Acceptability of Kamias (*Averrhoabilimbi*) Wine

Mena A. Caoli[1], Sonia A. Arenillo (PhD)[2], Ronie F. Magsino[3]
Mindoro State College of Agriculture and Technology – Calapan City Campus, Mindoro, Philippines
polemath@yahoo.com

Asia Pacific Journal of Multidisciplinary Research
Vol. 5 No.2, 85-88
May 2017 Part II
P-ISSN 2350-7756
E-ISSN 2350-8442
www.apjmr.com

Date Received: February 21, 2017; Date Revised: May 22, 2017

Abstract - *This study was conducted to test if kamias can be made into wine. Two methods were used to determine if there were differences on its quality attributes. Sensory evaluation was used to describe the quality attributes of wines in terms of appearance and color, aroma and taste. A 5-point scale was used for describing acceptability where five is interpreted as liked extremely and one as disliked extremely. To compare acceptability differences of fresh and sterilized kamias wine, t-test was used. Results of the study showed that the appearance and color of fresh kamias wine is dull or cloudy while pale light in sterilized kamias wine. In terms of aroma, fresh kamias wine was fruity while sterilized kamias wine was powerful. The taste of fresh and sterilized kamias wine was both sweet. Data also revealed that the appearance and color of both wines were liked moderately by the respondents. The fruity aroma of fresh kamias wine was liked very much by the respondents compared to powerful aroma of sterilized kamias wine which was liked moderately. The sweet taste of fresh kamias wine was liked very much by the respondents compared to sterilized kamias wine which was liked moderately only. It can also be noted that there were no significant differences on both wines in terms of appearance and color. However, there were significant differences on both wines in terms of aroma and taste.*

Keywords – *bilimbi, kamias, fruit juice wine, sterilization method*

INTRODUCTION

Food processing is the transformation of raw materials into food or food into other form of foods [1]. Raw materials like fruits can also be processed in various ways for future use. One of these which are not often practice is making fruit wine. Fruit wines are alcoholic beverages (usually made of grapes) which is made of various base ingredients and prepared through fermentation. It is typically referred to by the type of the main ingredient used. However, the taste and the overall features of wine merely depends on kind of fruit and how it is processed. Herbs, flowers and fruits are also additional sources of flavors added to fruit wine [2], [3], [4].

According to de Guzman [3], the popular wine-producing countries are Spain, France and Italy. However, through the increase of technological researches regarding wine making, wine production here in the Philippines started to rise and other possible raw materials has now been utilized. Philippines is a tropical country enriched with natural resources and supplies. Assuming that fruit production is relatively high and with low-cost, fruit wine making in the Philippines is really possible. There are 23 fruits in the Philippines that can be utilized into wines. Some tropical fruits that are typically used are mango, pineapple, *kamias* (ginger lily), *duhat*(Philippine black plum), Guyabano (sour sop) and *bignay*(Philippine wild berry) [5]. Recently, *sampalok*(tamarind) and granadilla (passion fruit) were considered as possible raw materials in fruit wine making which showed good quality attributes that nearly surpassed the sensory characteristics of a commercial wine.

Bilimbi fruit is commonly called *kamias* in the Philippines and is scientifically known as *Averrhoabilimbi*. It belongs to the family Oxalidaceae and typically found in tropical countries [6]. It can grow up to 15 meters high and its fruits are relatively cylindrical and developed in bunches. According to Matthew et al. [7], when it reaches the maturity stage, the fruits' color changes from green into light yellow. This fruit has a juice yield of 76.14% and with a very sour taste and can be utilized into pickles, wine, vinegar and can also be eaten raw or dipped on rock salt. When the fruit is already matured, it can be processed into jams. In the Philippines, it goes

together with stews, soups and the some popular dish of the Filipinos particularly *sinigang* and *sinaing na isda*. There are also reported facts that *kamias* can be used in medicinal and industrial purposes. It has a high oxalic acid content which makes it effective in removing rust stains and clean knife blades [8],[9], [10], [11], [6], [12]. The oxalic acid content of bilimbi fruit ranges from 10.5 to 14.7 mg/g in young fruit and from 8.45 to 10.8 mg/g in matured fruit and ripe bilimbi fruits have greater vitamin C content than half-ripe ones [6]. Pricking and soaking in water overnight, or soaking in salted water for a shorter time is a good way to lessen the fruits' acidity [13].

