preference of Corn Pudding Formulated with Corn Flour and Carrageenan

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ABSTRACT. The aims of this research was to produce instant puding from corn and carrageenan flour and to determine the respons of consumer to organoleptic analysis and other chemistry compound from that product. The method of this research was experimental design that directly tested by 150 trained panelists. There are three formulation was observed called were A formulation (70% corn flour: 30% carrageenan flour), B formulation (60% corn flour: 40% carrageenan flour) and C formulation (50% corn flour: 50 % flour carrageenan) with these indicators were colour, texture and flavor of the corn pudding. The results of research from organoleptic analysis showed that the color of corn pudding of C formulation has higher average than the corn pudding A and B formulations. The statistical test showed that formulation treatment was given significant effect to colour of corn pudding, but not significant effect to texture and flavour indicators. The result for consumer preference showed that $\pm$ 77% consumer "like" this product.

Keyword: corn flour, carrageenan flour, corn pudding, organoleptic test, consumer preference.

Introduction

Corn is one of the agricultural potential to be developed, because in addition to its high carbohydrate content, it also has other components that are very useful. Besides corn in some areas serve as a commodity that can increase revenue as in Gorontalo.

One form of corn-based product development is cornstarch. Corn starch can be used as raw materials of food products such as cakes, biscuits, noodles and others. The starch content in the corn flour allows the dough can be formed into. Ability is cornflour into a cornstarch base that is also a potential to be used as a flour pudding. However, the characteristics of the physical properties of corn flour has a low viscosity stability during the mixing process. Therefore, corn flour will be processed into flour pudding should be treated different or in formulations with other materials that have physical stability, especially for the better gel strength.

Alternative are often chosen by the manufacturer in the form of food as food pudding is carrageenan. Carrageenan is a potential marine resources which are polysaccharides from algae, a seaweed extract which has a number of benefits in the food industry and the like such as peanut butter and ice cream. Additionally carrageenan has a unique ability, which can form a variety of gels at room temperature. Carrageenan solution to thicken and stabilize particles as colloidal dispersion and emulsion water/oil (Dawn 2008).

Carrageenan is much used as an agent and a hydrocolloid gel has a good character at room temperature. Additionally carrageenan has a high fiber content so it is good to meet the needs of food fiber. Carrageenan other characters are capable of forming a gel temperature above 60° C and have the ability to react with proteins (Anonymous 2009) so good if used as materials for product substituent cornmeal pudding.

Technology flour is one of the alternatives suggested semi-finished products, because it can be retained, easily blended (made of composite or mixed food), flexible and easy to create generate various (diversification) products, easily added nutrients (fortification) and faster cooked fit consumers' desire for modern life and practical (Widowati *et al.* 2002 in Santosa *et al.* 2005).

The difference can be seen clearly between maize with other grains types are yellow on the corn. The yellow color in maize due to the content of carotene and beta-carotene, yellow corn generally contain 1.3 ppm carotene and beta-carotene between 0.7 to 1.46 ppm (Howe and Tanumihardjo 2006). Corn with different varieties possible to have different content of carotene. Measurement of vitamin A (retinol equivalent) in 19 maize varieties the average is 6.4 ppm (5 ppm to 7.7 ppm), equivalent to the amount of carotene and beta-carotene 72 ppm 38.4 ppm (FAO 1968 in Lestari 2009).

Filokoloid Carrageenan is obtained from the extract of red seaweed (Rhodophyta), function as stabilizers, thickeners, emulsifiers or gelling in the industry (Winarno

1996). Carrageenan is usually produced in the form of salts of Na, K, Ca, who distinguished two kinds of kappa carrageenan and iota carrageenan. Kappa carrageenan from *Eucheuma cottonii* and *Eucheuma striatum*, whereas iota carrageenan from *Eucheuma spinosum*.

Materials and Methods

Corn flour from local corn ("motoro kiki") is processed through a dry milling method. Carrageenan flour extracted from seaweed *eucheuma cottonii* using NaOH alkali precipitated with KCl. The process of making corn pudding made with the method as shown in Figure 1.

Stages of the study begins with an analysis of organoleptic test. The best results of organoleptic analysis serve as a formula that will serve as a sample to test consumer response.

For organoleptic analysis conducted to determine the level of preference after the cooking process with a variety of formulations.

