

Improving The Quality Of Nipa (*Nypa fruticans*) Wine

RONALD O. OCAMPO, NORMALINA P. USITA

ascrnd@yahoo.com

Apayao State College, San Isidro Sur, Luna, Apayao

PHILIPPINES

Abstract - This study was aimed to improve the quality of nipa wine. Specifically, it was intended to determine what fruit juices that can be added to nipa wine that improve its quality; compare the sample treatments in terms of taste, color and aroma; and determine the cost of production of the different samples.

The different treatments were: T0-Nipa wine (NW) control, T1 Nipa wine + Mulberry fruit extract T2 NW + Pineapple, and Treatment 3 NW + Calamansi. The samples were evaluated by 30 panel of judges in terms of taste, aroma and color. Data were analyzed using ranking and rank difference was further tested using the Friedman's rank test.

Results revealed that T1 was the most preferred sample in terms of taste and color while treatment 2 on aroma. The least preferred treatment was the control. Rank differences showed highly significant result in their taste, aroma and color.

Hence, nipa wine can be further improve using fruit juice additives. Hence, the following recommendations are forwarded: Mass Production of the improved nipa wine should be undertaken as part of the income generating activities of the college; Promotion of the improved nipa wine should be done especially in trade fairs; The alcohol, sugar content and other nutrients content should be done which is a needed in the development of product label; Design and development of packaging materials should be done for an added market value; Conduct other researches which focuses on other fruit additives should be done; Similar studies should be conducted especially to other wine of less economic value.

I. INTRODUCTION

Nipa is scientifically known as "*Nypa fruticans*". It is grown abundantly in estuaries body of water. This palm has a short, mainly underground trunk and very large erect leaves up to 6 meter tall. The leaves are divided into leaflets. A flowering head forms on a short erect stem that rises among the palm leaves.

The young flower stalk and the seeds provide a good source of sap that can be processed into varied products. The sap can be taken by cutting the flower stalk and collect the juice. The juice is rich in sugar and can be used in fermenting wine. The seeds are hard but edible.

Some wine connoisseurs say its taste is comparable if not better to imported wines. Many wine drinkers would try it too, but it cost more than the popular "barangay gin" of a favorite Barangay basketball team. And so, the kapainan nipa wine of Tabba, Abulug, Cagayan envisioned of introducing their wine into Philippine market, initially which will eventually move to the world market in the future.

Nipa is a kind of palm tree that grows profusely on the banks of Cagayan river in Cagayan province. It provides a great source of livelihood namely wine and vinegar from the sap, sugar, roofing from the leaves, and the haven for varied forms of aquatic life.

In addition, casual observation of most nipa population reveal the limited adaptiveness of the palm. It occurs most commonly in areas where brackish water occurs, extending for upstream into permanent fresh water areas where tidal influential water level fluctuations are able to carry and deposits the seeds. Secondly, it can occur on low flats and depressions near or from the main water bodies, at the base of eroding slopes and cliff, or on sandy ridges or embankments. It can tolerate infrequent inundation.

II. OBJECTIVES OF THE STUDY

This study was intended to improve the quality of nipa wine using fruit additives. It sought to determine what fruit juices that can be added to nipa wine that improve its quality; to compare the sample treatments in terms of taste, color and aroma; determine the cost of production of the different samples.

III. MATERIALS AND METHODS

Treatments Preparations

Nipa wine was purchased from Tayak, Abulug, Cagayan. The juice of three known fruits from the locality were added to add flavor and taste to the wine. The following were the treatments preparations:

T0- control (nipa wine)

T1- 1 L nipa wine + 1 cup sugar + 2 cups Fermented mulberry Juice

T2- 1 L nipa wine + 2 cups sugar + 2 cups calamansi juice

T3- 1 L Nipa wine + 1 cup sugar + 2 cups Fermented pineapple juice

Data Gathered

Samples were coded and were subjected to sensory evaluation. Samples were evaluated by panel of examinees (wine drinkers) consisted of community people and some members of the faculty of the college . Each samples were evaluated in terms of color, aroma and taste.

Statistical Analysis of Data

Data were analyzed using ranking. Rank Differences were subjected to Friedman's Rank Test.