Kamias is very abundant in Oriental Mindoro. It is considered as underutilized raw material which is only used as souring agent in fish dishes. Therefore, this research aimed to develop a value-added product from kamias with good quality and at the same time, with a very affordable price. Two methods were applied to evaluate if there are significant differences on its quality attributes.

OBJECTIVES OF THE STUDY

This study aimed to describe and compare the quality attributes of fresh and sterilized kamias wine in terms of color, appearance, aroma and taste. Moreover, it also intended to determine the level of acceptability of both wines.

MATERIALS AND METHODS

Materials, Tools and Equipment

The tools and equipment used in making kamias wine were mixing bowl, measuring cup and spoon, funnel, stainless casserole, sterilized bottle, cotton, gas stove and cheese cloth. The raw materials such as yeast and brown sugar were purchased from the local market. Moreover, the kamias were gathered in some areas in Calapan City.

Preparation of Kamias Wine

The kamias were pricked and soaked in water overnight to reduce its acidity. After soaking for almost 8 hours in water, the kamias juice was squeezed out using cheesecloth. On the other hand, in boiling method, the squeezed kamias juice were boiled and cooled. The ingredients such as brown sugar and yeast were then mixed with the juice. The mixtures were stored in a covered jar for one month. To remove the impurities, the mixtures were strained after one month and stored it into sterilized bottles for another three months. Afterwards, the straining processes were repeated and the mixtures were stored into wine bottles for a year.

Sensory Evaluation

The finished products were subjected to organoleptic evaluation. A 5 point scale was used in describing acceptability wherein five (5) is interpreted as liked extremely and one (1) as disliked extremely. Sensory evaluation sheets were given to thirty respondents to evaluate the quality attributes of fresh and sterilized kamias wine in terms of color and appearance, aroma and taste. Respondents were consisted of potential customers, male and female, age 35 to 60 and were considered as occasional wine drinkers. They were required to rinse with water before and in between drinking wines. Lastly, T-test was used to compare acceptability differences of fresh and sterilized kamias wine.

Statistical Analysis

To evaluate the quality attributes and the level of acceptability of kamias wine in terms of color, appearance, aroma, and taste, sensory evaluation using 5-point Hedonic scale was used.

The gathered data were analyzed using descriptive statistics and T-test for independent samples at 5% level of significance. SPSS v22.0 was used in the statistical analysis of the data.

Table 1. Five-point Hedonic Rating Scale

Scale	Range	Description
5	4.5-5.00	Liked Very Much
4	3.5-4.49	Liked Moderately
3	2.5-3.49	Neither Liked nor Disliked
2	1.5-2.49	Disliked Moderately
1	1.0-1.49	Disliked Very Much

RESULTS AND DISCUSSION

Table 2. Quality Attributes of Fresh and Sterilized Kamias wine in terms of appearance and color

	Fresh		Sterilized	
COLOR	*FREQ.*	*%*	*FREQ.*	*%*
Clear	0	0%	4	13.33%
Dull or cloudy	**14**	**46.66%**	4	13.33%
Bright	4	13.33%	7	23.33%
Dark	2	6.66%	5	16.66
Light pale	10	33.33%	**10**	**33.33%**

It can be noted that with respect to appearance and color, majority of the respondents with a percentage of

P-ISSN 2350-7756 | E-ISSN 2350-8442 | www.apjmr.com
Asia Pacific Journal of Multidisciplinary Research, Vol. 5, No. 2, May 2017 Part II

46.66 agreed that the appearance and color of fresh wine is dull or cloudy, this is because kamias wines do not yet undergo a treatment of clarifying. In sterilized wine, a light pale color was described by the respondents with a percentage of 33.33. This is due to light color of kamias juice and the color of sugar used which is wash sugar.

