



RESEARCH ARTICLE

Development and acceptability of mead wine with banana fruit flavor

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Abstract

The study discusses the development and acceptability of mead wine with banana fruit flavor. Banana, a brilliantly sweet natural product with firm and rich tissue is available for harvest all year round. It is comprised mainly of sugar and fiber, which makes it a source of fiber. In this study, the researcher used banana fruit as its flavor since cultivation and plantation of the said fruit in the locale of the study is plentiful. An experimental approach was utilized in this investigation, with fifty individuals assessing the mead wine with banana fruit flavor in terms of appearance, aroma, flavor and texture. The research used various statistical treatments, such as mean and T-test, in evaluating the obtained data. It was found that the mead wine with banana fruit flavor had an alcohol content of 12%. Furthermore, the respondents extremely liked the mead wine with banana fruit flavor because of its appearance and aroma, which obtained the highest appraisal from the respondents based on their sensory evaluation. The study uncovered that mead wine with banana fruit flavor has the potential to be utilized as an ingredient for wine production. Moreover, amid the appraisal of the respondents, the aroma, flavor, appearance and texture of the produced mead wine with banana fruit flavor were essentially influenced. Generally, the taster respondents extremely liked the mead wine with banana fruit flavor. Therefore, it is a highly appropriate product in the community in generating enterprise which could be a potential source of income.

Keywords

income, vitality, acceptability, flavour, aroma, appearance, texture

Introduction

Bananas (*Musa sapientum*) are a non-seasonal fruit and are common in tropical countries. It is bountifully available in the Philippines. Due to its high sugar content, it is a reasonable element for the production of wine (1). Depending upon cultivar and readiness, the substance can shift in taste from starchy to sweet and in texture from firm to soft. Both the skin and internal portions can be eaten raw or cooked. Banana flavor is rich also with other chemicals like isoamyl acetate, which is one of the most common constituents of banana oil. While, wine is a type of alcoholic beverage that is typically made from fermented natural juice product. Any natural product with a high sugar content could be used for wine production. Wines are labelled according to the fruit flavor used so as to inform the public about their components and contents.

Banana wine is a sweet-smelling, custom-made refreshment with a light natural flavor, honey color, and a unique taste. The most common fixings required are ready bananas. It can be made sweet or dry depending upon the formula being utilized and you'll be able to mix it with other wines for more vitality and flavor.

The type of fruit wine to be produced manages the natural product and strain of yeast to be involved (2). Wine production has not been a major showcase in the Philippines, although it has been included in the generation of bottled palm wine utilizing chemical preservatives. Bioaccumulation of chemical additives poses potential threats due to either harmfulness or pro-toxicity (3). It is thus pertinent to look for the implied means of creating wines devoid of chemically-added substances. Bananas have desirable qualities; this fruit is good for treating digestive-related illnesses. It helps in the proper production of hemoglobin in the blood. Furthermore, it is high in potassium, which helps to lower blood pressure and reduces the risk of stroke (4), as well as breast cancer (5) and renal cell carcinoma (6) in women.

Eating bananas as part of a regular diet can reduce the risk of having a stroke by up to 40%. In this way, wine delivered from a banana is highly acceptable. This consideration was pointed to small-scale wine generation with alluring organoleptic properties from bananas for prompt utilization without chemical additives.

The Philippines is one of the leading five exporters of bananas, with over 2.85 million metric tons sent out in 2017 (7). In 2018, the country conveyed a total of 9.36 million metric tons of bananas (8), with Cavendish cultivars accounting for around 52% of the banana era. Saba (27%) and Lakatan (10%). At the beginning of the century, as many as 90 cultivars were assessed to be created for neighborhood utilization. For the period of October to December 2020, the banana era was assessed at 2.40 million metric tons. It was 0.4 % higher than the previous year's total of 2.39 million metric tons. The Cavendish grouping had the highest raised era of 1.21 million metric tons, accounting for 50.4 % of the overall banana era. This was followed by the Saba combination with a 28.5 % share (8).