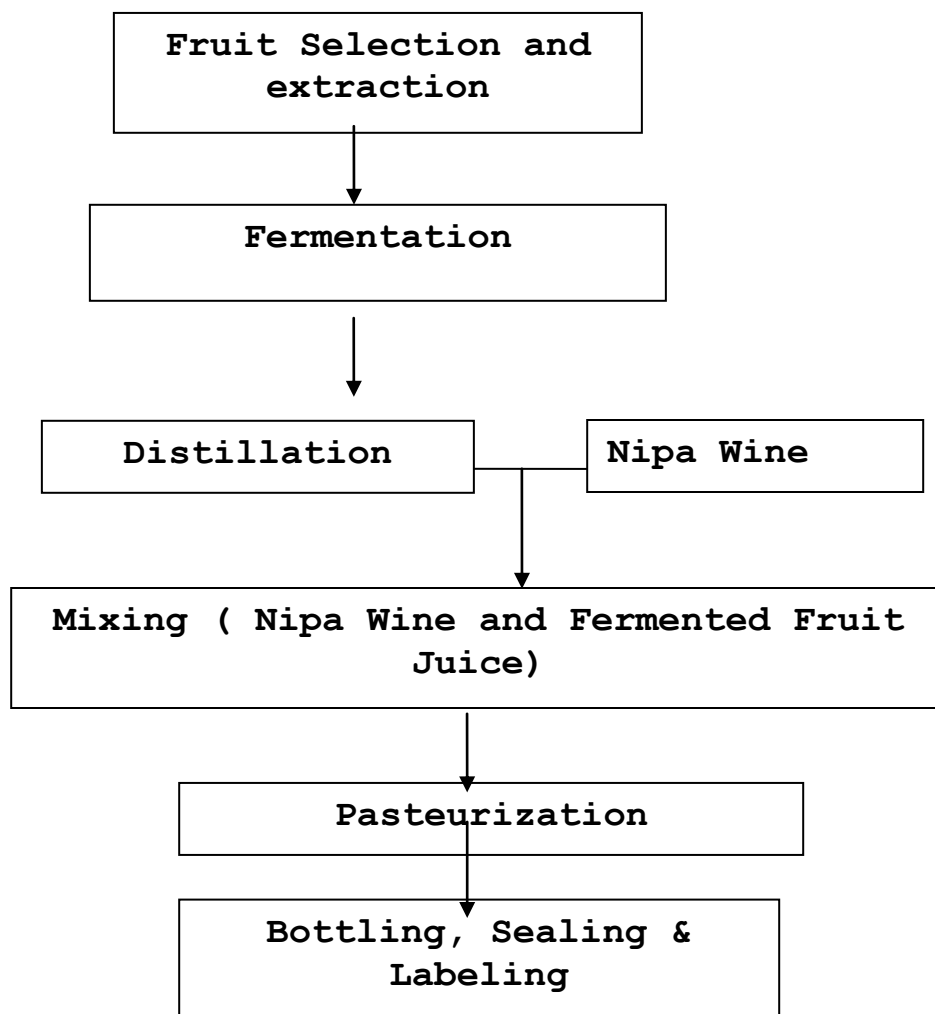


Figure 1. Schematic Diagram of the processes involved in the study.

IV. RESULTS AND DISCUSSION

Characteristics of Each Sample

The ripe fruit of the fruit additives were selected and fermented for about two weeks. These were added to nipa wine based on the desired proportions. The color, aroma and color characteristics is tabulated below.

Table 1. Color, aroma and taste characteristics of the samples.

Treatments	Color	Aroma	Taste
T0	Turbid	Nipa odor, characteristics odor	A little of bitter taste
T1	Violet	Sweet(mulberry aroma)	Little of sweet and bitter taste
T2	Turbid	Calamansi aroma	A blend of sweet, sour and bitter
T3	Pale yellow	Pineapple aroma	A blend of sweet and bitter (pineapple flavor)

The color of the different samples vary from each other based on the additives added to the wine. The addition of fermented fruit extract to treatment 2 and treatment 3 (pineapple and mulberry) added color to the wine. The violet color of the mulberry is due to the extracted anthocyanin content of fruits and vegetables in plants. Anthocyanin has been proven to be a good antioxidant.

Sensory Evaluation

Sensory evaluation was done by 30 wine drinkers who served as panel of judges. The wine samples were judged in terms of taste, color or body, and aroma. Each of the samples were ranked based on the preference of the panelists. The data is tabulated below.

