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RESEARCH ARTICLE

ACCEPTABILITY OF DEVELOPED YAMBO (SYZYGIIUM JAMBOS)FRUIT AS TEA-SUBSTITUTE

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Abstract

This study was conducted to determine the acceptability of developed yambo (*Syzygiumjambos*) fruit as tea-substitute as evaluated by the taste panelists based on its sensory quality. The researcher harvested ripe fruits of yambo from different barangays of Cavinti, Laguna, along the river side and lake shore. Boiled tea was submitted for microbial analysis to test the safety of the product. This research emphasizes that underutilized fruits like yambo can be developed into other products which serve as an eye opener for its value. This study sought answers to the following questions: (1) Is yambo fruit can be made or developed as tea?; (2) Is yambo fruit tea safe to drink by the panelists in terms of microbial present?; (3) What are the levels of acceptability of yambo fruit tea-substitute in terms of color, aroma, flavor, consistency and general acceptability?; (4) Is there significant difference in the acceptability of developed yambo based on the profile of the panelists?; and (5) Is there significant difference in the degree of acceptability of developed yamboas tea-substitute according to its level in grams? Yambo fruit was developed into tea. Experimental method was employed to answer the above stated problems. There are 4 treatments. Each one has variation of tea content per bag but mixed with same amount of sugar. A score- sheet was used to test its acceptability using the five parameters. Yambo fruit tea was prepared by applying the following procedures: collection of yambo fruit, weighing, blanching, cutting, cabinet drying, pin milling, and packaging. Findings of the study disclosed that all the treatments are acceptable but the treatment which has 10 grams of yambo emerged as the most highly acceptable among the taste panelists irrespective of sex and age. Further, the study limits its scope only on the microbial analysis of yambo as fruit tea-substitute. Therefore, it is recommended to conduct further studies on the toxicity level and shelf - life of the tea.

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Introduction:-

Making fruit as tea, juice and other beverages is one of the latest trends in food preservation. People are fond of drinking any of them because they are refreshing, readily available and affordable.

A lot of unconventional/underutilized fruits can be used as raw materials for beverages. Most of them are good sources of nutrients, vitamins and anti-oxidants. The nutritive value of these plant species revealed valuable sources

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of minerals and vitamins, often lacking in the daily diet of the rural poor (Wagan, 2009). It was also pointed out by Eleazar (2012) that because those fruits are neglected, the Department of Agriculture-Bureau of Agricultural Research (DA-BAR) gave emphasis on the said fruits by conducting studies on the nutritional and processing value of species, product developments and approaches for developing novel products and uses. Analysis of nutritional and processing value has a direct link to food security and sustainability as well as potential markets for crops and their products.

The Philippines is among the countries in the tropics endowed with rich natural biodiversity. Despite this, only a few plant species are being fully utilized today for food, income and even for environmental conservation and enhancement. Laguna is one of the provinces in the country that is characterized by diverse agricultural landscape which often consists of mixed cropping systems where underutilized crops are a major component. At least 83 underutilized plant species were identified, mostly tropical fruit trees and shrubs that serve as vegetables; medicinal herbs and root crops that are locally consumed.

Most of the underutilized fruits have high economic and nutritive values and therefore they should be preserved. One of these is yambo which has been found to have health and medicinal values yet is considered as unknown or never been heard by many people in the country. Yambo (*Syzygium jambos*) is a flowering plant that belongs to the myrtle family, Myrtaceae. It thrives best in tropical to semi-tropical agro-climatic conditions on a loamy type of soil. This tree is native to Southeast Asia. Its fruit contains protein, iron, fat, carbohydrates, calcium, calories, ash, magnesium, phosphorus, sodium, potassium, carotene, thiamine, riboflavin, niacin, ascorbic acid, and fiber which make it a health food. It is beneficial for the liver and brain as it boosts the vigor of these major organs. The fruit also has a diuretic function while the flower, when sweetened, has the ability to reduce fever. The leaf decoction can be used to relieve sore eyes and rheumatism. The seeds can aid in dysentery, catarrh (inflammation/irritation of the mucous membrane), diarrhea, and diabetes (Orwa et al, 2009)

In the past years, Yambo trees used to be abundant in Cavinti, Laguna. But because locals are not aware of its importance, the said tree has been neglected and endangered. Cavinti is a third class municipality in the province of Laguna in the Philippines. It is situated in the Sierra Madre mountain range, and part of the 4th congressional district of Laguna. It is an agricultural town and is blessed by numbers of rivers and some man-made lakes, with a population of 20,809 people in 2010 (NSO). The main source of income of most of the families is farming. Uncontrolled population explosion in the area calls for more food supplies and source of income. Thus, utilizing and developing indigenous crops present in the area like yambo fruit will somehow help solve the said problem by using it as raw material for beverages like tea.