The production of mead wine with banana fruit flavor requires careful selection of the ingredients to be used, the fermentation process to be applied, and the proportion of the ingredients in developing and producing a honey wine. The goal of this research project was to produce a high-quality mead wine infused with banana fruit flavor. It also aimed to determine the alcohol content of mead wine with banana fruit flavor as well as its acceptability. A sensory assessment was utilized to determine the acceptability of the product among taster respondents, focusing on its appearance, aroma, flavor, and texture. In the end, the study also evaluated the return on investment, considering that it could be a potential income source and a revenue-generating enterprise by immediately producing a cheaper wine on the market.

Materials and Methods

The ingredients used in making the mead wine with banana fruit flavor were 4.5 liters of water, 600 ml of honey, 1.4 kg / 3lb bananas, 900g / 2lb sugar, 1/4 tsp tannin, 3 tsp acid blend, 1/2 tsp pectic enzyme, 1 tsp yeast nutrient, 1 campden tablet, 1 sachet yeast (ideally lallemand EC-1118). The tools and equipment used were a large stock pot, small fermenting bucket, demijohn, syphon, fine straining bag and airlock and bung.

The procedures involved in making the mead wine with banana fruit flavor were the following: First, bring half of the water to a boil in the huge stockpot. While the water is heating up, cut the bananas into quarters, counting the skins and place them in the straining sack. Submerge the straining sack in the boiling water and cook for 30 min. on low heat. Then, after simmering for 30 min., expel the pot from the heat. Lift out the straining sack with the bananas and set it to one side for a moment. Pour the fluid from the pot into a disinfected fermenting bucket and, after that, include the straining sack with the bananas as well. Next, take the remaining half of the water and add it to the stockpot with the sugar. Bring to a boil, then blend to dissolve the sugar and prevent it from burning. Simmer for several min., then remove from the heat and add to the fermenter. In conjunction with this, add the acid blend, tannin and yeast supplement. Let it cool to room temperature.

Once cooled, include the crushed Campden tablet and blend completely, allowing it to stand for at least 12 hrs. Finally, after at least 12 hrs, add the pectic enzyme and blend altogether. 24 hrs after including the pectic enzyme, include the yeast by sprinkling it onto the surface of the must, fitting a top and airlock. Fermentation will start some days after this.

To determine the alcohol content of the mead wine with banana fruit flavor, the following equipment were utilized: distillation apparatus, alcohol hydrometer, measuring cylinder, thermometer, retort stands and clamps. The study took two readings with what was known as a wine hydrometer: one reading was taken at some point in time before fermentation began, and the other reading was taken after the fermentation had wrapped up.

Research Design

An experimental approach was utilized in this investigation (9). The mead wine with banana fruit flavor was decided by its advancement and adequacy by assessing the liquor substance and a tangible evaluation as to its appearance, aroma, taste, texture and general worthiness. The emotional and explanatory test assessments were utilized in this research.

Sensory Evaluation of Mead wine with Banana fruit flavour

The physical properties of mead wine with banana fruit flavor, particularly the appearance, aroma, flavor, and texture, have been determined by organoleptic testing or appraisal of the consumer's worthiness of wine. To decide the ultimate product's market acceptability, 50 male and

female individuals, comprising of 25 consumers and 25 non-drinkers, who showed up to be physically fit, were selected as taste panelists, employing intentional testing to evaluate the manufactured mead wine with banana fruit flavor, employing a 4-point Likert Scale Quality Score. Taste panelists were asked to rate the wine test utilizing the scoring sheet, which was clearly clarified and examined by them. The wine was handled appropriately and was served in a clean, clear wine glass.

The Likert scale below was used in the evaluation:

Scale	Description
3.26–4.0	Extremely Like
2.51–3.25	Like
1.76–2.5	Dislike
1.0–1.75	Extremely Dislike

In terms of statistical treatment utilized within the study, the data were examined using weighted mean to achieve the rundown rating and depict the tangible assessments of the wine as well as T-test to decide the presence of significant differences in tests of produced mead wine with banana fruit flavor.

Results and Discussion

The following presents the results and discussion of the study with this order: alcohol content of mead wine with banana fruit flavor; sensory evaluation of honey wine with banana fruit flavor using the four parameters: appearance, aroma, flavor and texture; the test of significant difference of the product; and the return on investment.