Table 2 shows the taste preference of the different samples by 30 panel of judges

Table 2. Taste preference of the different samples by 30 panel of judges

Panelists	T0	T1	T2	T3
1	4	1	2	3
2	4	2	1	3
3	4	1	2	3
4	4	1	2	3
5	4	1	3	2
6	4	2	1	3
7	4	1	3	2
8	4	3	2	1
9	4	1	2	3
10	4	2	1	3
11	4	1	2	3
12	4	2	1	3
13	4	1	2	3
14	4	1	2	3
15	4	1	2	3
16	4	1	2	3
17	4	2	1	3
18	4	2	1	3
19	4	2	1	3
20	4	2	1	3
21	4	1	2	3
22	4	1	3	2
23	4	1	3	2
24	4	2	1	3
25	4	2	1	3
26	4	1	3	2
27	4	2	3	1
28	4	1	2	3
29	4	1	2	3
30	4	1	2	3
Total	120	43	56	81
Overall Rank	4	1	2	3

Table 3. Preference of 30 panel of judges on the different treatments in terms of aroma

Panelists	T0	T1	T2	T3
1	4	2	1	3
2	4	1	2	3
3	4	2	1	3
4	4	1	2	3
5	4	3	2	1
6	4	2	1	3
7	4	2	1	3
8	4	2	1	3
9	4	2	1	3
10	4	3	1	2
11	4	2	1	3
12	4	3	1	2
13	4	2	1	3
14	4	3	1	2
15	4	3	1	2
16	4	2	1	3
17	4	2	1	3
18	4	3	2	1
19	4	3	1	2
20	4	2	1	3
21	4	3	1	2
22	4	1	2	3
23	4	1	3	2
24	4	2	1	3
25	4	2	1	3
26	4	2	1	3
27	4	2	1	3
28	4	2	1	3
29	4	2	1	3
30	4	2	1	3
Total	120	64	37	79
Overall Rank	4	2	1	3

The above table shows the sensory evaluation made by 30 panel of judges on taste to the different treatment preparation. Results showed that the addition of fruit fermented juices improve the taste quality of the samples. As shown in the table treatment 1, a nipa wine added with fermented mulberry juice came up to be ranked 1 followed by pineapple flavored wine, and calamansi juice. Mulberry is a fruit, popularly known for its leaves used in sericulture. Some notable institutions such as the MMSU, DMMSU and other SUC have been processing mulberry wine. Likewise, pineapple wines are already out in the local and international markets. The taste of pineapple added flavor to the taste quality of nipa wine. Calamansi flavored wine is the least preferred among the fruit flavors due to its sour taste. Aside from the alcohol content, wine drinkers prefer wines which has good taste such that most wines are made up of fermented fruit juices.

Results of the Friedman's Rank test shows highly significant result as revealed in the computed Fr value, 68.92. This value is greater than the critical value of Fr at 5% and 1% which are 7.81 and 11.34 respectively.

The aroma of food and drink products has been one of the important considerations. The aroma of food, wine and beverages add up to the overall acceptability and marketability. Looking at the above table, nipa wine mixed with fermented pineapple juice ranked first among the treatment followed by treatment 1 and treatment 3. The least preferred among the treatment is the control. This means that the aroma of nipa wine can still be improved by adding fruit juices. Pineapple juice has been noted for its sweet aroma such that it has been used for culinary purposes. Besides, people are already familiar with pineapple aroma.

Highly significant result was observed in the rank differences of the different treatment as manifested in the computed Fr value, 72.12. This value is greater than the critical values of Fr both at 5% and 15 level of significance which are 7.81 and 11.34 respectively. This means that treatment 2 is the best treatment followed by treatment 1 and treatment 3.

Table 4 shows the color preference of 30 panelists on the different treatments

Table 4. Color preference of 30 panelist on the different treatments

Panelists	T0	T1	T2	T3
1	4	1	2	3
2	4	1	2	3
3	4	1	2	3
4	4	1	3	2
5	4	1	3	2
6	4	2	1	3
7	4	2	1	3
8	4	1	2	3
9	4	1	2	3
10	4	1	2	3
11	4	1	2	3
12	4	2	3	1
13	4	2	1	3
14	4	1	2	3
15	4	1	3	2
16	4	1	2	3
17	4	1	3	2
18	4	1	3	2
19	4	1	3	2
20	4	1	3	2
21	4	1	2	3
22	4	1	3	2
23	4	3	1	2
24	4	1	2	3
25	4	1	3	2
26	4	3	2	1
27	4	1	3	2
28	4	1	2	3
29	4	1	2	3
30	4	1	2	3
Total	120	38	67	75
Overall Rank	4	1	2	3