Table 3. Quality Attributes of Fresh and Sterilized Kamias wine in terms of Aroma

	Fresh		Sterilized	
AROMA	*FREQ.*	*%*	*FREQ.*	*%*
Fruity	**14**	**46.66%**	2	6.66%
Powerful	3	10%	**11**	**36.66%**
Subtle	8	26.66%	10	33.33%
Putrid	5	16.66%	6	20%
Floral	0	0%	1	3.33%

Results showed that in terms of aroma on Table 3, the highest percentage of respondents with 46.66 revealed that fresh kamias wine has a fruity aroma. However, in sterilized kamias wine, respondents agreed that sterilized wine has a powerful aroma with a percentage of 36.66.This implies that when the juice of kamias is exposed to heat before fermentation, it produced a powerful aroma therefore reduced its fruity scent.

Table 4. Quality Attributes of Fresh and Sterilized Kamias wine in terms of Taste

	Fresh		Sterilized	
Taste	*Freq.*	*%*	*Freq.*	*%*
Sweet	**21**	**70%**	**12**	**40%**
Bitter	1	3.33%	4	13.33%
Acid	6	20%	3	10%
Salty	0	0%	3	10%
Dry	2	6.66%	8	26.66%

Results of the study revealed in Table 4 that in terms of taste, seventy percent of the respondents agreed that fresh kamias wine is sweet while only forty percent of respondents described sterilized kamias wine as sweet, too. This is parallel to what de Guzman [3] cited that the quality and taste of wine solely depend on how it is processed. Sweet wines are made from riper fruits. Shorter fermentation period results to lower alcohol content granting sweeter wine, while longer fermentation period results to higher alcohol content.

Data in Table 5 revealed that in terms of appearance and color, both wines were described by the respondents as neither liked nor disliked. In terms of aroma, data showed that in Fresh kamias wine respondents described it as liked moderately with a mean score of 3.73 and neither liked nor disliked in Sterilized kamias wine with a mean score of 3.16.

Table 5. Level of Acceptability of Fresh and Sterilized Kamias Wine

	FRESH		STERILIZED	
Quality Attributes	***Mean***	***Description***	***Mean***	***Description***
Appearance & Color	3.33	Neither Liked nor Disliked	3.3	Neither Liked nor Disliked
Aroma	3.73	Liked Moderately	3.16	Neither Liked nor Disliked
Taste	3.97	Liked Moderately	2.77	Neither Liked nor Disliked

Overall Mean for Fresh Kamias is 3.68 which is verbally interpreted as Liked Moderately while for sterilized is 3.08 as Neither Liked nor Disliked.

Data proved that the taste of fresh kamias wine is described as liked moderately with a mean of 3.97 and neither liked nor disliked in sterilized kamias wine with a mean of 2.77.Generally, fresh kamias wine was more acceptable with the description of liked moderately than the sterilized kamias with the description of neither liked nor disliked. Results revealed that when kamias is not subjected to heat, its fruity aroma is preserved and does not produce a strong flavor which was the preferred wine of the respondents.

Table 6. T-test Analysis on the significant differences of Fresh and Sterilized Kamias Wine

Variable	Computed t-value	Critical t- value at 0.05	Result
Appearance & Color	0.1968	2.003	Not Significant
Aroma	2.7102	2.003	Significant
Taste	6. 2247	2.003	Significant

Result implies in Table 6 that in terms of appearance and color, there were no significant differences in fresh and sterilized kamias wine. However, it was noted that there were significant differences in both wines in terms of aroma and taste. Fresh kamias wine has a fruity aroma while sterilized kamias wine has a powerful aroma because it undergoes a cooking process thus reduced its sweet taste and produced a strong taste.