Methods and Materials:-

This study used the experimental research design. The basic purpose of experimental research is to discover the influence of one or more factors upon a condition, group or situation, purpose of which to discover what will be. It describes and analyses variables in carefully controlled conditions as a basis or reference for inferring or concluding. Experimental research, therefore consist of manipulating an experimental variable under highly controlled condition to determine how and why a specific situations occur (Manuel and Mendel, 2007). In this study, the researcher tried to find out if the panelist choice was influenced by their age, gender and the amount of yambo fruit tea-substitute content for every tea bag.

There are four treatments in this experiment and each treatment is replicated three times. The treatments were different amounts of yambo fruit-tea substitute as suggested by the researchers of Institute of Food Science and Technology, University of the Philippines, Los Baños, Laguna, as follows:

Treatment 1 - 3 grams of yambo fruit tea-substitute diluted in 2% sugar in water solution.

Treatment 2 – 5 grams of yambo fruit tea-substitute diluted in 2% sugar in water solution.

Treatment 3 - 7 grams of yambo fruit tea-substitute diluted in 2% sugar in water solution.

Treatment 4 – 10 grams of yambo fruit tea-substitute diluted in 2% sugar in water solution.

The subject of the study was Yambo or Tampoy (*Syzygium jambos*). It was developed into tea. As recommended by the researchers from the Institute of Food Science and Technology, University of the Philippines, Los Baños, Laguna, fresh fruit was dried, milled, and packed into tea bag according to the treatments which are 3 grams, 5 grams, 7 grams and 10 grams. Each treatment was boiled for 3 minutes in 100 ml of water with 2 grams of sugar.

The acceptability of yambo tea - substitute was evaluated by the taste panelists using the researcher-made score-sheet. It contains information to be filled-up by the taste panelist of different ages and sexes. A one to five hedonic point scale was used for the color, flavor, aroma, consistency and general acceptability, with five as the highest and one as the lowest. There are different descriptions for each parameter which are indicated below for each criterion.

Sample	COLOR					AROMA					FLAVOR					CONSISTENCY					GENERAL ACCEPTABILITY				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1																									
2																									
3																									
4																									
	Very dark				5	Very strong				5	Very strong				5	Very runny				5	Very acceptable				5
	Moderately dark				4	Moderately strong				4	Moderately strong				4	Moderately runny				4	Moderately acceptable				4
	Neither light nor dark				3	Neither strong nor weak				3	Neither strong nor weak				3	Neither viscous nor runny				3	Neither acceptable nor unacceptable				3
	Moderately light				2	Moderately weak				2	Moderately weak				2	Moderately viscous				2	Moderately unacceptable				2
	Very light				1	Very weak				1	Very weak				1	Very viscous				1	Very unacceptable				1

Also, the median score obtained from the result of the analysis was interpreted verbally as follows:

Median Score	Verbal Interpretation
4.21 – 5.00	Very Much Like
3.41 – 4.20	Like
2.61 – 3.40	Neither Like nor Dislike
1.81 – 2.60	Dislike
1.00 – 1.80	Very Much Dislike

Purposive sampling was done in choosing the panelists who assessed the yambo tea- substitute.

Result and Discussion:-

The 30 untrained taste panelists were chosen to have a representation of the population with age and sex consideration. Age and sex were the factors of evaluation of acceptability of yambo fruit tea – substitute.

The findings of the study show that there is no significant difference in the degree of acceptability of yambo fruit tea substitute in terms of age of the respondent. Also, the sex earned a computed statistics of 0.0171 which is lower than the 0.05 level of significance, thus the null hypothesis was rejected. (See Appendix)

This emphasizes that the male panelists like yambo fruit tea-substitute as compared to their female counterparts.

