

PROCESSING OF WINE FROM NUTMEG PERICARP

Eddi Imanuel, Tri Haryani Savitri, Elna Karmawati and Djajeng Sumangat ¹⁾

ABSTRACT

Processing of wine from nutmeg pericarp as an effort in maximizing the utilization of nutmeg pericarp was studied from January to May 1992. The fresh and unfresh pericarps were processed after stored for 7 days and fermented for 10, 15, and 20 days. Data were taken by analyzing the acidity, alcohol, and sugar content of nutmeg-wine. The results indicated that fermentation period was significantly different on alcohol content. The highest alcohol content (2.86 %) was obtained from 20 days of fermentation. While the acidity and sugar content were not significantly different.

Key words: nutmeg-wine, pericarp

ABSTRAK

Pembuatan anggur pala dari daging buah pala

Dalam rangka meningkatkan daya guna dari daging buah pala, telah dilakukan penelitian pembuatan anggur pala dari daging buah pala. Penelitian dilakukan dari bulan Januari sampai dengan Mei 1992. Pembuatan anggur pala dicoba dengan menggunakan bahan olah daging buah pala segar dan non segar (setelah disimpan selama tujuh hari) dengan perlakuan lama fermentasi selama 10, 15 dan 20 hari. Analisis dilakukan terhadap kadar alkohol, kadar gula dan bilangan asam pada anggur pala yang dihasilkan. Hasil penelitian menunjukkan bahwa lama fermentasi berbeda nyata terhadap kadar alkohol yang dihasilkan. Kadar alkohol tertinggi (2.86 %) diperoleh pada lama fermentasi 20 hari. Untuk bilangan asam dan kadar gula, lama fermentasi tidak menunjukkan pengaruh yang nyata.

INTRODUCTION

Nutmeg (*Myristica fragrans* Houtt) is a spice crop that spreads throughout Indonesia and it is cultivated by smallholders. The producing areas comprises West and Central Java, West Sumatera, Aceh, North Sulawesi, Maluku and Irian Jaya. In 1990 the nutmeg area was about 65 277 ha with the production of 15 866 tons (Anon., 1990).

All of the nutmeg parts can be utilized into several kinds of product, i.e. dried nut and mace

can be processed into nutmeg oil and oleoresin, while its pericarp which is a major part of nutmeg (83.3 %) can be processed into several kinds of food product and beverages (Purseglove *et al.*, 1981; Rismunandar, 1988; Somaatmadja, 1984). The chemical composition of nutmeg pericarp is shown in Table 1.

Generally a beverage produced from nutmeg pericarp is nutmeg juice. Actually this can be processed into an alcoholic drink such as nutmeg-wine which is not commonly known.

An alcoholic drink like wine firstly known from Western countries. France is famous as the main wine producer beside Germany, USA, Portuguese, Italy, Spain etc. In Indonesia there is also known a kind of an alcoholic drink called *arak* or *tuak*. Wine can be classified into 5 categories (Anon., 1992), i.e.: (1) Appetizer wine with alcohol content of 15-20 % (2) Red table wine with maximum alcohol content of 14 %, red in color which comes from anthocyanin pigment in fruit skin (3) White table wine, colorless wine, and made from white variety of grape (4) Sweet dessert wine, sweet enough with alcohol content of 14-20 % and (5) Sparking wine, wine containing carbondioxyde (alcohol content of 10-14 %), causing foam to occur and it is usually drunk after cooling off.

Table 1. Chemical composition of nutmeg pericarp (per 100 g material)

Composition	Amount (%)
Protein (g)	0.3
Fat (g)	0.2
Carbohydrate (mg)	10.2
Calcium (mg)	32.2
Potassium (mg)	24.0
Fe (mg)	1.5
Vitamin A (IU)	29.5
Vitamin B (mg)	trace
Vitamin C (mg)	22.0
Water (g)	88.1

Source : Rismunandar (1988)

¹⁾ Research and Development Center for Industrial Crops

Wine can also be processed from other fruits such as: apple, rose-apple, pine apple, mangoes, cashew nut and nutmeg that called fruit wine (Sofiah in Yuliani *et al.*, 1992). Fruit wine is a kind of alcoholic drink processed by fermenting juice with or without sugar increment (Nofirdi, 1992) and by adding yeast like *Saccharomyces*, *Candida* and *Hansenula* sp.. Yeast of *Saccharomyces cereviceae* Champayag and *S. ellipsoideus* Steinberg play an important role in wine processing (Amerine *et al.*, 1982).

The processing of nutmeg-wine had been conducted in order to increase the utilization of nutmeg pericarp as an alternative product from nutmeg.

MATERIALS AND METHOD

This study was conducted at Post Harvest Laboratory of the Research Institute and Development Center for Industrial Crops and Technology Laboratory of The Research Institute for Spice and Medicinal Crops- Bogor, from January to May 1992.

Nutmeg from 7-9 months old used in this study was taken from Bogor. Yeast of *Saccharomyces cereviceae* obtained from The Research Institute for Biology-Indonesian National Institute of Science (LIPI) Bogor.