- Formula A is 70% corn 30% Flour carrageenan.
- Formula B is 60% corn 40% carrageenan powder
- Formula C is 50% corn 50% flour carrageenan,

Hedonic quality tests conducted on 30 people panelist. The parameters tested were taste, firmness, color test with

7 scale (1 = strongly dislike, 2 = dislike, 3 = somewhat dislike, 4 = neutral, 5 = somewhat like, 6 = like, and 7 = very like).

Data were analyzed using the results of organoleptic test and descriptive Friedman. After stage organoleptic analysis performed will be chosen one of the best formulations panelists preferred to use as formulations that will be tested in a test of consumer preferences. Test prefersi mkonsumen use + 150 panelists from a variety of age groups, namely children, adolescents and adults. At this stage will be known whether the product is an instant corn pudding can be accepted by the general public or not

Result and Discussion

Flour corn flour produced is formulated with carrageenan which is further processed to form the products of corn pudding. Formulations were selected in previous studies is a formula A (70% corn 30% carrageenan powder), formula B (60% maize flour 40% carrageenan powder) and the formula C (50% maize flour 50% flour carrageenan).

The assessment process begins organoleptically corn pudding with custard product preparation comprising material preparation, cooking process by adding sugar and vanilla as well as the printing process and cooling. After a cold corn pudding prepared as an example for organoleptic test. Each sample to be tested is labeled with a code A, B and C. Panelists were chosen to carry out the testing process is semi-trained panelists where they are panelists who already know how to assess the organoleptic food products amounted to 30 people. Parameters tested on corn pudding products are color, texture and flavor pudding. Organoleptic assessment results are processed by using analysis of variance.

Assessment Results of Colour from Corn Pudding

Colors produced from corn pudding formulation cornstarch and flour pudding carrageenan produces a gray color, which color is formed due to the dominant color of the flour carrageenan. The results of an assessment of the color of custard powder and corn flour carrageenan formulations described in Figure 2.

The results of the organoleptic assessment of the color of corn pudding formulation views of value - average obtained, the results pudding formulation C has the highest color ratings compared to the formulation C 4.57 4.47 B formulations and results are the mean - prestudy

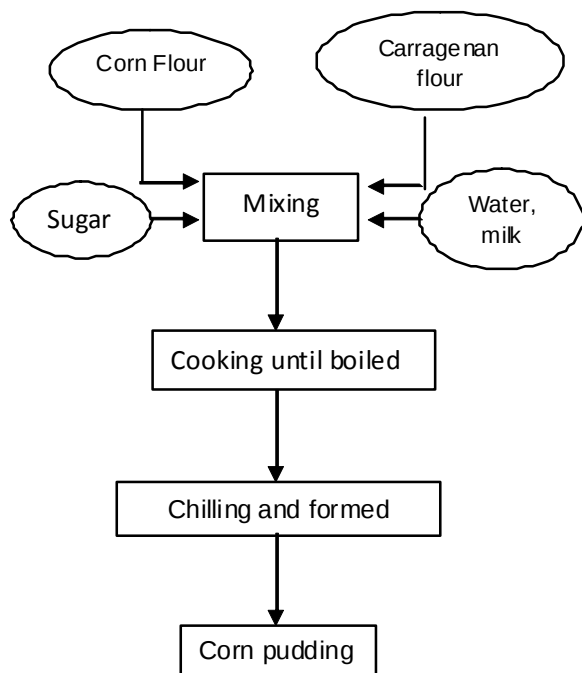


Figure1. Corn pudding processing.

4.37. While there is value - average highest but the results of statistical tests show that the difference formulation corn flour and carrageenan did not give a significant effect on color assessment pudding corn. Sensitivity limitations of the human senses at time of assessment may be one thing that led to the assessment of the color of the pudding did not differ between formula A, B and C. At the time of presentation of the consumer noticed that the color of the pudding A, B and C together are grayish. Pictures of three corn pudding formula tested organoleptically Figure 3 can be seen in the following:

Assessment Results of Texture from Corn Pudding

The results of an assessment of the corn pudding texture formulation cornstarch and flour carrageenan illustrated in Figure 4.