CONCLUSIONS AND RECOMMENDATIONS

The appearance and color of fresh kamias wine is dull and cloudy, while light pale in sterilized kamias

wine. In terms of aroma, fresh kamias wine is fruity while powerful in sterilized kamias wine. In terms of taste, both wines are sweet although fresh kamias wine got the highest percentage. The appearance and color of both wines were neither liked nor disliked. In terms of aroma, fresh kamias wine was liked moderately compared to sterilized kamias wine which was described as neither liked nor disliked. In terms of taste, fresh kamias wine was liked moderately while sterilized kamias wine was described as neither liked nor disliked. As a whole, study showed that fresh kamias wine is more acceptable than sterilized kamias wine. There were no significant differences on both wines in terms of appearance and color. However, there were significant differences on both wines in terms of aroma and taste.

It was also found out that kamias is also feasible in terms of marketability and productivity. We also believed that this study will be able to contribute on the utilization of kamias in terms of product development particularly fruit wines. Aside from drying, there is no known products out of kamias. Most of the fruits are just go to waste. This study could help our local farmers to process kamias into wine and start planting kamias and make it as their other source of income.

Furthermore, it is recommended to test the acidity and alcohol content of both wines and to infuse wines with various flavors.

REFERENCES

[1] Stanley, D. W. (1997). Principles of food processing. Food Research International, 30(6), 463. https://doi.org/10.1016/S0963-9969(97)00064-1

[2] Robinson, J. (2006). "The Oxford Companion to Wine" Third Edition pp. 768 Oxford University Press ISBN 0-19-860990-6

[3] de Guzman, C. B. (2008). No grapes allowed: Filipino wine-making with homegrown tropical fruits [sour sop, pineapple, ginger lily (kamias), mango, Philippine black plum (duhat), and Philippine black berry (bignay)] URL:https://bar.gov.ph/index.php/digest-home/digest-archives/63-2008-4ht-quarter/1436-octdec08-fruit-wine-6, date retrieved: January 26, 2017

[4] George, R. (1991). The Simon and Schuster Pocket Wine Label Decoder. Fireside ISBN 978-0-671-72897-7

[5] Belina-aldemita, M. D., Sabularse, V. C., Erlinda, I., Hurtada, W. A., & Torio, M. A. O. (2013). Physicochemical properties of bignay [Antidesma bunius (L.) Spreng.] wine at different stages of processing. Philippine Science Letters, 6(2), 249–256.

[6] de Lima, V. lucia arroxelas galvao, Mélo, E. de almeida, & Santos lima, L. oos. (2001). Physiochemical charcteristics of Bilimbii (Averrhoa bilimbi L.). Revista Brasileira de Fruticultura, 23(2), 421–423. https://doi.org/10.1590/S0100-29452001000200045

[7] Mathew, L., George, S. T., Babylatha, A. K.; Geetha, C. K. (1993). Flowering and fruit development in bilimbi (Averrhoabilimbi L.). South Indian Horticulture, Kerala, v.41, n.1, p.41-42, 1993.

[8] Lennox, A.; Ragoonath, J. (1990). Carambola and bilimbi. Fruits, Paris, v.45, n.5, p.497-501, 1990

[9] Wong, K. C.; Wong, S. N. (1995).Volatile constituents of Averrhoabilimbi L. fruit.Journal of Essential Oil Research, Carol Stream, v.7, n.6, p.691-693, 1995.

[10] Corrêa, M. P. (1926). Diccionario das PlantasÚteis do Brasil e das ExoticasCultivadas.. Rio de Janeiro: ImprensaNacional, 1926. 307 p.

[11] Joseph, J., Mendonca, G., (1989). Oxalic acid content of carambola (Averrhoacarambola L.) and bilimbi (Averrhoabilimbi L.).Proceedings of the Interamerican Society for Tropical Horticulture, Georgetown, v.33, p.117-120, 1989.

[12] Love, K., Paull, R. E. (2011). Hawaii Tropical Fruit Growers, & CTAHR Department of Tropical Plant and Soil Sciences. Bilimbi. Fruit and Nuts, College of Tropical Agriculture and Human Resources, University of Hawai'i, (June), 1–6.

[13] Morton, J. (1987). Bilimbi. p. 128–129 In: Fruits of warm climates. Julia F. Morton, Miami, FL.

COPYRIGHTS