CALAMANSI-BLUE TERNATE-LEMON GRASS READY TO DRINK JUICE

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ABSTRACT This study was conducted to develop a calamansi-blue ternate-emon grass ready to drink juice. The calamansi, blue ternate and lemon grass extract or juice were processed and combined with a proportion of 8% Calamansi + 62% Blue Ternate + 10% Lemon Grass + 20% Sugar Solution. The finish product was subjected to pasteurization using a water retort at different processing temperature varying from 70-75°C. Calamansi, Blue ternate, Lemon Grass Ready to Drink Juice was subjected to sensory evaluation using a 9 point hedonic scale to determine its general acceptability. Result revealed that the product was very much liked by the respondents as to its taste, appearance and aroma. Laboratory analysis revealed that the Ready to Drink Calamansi Blue ternate Lemon grass Juice pasteurized at 70 °C has a pH level of 2.65 and total titratable acidity as citric acid of 0.44%, on the other hand the Ready to Drink Calamansi Blue ternate Lemon grass Juice pasteurized at 75°C has pH=2.68 and total titratable acidity as citric acid = .48%. In terms of the microbial analysis, it was found out that both RTD Calamansi Blue ternate lemon grass juice at 70 °C and RTD Calamansi Blue ternate lemon grass juice at 75 °C has an Aerobic Plate Count of < 1 cfu/ml sample, an Escherichia coli Count which is < 0.018 MPN/ml sample and Molds and Yeast Count of 1 cfu/ml sample.

Keywords: calamansi, blue ternate, lemon grass, water retort, juice

INTRODUCTION

Fruit or vegetable based Ready-To-Drink juices are popular drinks as they contain antioxidants, vitamins, and minerals that are essential for human being and play important role in the prevention of heart diseases, cancer, and diabetes. The combination of locally available ingredients in the development of Ready-To-Drink juices is now a trend in healthy lifestyle of the consumers as it's gradually gain popularity.

In the Philippines, one of the commonly consumed fruit beverage is calamansi juice. Considering its vitamin C and certain antioxidants such as limonene, potassium, vitamin A, and calcium, Calamansi (Citrofortunella macrocarpa) or calamondin / Philippine lime, regardless of its sour taste many people still consume it regularly as it is perceived to have multiple health benefits. To further enhance the taste, appearance and aroma of RTD juices, some people have upgraded their preparations as they combined two or more ingredients. Aside from its amazing brain boosting luminous property, Asian Pigeon Wings, Blue Bell Vine, Blue Pea, Cordofan Pea and Darwin pea, 'Butterfly Pea' (Clitoria ternatea) has gain popularity because of its indigo color which have been used to give aesthetics in both food and beverages.

Lemongrass (Cymbopogon citratus) on the other hand is a widely used herb in tropical countries, especially in Southeast Asia as it is used in aromatherapy. Many researchers have reported that lemongrass (Cymbopogon citratus) and its essential oil was bactericidal and fungicidal against a broad range of microorganisms, both pathogenic and spoilage (Naik et al., 2010). Among eight essential oils that were evaluated, lemongrass essential oil showed the strongest fungicidal effect against the target microorganisms in fruit juices (Helal et al., 2006).

Bacterial and microbial contamination are some of the major pitfalls in the fruit juice industry, thus , business owners and researchers created methods that are currently and commonly used to prevent microbial deterioration of fruit juices during storage. which include thermal processing (pasteurization) and the utilization of allowed food preservatives (Eissa, et al., 2008).

Objectives of the Study

This study aimed the following: (1) to develop calamansi- blue ternate-lemon grass ready to drink juice pasteurized using the water retort; (2) to conduct chemical analysis of the product as to pH and total titratable acidity after subjected to pasteurization at different temperature; and (3) to conduct biological test as to the Aerobic Plate Count(APC), yeast and molds counts, E.coli content of the product.

METHODOLOGY

Procurement. The materials needed in the experiment were procured from the local calamansi, blue ternate and lemon grass growers while the study was held in the Western Visayas Food Innovation Center.

Method of preparing calamansi extract, blue ternate and lemon grass decoction

1. Washing of the Raw Materials. Calamansi fruits, blue ternate and lemon grass were thoroughly washed to ensure the cleanliness of raw materials;
2. Extraction of calamansi juice. The topmost of the calamansi fruits were sliced to avoid injuring the seeds to

prevent the bitter taste of the product. The fruits were squeezed to extract the juice. The extracted juice was strained to separate the seeds from the juice;

3. Preparation of blue ternate and lemon grass decoction. With the ratio of 1:1, a kilo of lemon grass was boiled in 1 liter of water for 15 minutes. The decoction was transferred to a container to let cool. The same process was done with the blue ternate, with lesser boiling period of 5 minutes; and

4. Preparation of Calamansi-Blue Ternate-Lemon grass ready to drink juice. Calamansi juice, Blue Ternate and Lemon grass decoction were combined and added with sugar to enhance taste of the product.