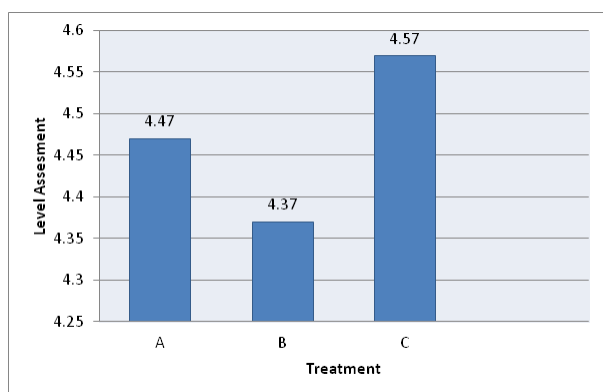


Figure 2. Organoleptik test corn pudding

Value - average has tabulated the corn pudding texture formula A are 4.07, 4.73 and formula B C formula is 5.03. The results of statistical analysis showed in these tests indicate that this formulation significantly affect corn pudding texture. To determine the level of difference in any formula, this statistical test followed by Duncan's test advanced methods. Duncan test results can be seen in Table 1.

The results above can be interpreted that the level of preference panelists for corn pudding texture formula B is equal to the level of fondness texture formula A corn pudding, corn pudding as well as between B and C. However, this assessment is different between C and A formula in which panelists assessment showed that the difference formula A and formula C affects the texture of the resulting corn pudding.

Assessment results over diukai as texture C formulations resulting from the 50% corn flour and 50% carrageenan. This formula produces strong pudding texture and soft, this is due to the simple nature of the carrageenan binds water when cooking the custard so that the texture is more compact than the corn pudding A material formulations yield 70%:30% and corn pudding ingredient formulation B 60%:40%. Corn pudding formula A and B composition corn starch flour more than carrageenan. This composition produces a pudding texture that is easier devastated when compared with corn pudding formula C. Capacity or water holding capacity corn flour carrageenan lower than it is in accordance with that described by Pietrasik and Jarmolouk (2003) that the addition of carrageenan can affect water holding capacity due to the ability of carrageenan to form a three-dimensional gel matrix



(a) A Formula (70 % corn flour: 30 % carrageenan flour)
 (b) B Formula (60 % corn flour: 40 % carrageenan flour)
 (c) C Formula (50 % corn flour: 50 % carrageenan flour)

Figure 3. Colour of corn pudding.

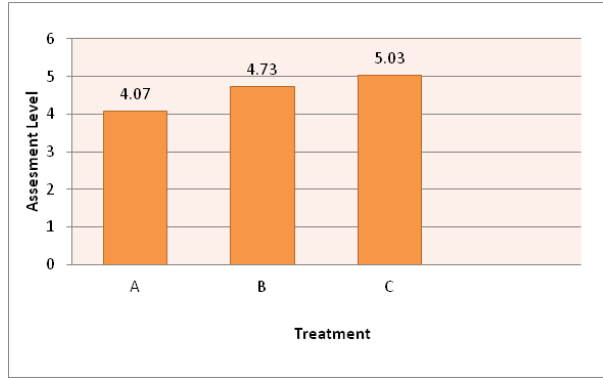


Figure 4. Organoleptic assessment of texture corn pudding.

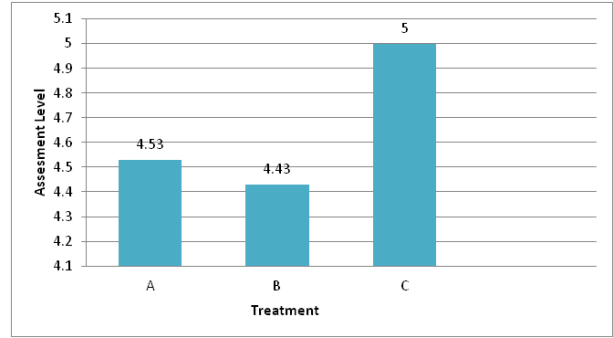


Figure 5. Organoleptic assessment.

Table 1. Duncan test for texture of corn pudding

Treatment	A = 70% : 30%	B = 60% : 40%	C = 50% : 50%
Average	4,07	4,73	5,03
B – A =	4,73 – 4,07 =	0,67 < 0,41	B = A
C – A =	5,03 – 4,07 =	0,97 > 0,43	C ≠ A
C – B =	5,03 – 4,73 =	0,30 < 0,45	C = B

Table 2. Duncan for corn pudding taste.

Treatment	B = 60% : 40%	A = 70% : 30%	C = 50% : 50%
Average	4.43	4.53	5.00
A – B	4.53-4.43 =	0.10 < 0.46	A = B
C – B	5.00-4.43 =	0.57 > 0.48	C ≠ B
C – A	5.00-4.53 =	0.47 < 0.50	C = A

that can trap water. Addition of carrageenan higher will increase the cohesiveness of the gel matrix and reduced hollow structure that causes decreased elasticity and increased violence.