A. Alcohol content of mead wine with banana fruit flavour

The study utilized the wine hydrometer test to find out the amount or content of alcohol within the produced mead wine with banana fruit flavor. The wine hydrometer was taken at the same time the yeast was included in the wine. In the midst of this point, inside the wine-making handle, the wine reading test was around 15%. The reading was taken at the point where the surface of the liquid crossed the scale. This reading appeared to show how much alcohol the wine could have had on the occasion that all the sugars were matured. The numbers obtained from the gravity hydrometer were recorded.

Another reading was taken with the hydrometer after fermentation was completed. The reading was around +1 on the potential alcohol scale. By comparing the two gravity hydrometer readings, the study determined the wine's alcohol level, which was proportionate to 14%.

By comparing the two hydrometer readings, with suitable accuracy, the study determined how much liquor content was within the honey wine with banana fruit flavor. Furthermore, the reading was absolutely chosen after the discernment based on how high or low the hydrometer had coasted in a liquid. The study endeavored to figure out how much sugar the wine or wine must contain. It was found that the higher the wine hydrometer floats, the more sugar

amount present in the liquid and thus the opposite. This is in support in the study conducted of Baua M A I. Development and acceptability of mead wine with calamansi fruit flavor.

B. Sensory Evaluation of the Respondents

Table 1 presents the common evaluation of the respondents on determining the acceptability of the mead wine with banana fruit flavor, focusing on its appearance, aroma, flavor and texture, with an average mean of 3.77, indicating that the mead wine with banana fruit flavor was profoundly accepted by the respondents.

Table 1. Sensory evaluation of the respondents

Variables	Weighted mean	Descriptive Interpretation
Appearance	3.77	Extremely Like
Aroma	3.5	Extremely Like
Flavour	3.73	Extremely Like
Texture	3.63	Extremely Like
Overall	3.77	Extremely Like

Based on the given indicators, "appearance" obtained the highest weighted mean, equivalent to 3.77, with an interpretation of "extremely like". It was followed by "flavor" with a weighted mean of 3.73 and a verbal interpretation of "extremely like".

Of the four indicators listed, "aroma" got the lowest weighted mean of 3.5 with a verbal interpretation of "extremely like".

As the wine has been poured inside the glass, the time to begin its assessment has at long last come. The examination of wine may be a series of particular and specific stages, and the essential one is around its appearance. Wine's appearance evaluation is, possibly, the evaluation stage that takes the smallest amount of time in this case compared to others, and it is likely the stage where one pays the least amount of thought; this will be likely since it is considered as an examination of little significance (10). Other than that, wine's appearance appraisal can additionally show some conceivable surrenders and imperfections as well as choose their causes. Last, it can tell the wine's age, as well as the by and large state and advancement (11).

As to the appraisal of the appearance as an essential examination conducted on wine tasting, as the stage that allows us to "make friends" with wine, it is crucial to pay correct attention to this in order to induce the analyzer to have the proper slant and concentration for the taking after stages (12). It needs to be taken note that wine's appearance, which is the result of this evaluation, can conflictingly or decidedly affect the taster's slant towards the wine itself. A wine that is considered to have a terrible appearance, or other than not having those characteristics that would meet the taster's wants, can antagonistically slant the analyzer to all the other stages. In a sense, this is usually what happens when one sees something elegantly brilliant, and as a result of this mental fulfilment, it'll be earnestly affected and slanted (13). In any case, a capable analyzer must not be affected by what he or she sees, at least not completely.

There are apparent changes in the pH of the banana wines during fermentation. It was observed that the pH values reduced with the period of fermentation, clearly due to the era of acids from the blended fermentation as well as the life forms in a microbial progression. A malo-lactic maturation is clearly visible. Besides, increases in values with periods of fermentation were clearly observed due to growing microbial stacks with periods of fermentation. It was observed that values decreased with the period of fermentation. This may well be due to microbial utilization of supplements (basically sugars) inside the juice for metabolic work outs with the advancement of CO₂ and heat.

Table 2 shows the test for significant difference in the sensory evaluation of mead wine with banana fruit flavor in terms of appearance, aroma, flavor and texture. It reveals that the computed t-values of 3.75 (appearance), 4.29 (aroma), 5.46 (flavor) and 2.76 (texture) are more significant than the critical value of 2.04, which suggests that the samples have a significant relationship in the development and acceptability of the product based on the responses made by the respondents.