The study was arranged by using a factorial randomized block design in 2 replications. The first factor was fresh and unfresh nutmeg (after stored for 7 days); the second factor was fermentation period of 10, 15, and 20 days. The nutmeg-wine was analyzed for its acidity, alcohol content, and sugar content. The processing of nutmeg-wine conducted in this study is detailed in Figure 1.

In fruit-wine processing the first step to be prepared was starter solution as a growth media for microorganism added. Starter solution was prepared by combining water and nutmeg pericarp in weight ratio of 1:1, and sugar volume of 20 % was then added and sterilized for 15 minutes at temperature of 121°C with pressure of 1 kg/cm² and waited until cooling off. As much as 3-5 loopful of *Saccharomyces cereviceae* was

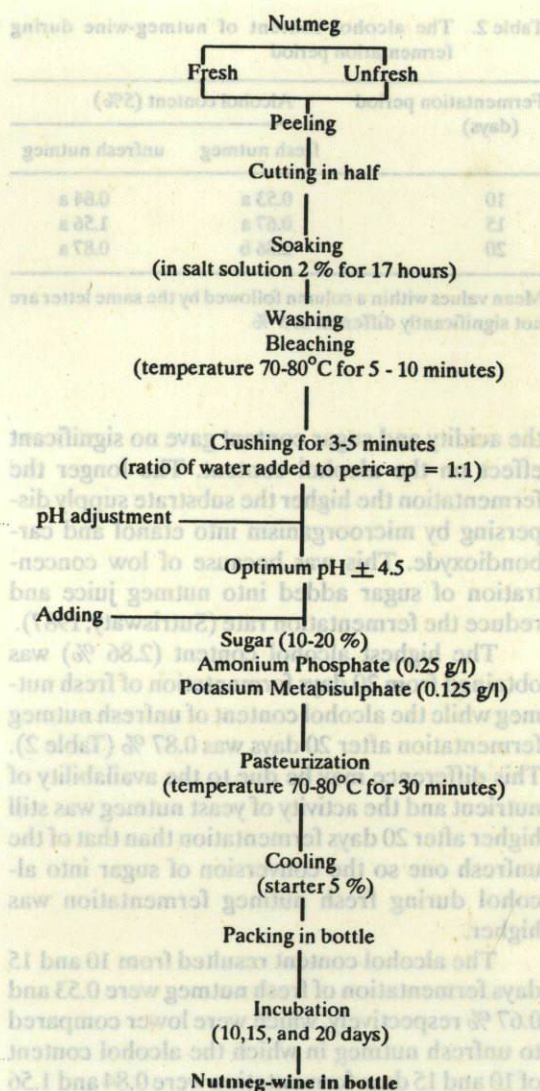


Figure 1. The processing of nutmeg-wine

added into 300 ml solution and incubated for 24-36 hours at temperature of 25-28°C.

RESULTS AND DISCUSSION

The result showed that statistically the fermentation period significantly affected the alcohol content resulted from nutmeg-wine. While

Table 2. The alcohol content of nutmeg-wine during fermentation period

Fermentation period (days)	Alcohol content (5%)	
	fresh nutmeg	unfresh nutmeg
10	0.53 a	0.84 a
15	0.67 a	1.56 a
20	2.86 b	0.87 a

Mean values within a column followed by the same letter are not significantly different at 5 %

the acidity and sugar content gave no significant effect on the alcohol content. The longer the fermentation the higher the substrate supply dispersing by microorganism into ethanol and carbon dioxide. This was because of low concentration of sugar added into nutmeg juice and reduce the fermentation rate (Sutriswaty, 1987).

The highest alcohol content (2.86 %) was obtained from 20 days fermentation of fresh nutmeg while the alcohol content of unfresh nutmeg fermentation after 20 days was 0.87 % (Table 2). This difference may be due to the availability of nutrient and the activity of yeast nutmeg was still higher after 20 days fermentation than that of the unfresh one so the conversion of sugar into alcohol during fresh nutmeg fermentation was higher.

The alcohol content resulted from 10 and 15 days fermentation of fresh nutmeg were 0.53 and 0.67 % respectively, which were lower compared to unfresh nutmeg in which the alcohol content of 10 and 15 days fermentation were 0.84 and 1.56 %. This is probably due to the availability of nutrient especially glucose in unfresh nutmeg after 10 and 15 days were higher than that of the fresh one. After storing for 7 days, the glucose content of unfresh nutmeg could be higher because of conversion of starch into glucose which is usually happening during storage of fruits or tubers.

Compared to the Industrial Standard of Indonesia no. 30/SI/73 this alcohol content is included into an alcoholic drink category.

CONCLUSION

Analytical result obtained in this study indicated that fermentation period increase the alcohol content while the acidity and concentration of sugar did not significantly affect alcohol content. The highest alcohol content obtained was 2.86 %. According to the Ministerial Health Regulation of Indonesia no. 86/Menkes/IV/77, this nutmeg-wine is categorized into an alcoholic drink grade A (alcohol content 1-5 %). While based on the Industrial Standard No. 30/SI/73 it is classified as medicinal wine which is usually consumed to warm up the body.

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