Assessment Results of Taste from Corn Pudding

The results of an assessment of the corn pudding flavor formulations cornstarch and flour carrageenan described in Figure 5.

Based on the calculation of the statistical analysis assessing corn flavor pudding with value - average is 4.53 A corn pudding, corn pudding for B grade average - prestudy was 4.43 and the last corn pudding C grades - average of ratings flavor is 5, 00, these results suggest that corn pudding flavors C preferred over corn pudding flavors A and B.

The results of statistical analysis showed that the there is a significant effect on valuation differences in taste between a corn pudding product formulation with a ratio of cornmeal and flour 70% : 30% corn flavor pudding of material B with 60% : 40%, and corn pudding flavor ingredient C ratio 50% : 50%, because this is done further test or Duncan test for assessment of corn pudding flavors. The results of further testing for the assessment of corn flavour pudding can be seen in Table 2.

Further test results show that the formulas A and B produce the same flavor pudding where different formula does not affect the resulting flavor pudding. Unlike the case with custard flavor resulting from the formula C. According to the assessment panel pudding formula is different from the formula B and A in terms of taste. C formulations corn pudding flavor are preferred by the panelists, that formula is more accepted by the panelists. This is probably due to the corn pudding formula C has a more chewy texture so when trying or testing the flavor pudding tasted way, assessment panelists also affected by the texture of pudding. Elasticity causes custard pudding somewhat longer retained in the mouth and takes a longer time to savor the flavor pudding so the longer panelists will feel different sensations with two other formulas.

Of the three organoleptic parameters pudding is the preferred formula formula formula C is 50% and 50% maize flour carrageenan. in terms of color, and taste panelists chose tekstur formula C is the preferred formula. therefore the formula C is selected as the formula to be used as a sample to test consumer response.

Consumer Preference Test

Test consumer response is one test method conducted to determine whether a new product that is produced can be accepted by the consumer/community or not. This test uses a panel of more than organoleptic tests of 150 people.

Table 3. Consumer preference test.

Assesment scale	Percentage (%)
Really like	33
Like	44
Normal	12
Less like	8
Not like	3

Source: Primer data (2012)

Especially for corn pudding product is a product that targets can be consumed by all ages both children, adolescents and adults.

Therefore, to test consumer response to this corn pudding selected consumer is 50 adults drawn from vocational teachers as representatives of adult consumers, 50 people from the student as consumer representatives teens and 50 people from primary school children as young consumer representatives child.

Assessment test consumer response based on the results of a questionnaire that describes the product this corn pudding disuakai or not. The results of testing consumer response to 5 rating scale can be seen in Table 3.

The results of this assessment can be concluded that 77% + panelists/consumer products like corn pudding rest + 23% response was normal to not like. This means that the product is corn pudding can be accepted by consumers if produced commercially.

The response of consumers who expressed love and love along with the reason that it is over all (whole) corn pudding has a delicious flavor and texture with a distinctive flavor of corn that appears. Lack of product corn pudding than custard commercial products, especially in terms of the amount of formula. For pudding commercial products whose raw materials as a whole is seaweed only requires + 9-10g raw materials, formulated with 900 ml of water so that the final product more, while for corn pudding with a number of raw materials + 9-10g raw materials can only be formulated by 250 ml of water so that the final product less.

Most consumers prefer products menatakan corn pudding, but there is also less not even like pudding this product. Consumers who said they did not or do not like is

the consumer who basically do not like corn or consumers who do not like the product pudding. Therefore the statement do not like or do not like the corn pudding is not for pudding made from corn but because the statement delivered earlier in the questionnaire given they are not consumer products like corn or non-consumer products like pudding. Some consumers suggested that colored pudding products so that more interesting or different flavorings like pudding commercial. This can be done at this stage for further research, especially for the preparation of commercial corn pudding. Furthermore shelf life of instant corn flour pudding also keep in mind that for the analysis of the shelf life of instant corn flour pudding needs to be investigated

Conclusion

Based on the stages of the research that has been carried out we can conclude the following:

1. The results of sensory analysis showed that 50% formulation and 50% corn starch flour carrageenan (Formula C) favored by consumers both in terms of taste, color and texture.
2. Consumer response test results showed that 33% of consumers expressed a great love, 44% stated this, 12% gave normal responses, 8% said less likely and 3% said they did not like.

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