Table 2. Test of significance on the mead wine with banana fruit flavour

Variables	Computed t-value	Critical Value	Decision	Interpretation
Appearance	3.75	2.04	Reject	Significant
Aroma	4.29	2.04	Reject	Significant
Flavour	5.46	2.04	Reject	Significant
Texture	2.76	2.04	Reject	Significant

df = 29, @ = 0.05,

Learning how to taste wine incorporates locks within the faculties of sight, smell, taste and touch, all with the objective of finding a wine to suit your sense of taste. Wine has been a part of human civilization for thousands of years, but it hasn't ceaselessly tasted as awesome as what we drink these days. Wine quality has improved exponentially over the last century as winemakers discovered better wine-creation and wine-making techniques. In a world view, commerce grants us the opportunity to drink wines from all corners of the world, and the net licenses each buyer to share their supposition, which makes it more imperative to know how to taste wine, so you'll get to know what's in your glass and find wines you really appreciate (14).

Return of Investment

A. Input

600 ml honey	300.00
600 ml banana fruit	75.00
35 g yeast	10.00
2000 ml water	10.00
4 bottles with seal and cup	152.00
LPG	20.00
TOTAL	567.00 php

B. Output

4 Bottles of Honey Wine with Banana Flavor.

4 Bottles @ a market competitive price of 170 php per bottle = 680.00 php

C. Net Income

$$(B-A) = 113.00$$

D. Return on investment

$$(\text{Net Income}/\text{gross Expenses}) \times 100 = 19.9\%$$

Investing in wine may be an advantageous elective venture also for additional income while at the same time gives nutritive value items for the consumer. The mead wine with banana fruit flavor grandstand has outflanked most of the world's value and exchange-traded stores. Mead wine with banana fruit flavor includes a track record of passing on relentless advancement and strong returns that has outflanked budgetary markets and commodities over the long term (15). Investing in mead wine with banana fruit flavor is both charming and uncommonly satisfying, giving the opportunity to examine, get it, and claim a number of the finest luxury things in the world. The mead wine with banana fruit flavor's chronicled execution has driven numerous theorists to see it as a significant, selective asset that can be utilized to distinguish a theory portfolio, passing on relentlessness and advancement that can de-risk a venture technique and secure riches.

Considering the statistical findings of having 32.44% of Filipinos having less than one drink per week and 20.64% does one to three drinks per week (21) in the average total population of the Philippines of about 112 million. The mead wine with banana flavor when marketed at a cheaper price against its closest competitor available in the market can potentially spark a satisfying demand for the product. Thus, making a revenue enterprise out of mead wine with banana flavor production and commercialization is relatively viable.

The mead wine with banana fruit flavor, which is seen as investment-grade, is of an incredibly high quality, seen by the world's leading critics, conveyed under strict conditions by the world's greatest wine producers and, critically, the demand for these wines underpin an energetic assistant notice which drives costs to outstandingly basic levels (16). By this, we mean a survey method of ownership would ensure the wine has been stored in idealized conditions to protect the wine's incredible quality.

Conclusion

The study aimed to develop and find out the acceptability of mead wine with banana fruit flavor. It was known that this could be possibly in the locality of the study since bananas are available everywhere. The product presented to the respondents was extremely acceptable to them in terms of alcohol content, appearance, aroma, flavor and texture. The study revealed that the banana fruit has the potential to be used as an ingredient for honey wine production. Results revealed that mead wine with banana fruit flavor was most accepted or extremely liked by the taster respondents. Mead wine with banana fruit flavor will have a positive return on investment in the commercialization of the product in the market.

In order to boost the advancement and market ac-

ceptability of the mead wine with banana fruit flavor, producers ought to focus on alluring, fitting, and exact wine names that incorporate the total points of interest like alcohol content, labels, caution messages, and varietal distinguishing proof. These criteria ought to be met since names are all approximately the information (both expressed and downplayed) that producers need to convey.

Moreover, there should be a continuous sustainability of production, adapting the latest trends in wine innovation. Further studies on the utilization of other fruits as flavoring for wine should be considered. Lastly, further studies on the fermentation process of mead wine with banana flavor should be given emphasis.

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Compliance with ethical standards

Conflict of interest: The author has no conflict of interest

Ethical issues: None

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