Pasteurization of the Product using the Water Retort. The water retort was employed for the pasteurization process. At a varying temperature of 70 °C and 75 °C, the products were pasteurized for 10 minutes.

Experimental Design. The experiment was conducted using a Two-way Anova experimental design following the formulation as stated in Table 1.

Table 1.Experimental Design

Treatment	Pasteurization Temperature
T_0	0
T_1	70 °C
T_2	75°C

Product Performance Evaluation and Testing:

Sensory Evaluation. The 9 point Hedonic Scale was used for sensory evaluation to assess the product as to its color, taste, and aroma. Fifteen (15) students and fifteen (15) faculty and staff members were taken as respondents.

Chemical Analysis. After the pasteurization process at varying temperature, samples of Calamansi-Blue Ternate-Lemon Grass ready to drink juice were analyzed for pH and total titratable acidity.

Microbial Analysis. The 100 mL Calamansi-Blue Ternate-Lemon Grass ready to drink juice sample was subjected to microbial analysis to determine the Aerobic Plate count (APC), yeast and molds and Escherichia coli contents of the product.

RESULTS AND DISCUSSION

Sensory Evaluation. It was done to 30 faculty and staff and students of GSC in order to determine the acceptability level of Calamansi-Blue Ternate-Lemon Grass ready to drink juice in reference to its: color, taste and aroma. A 9-point Hedonic Scale was used. These were: Extremely Like (9), Very much Like(8), Moderately Liked (7), Slightly Liked (6), Neither Liked or Disliked (5), Slightly Disliked (4), Moderately Disliked (3), Very much Disliked (2) and Extremely Disliked (1). As to its color, the product was identified by the respondents as solid pale purple having the mean of 7.67 (Like very much). For its aroma, the product has the mean of 7.15(Like Very Much). As to the product's taste, it was evaluated by the respondents as desirable with the mean of 7.27. This implies that the product was generally acceptable.

Table 2. Results on Sensory Evaluation

Sensory	Characteristics	Mean	Acceptability
Color	Pale Solid Purple	7.67	Like very much
Aroma	Desirable	7.15	Slightly like
Taste	Desirable	7.27	Like very much
	Overall Mean	7.36	Like very much

Scale: 9 (Extremely liked), 8 (Very much liked), 7 (Moderately liked), 6 (Slightly liked), 5 (Neither liked or disliked), 4 (Slightly liked), 3 (Moderately liked), 2 (Very much disliked), 1 (Extremely disliked)

Chemical Analysis. The Calamansi-Blue Ternate-Lemon Grass ready to drink juice was analyzed for its pH and total titratable acidity. In chemical analysis for pH of the product, the result showed that in a 100 mL sample of Calamansi-Blue Ternate-Lemon Grass ready to drink juice pasteurized at 70 °C has a pH level of 2.65, while samples pasteurized at 75°C has pH=2.68. This implies that the varying temperature has a direct effect on the pH level of the product.

As to the total titratable acidity, the analysis also showed that the 100 mL Calamansi-Blue Ternate-Lemon Grass ready to drink juice pasteurized at 70 °C has a total titratable acidity as citric acid of 0.44%, while the samples pasteurized at 75°C has and total titratable acidity as citric acid of .48%. This implies that total titratable acidity of the product was affected by the varying temperature during the treatment.

Table 3. Results in Chemical Analysis

Sample Description	Parameter	Processing Temperature	
		70°C	75°C
100mL sample of Calamansi-Blue Ternate-Lemon Grass ready to drink juice	pH	2.65	2.68
	Total Titratable Acidity as Acetic Acid	0.44%	.48%

Microbial Analysis. Product was analyzed as to the Aerobic Plate count (APC), yeast and molds and Escherichia coli contents. The results revealed that samples of 100 mL Calamansi-Blue Ternate-Lemon Grass ready to drink juice pasteurized in 70 °C and 75 °C has an Aerobic Plate Count of < 1 cfu/ml sample, an Escherichia coli Count of < 0.018 MPN/ml sample and Molds and Yeast Count of 1 cfu/ml. This implies that the product passed the standard of food safety in terms of estimated Aerobic Plate Count, Escherichia coli Count and Molds and Yeast Count

Table 4. Results on Microbial Analysis

Sample Description	Parameter	Result
100mL sample Calamansi-Blue Ternate-Lemon Grass ready to drink juice	Aerobic Plate Count	< 1 cfu/ml (estimated)
	Escherichia coli Count	< 0.018 MPN/ml sample
	Molds and Yeast Count	1 cfu/ml

CONCLUSION

The pH and total titratable acidity of the product varies along with the increasing temperature employed during the pasteurization. The pasteurization process reduced the APC, Molds and Yeast Count and E. coli Count in the product.

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