The color preference of the different treatments is tabulated in the above table. Result shows that treatment 1 is the most preferred treatment, followed by treatment 2 and treatment 3 respectively. The least preferred sample is the control. The violet color of mulberry added color to the nipa wine which makes its color pleasing to wine drinkers. Fruits that contains pigmentation has been known for their anthocyanin content. Anthocyanin is a color (blue, red, violet) found in fruit, vegetables and root crops (sweet potato) which is known to have antioxidant property.

When rank difference was subjected to Friedman's rank test, the computed Fr value is 69.16. This value is greater than the value of Fr at 5% and 1% level of significance which are 7.81 and 11.34 respectively. Thus, result is highly significant difference favoring treatment 1 followed by treatment 2 and treatment 3. the least preferred is still the control.

V. CONCLUSIONS AND RECOMMENDATIONS

This study was aimed to improve the quality of nipa wine. Specifically, it was intended to determine what fruit juices that

can be added to nipa wine that improve its quality; compare the sample treatments in terms of taste, color and aroma; and determine the cost of production of the different samples.

The different treatments were: T0-Nipa wine (NW) control, T1 Nipa wine + Mulberry fruit extract T2 NW + Pineapple, and Treatment 3 NW + Calamansi. The samples were evaluated by 30 panel of judges in terms of taste, aroma and color. Data were analyzed using ranking and rank difference was further tested using the Friedman's rank test.

Results revealed that T1 was the most preferred sample in terms of taste and color while treatment 2 on aroma. The least preferred treatment was the control. Rank differences showed highly significant result in their taste, aroma and color.

From the result of the study, it can concluded that the quality of nipa wine can be further improve using fruit juice additives. Hence, the following recommendations are forwarded: Mass Production of the improved nipa wine should be undertaken as part of the income generating activities of the college; Promotion of the improved nipa wine should be done especially in trade fairs; The alcohol, sugar content and other nutrients content should be done which is a needed in the development of product label; Design and development of packaging materials should be done for an added market value; Conduct other researches which focuses on other fruit additives should be done; and similar studies should be conducted especially to other wine of less economic value.

REFERENCES

- Anderson, A. B. 1987. Management of Native Palm Forests: A Comparison of Case Studies in Indonesia and Brazil. In: Agroforestry: realities, Possibilities and Potentials. Dordrecht, Netherland. 155-167.
- Banzon, J. A. 1984. harvestable Energy from the Coconut Palm. Energy in Agriculture. 3:337-344.
- Coconut Research Institute. 1967. Toddy tapping. Ceylon Leaflet No. 48 pp 13.
- Cunningham, A. B. Income, Sap Yield and Effects of Sap Tapping on Palms in South-Eastern Africa. S. Afr. J. Bot. 56(2): 137-144.
- Current Utilization and further Development of the Palmyra Palm (*Borassus flabellifer*) in tamil, Nadu State, India. Economic Botany, 41(2): 247-266.
- Encendencia, E. M. 1985. Versatile Nipa: Potential resource for various Economic Needs. NSTA Technology Journal/ July-Sept. pp4-12.
- Fox, J F. 1997. Harvest of the Palm, Ecological change in Eastern Indonesia. Harvard University press. Cambridge, England p 290 .
- Hamilton, L. S. and Murphy D H. 1988. use and Management of Nipa Palm (*Nypha fruticans*, Arecaceae): A Review Economic Botany. 42 (92): 206-213.
- Kiew, r. 1989. Utilization of Palms in peninsula Malaysia, Malayan Naturalist.43 (1 & 2): 43-67.
- Nutritional and Health Benefits of Citrus Fruits. <http://www.allmarke.com/citrus.html>
- Pineapple (Raw). <http://www.moondragon.org/nutrition/foodguide/pineapple.html>
- Quimbo, L. L. 1991. Increasing Nipa Sap Yield Improved Mechanical tapping. Technology. PCARRD. The Philippines. XIII (4): p16.
- <http://www.mulberryleaftea.com/>
- <http://www.itmonline.org/arts/morus.htm>
- <http://www.nnc.da.gov>