Table 1 shows the result of acceptability of yambo fruit tea-substitute in terms of five parameters: a) color; b) aroma; c) flavour; d) consistency; and e) general acceptability using the Kruskal-wallis or H-Test.

Table 1:- Difference on the degree of acceptability of yambofruit (*S. jambos*) as Tea - Substitute.

Parameters	Amount of Yambo Tea Substitute in grams	Median	H-value	p-value	Difference
Color	3	2.36c	62.59	<0.0001	Significant
	5	2.69 c			
	7	3.29 b			
	10	4.11a			
Aroma	3	2.73 c	45.41	<0.0001	Significant
	5	3.29 bc			
	7	3.66 b			
	10	4.20 a			
Flavor	3	3.02 c	52.80	<0.0001	Significant
	5	3.57bc			
	7	3.73 b			
	10	4.49 a			
Consistency	3	3.89 b	18.78	0.0003	Significant
	5	4.09 b			
	7	4.12 b			
	10	4.56 a			
General Acceptability	3	3.98 b	30.15	<0.0001	Significant
	5	4.08 b			
	7	4.58 a			
	10	4.82 a			

* Median Scores with the same letter are statistically the same at 5% level of significance.

Median Score	Verbal Interpretation
4.21 – 5.00	Very Much Like
3.41 – 4.20	Like
2.61 – 3.40	Neither Like nor Dislike
1.81 – 2.60	Dislike
1.00 – 1.80	Very Much Dislike

The result of analysis of data reveals that there is highly significant difference among the treatments with respect to the five parameters. Since all the p-value is less than the threshold value of 0.05, thus the null hypothesis was rejected. This implies that all treatments were accepted by all the panelists irrespective of the amount of the tea-substitute content per tea bag.

Further analysis indicates that treatment IV which weighs 10 grams is considered highly acceptable as compared to other treatments having a consistent median of 4. It was followed by treatment III weighing 7 grams. However, treatment I which weighs 3 grams is considered as the least accepted among the treatments. It can be inferred that most of the people preferred higher amount of yambo fruit-tea substitute content in their drink or beverages.

Drewnowski(1997) found out on their study that individual most likely sweet foods regardless of age, sex or races. Result of study displays that the higher level contents of tea-substitute the sweeter it may result, therefore the higher the acceptability level.

Moreover, because the yielded results show that there is significant difference in the acceptability level of the panelist to the different samples. This means that the panelist varies in their choices or preference to yambo fruit tea-substitute. This also means that the panelist may be able to accept yambo fruit tea - substitute using 3 grams, 5 grams, 7 grams and 10 grams depending on the acceptability preference of the drinker.

Table 2 discloses the result of microbial analyses of yambo tea in 4 parameters namely Aerobic Plate Count, Coliform Count, E. coli Count and Yeast&Mold Count.

Table 2:- Microbial analyses of yambo (*S. jambos*) tea.

Parameter	Content Cfu/ml
Aerobic Plate Count, cfu/mL	<1*
Coliform Count. Cfu/mL	<1*
E. coli Count. Cfu/mL	<1*
Yeast & Mold Count, cfu/mL	<1*

It can be gleaned that the sample yambo fruit tea - substitute obtained <1 for all parameters which means there is no growth of microbes in 10° dilution. The asterisk means estimated Plate Count. In comparison to DOST's reference, the yambo tea sample is safe because it is less than the acceptable level of microorganism determined by a specific method of beverages which is 10². Therefore, it is safe to drink.

Conclusion:-

Findings of the study discloses that all the panelist have same preference irrespective of age. Regardless of age, they accepted the yambo tea-substitute. They all liked yambo as the main ingredient for making tea. However in terms of sex, on the other hand, male individuals accepted yambo tea-substitute more than the female ones. Further, the entire panelists have the same acceptability level considering all the parameters: a) color; b) aroma; c) flavour; d) consistency; and e) general acceptability. Moreover, Yambo tea - substitute containing 10 grams is highly acceptable by all the panelists. This study limits only on the microbial analysis of the product, hence, further study studies on the toxicity level and shelf - life of the tea.

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