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QUALITY ANALYSIS OF JACKFRUIT WINE

[1]T. UMA MAHESWARI, [2]VIDHU VALSAN

[1,2] Department of Horticulture, Faculty of Agriculture, Annamalai University, Annamalainagar, Tamil Nadu – 608002.
Email: umahorti2003@gmail.com, valsanvidhu95@gmail.com

Abstract: **The present experiment was conducted at Post Harvest Lab, Dept. of Horticulture, Faculty of Agriculture, Annamalai University to prepare wine by processing of jackfruit and to evaluate the nutritional qualities. Matured well ripened jackfruit bulbs of MuttomVarikka variety were selected for the study. The study was conducted with five replications and four formulations in Completely Randomized Design varying only in sugar concentrations (T_1: 50%, T_2: 45%, T_3: 40%, T_4: 35%). Ten untrained panelists performed sensory evaluation test of the processed wine using 9 point hedonic scale. Among the treatments, T_4 with 35% of sugar significantly recorded higher alcohol percentage (15.72%) over rest of the treatments followed by T_3 with 40% sugar (15.36%). The treatment, T_1 with 50% of sugar recorded significantly lower alcohol percentage (14.53%). The highest ascorbic acid content was recorded in T_1 with 50% sugar (1.78 mg/100g) followed by T_2 with 45% of sugar (1.63 mg/100g) and lowest ascorbic acid content was recorded in T_4 with 35% of sugar(1.58 mg/100g). After six months of storage, quality of the wine regarding colour, taste, flavor and overall acceptability were increased to that of freshly processed wine. The benefit cost ratio of was calculated for the production of 1 kg of wine.Based on the results, formulation T_3 secured the overall acceptability for sensory and nutritional evaluation.**

Keywords: **Jackfruit, Wine, Quality analysis.**

1. INTRODUCTION

Jackfruit (*Artocarpus heterophyllus*) belongs to the family Moraceae, and can be considered as the largest fruit among the edible fruits. Ripe jackfruit comprises 3 parts namely: the skin (fibrous portion) these constitute 50% of the fruit weight, then the pulp (bulbs) constitute 25-40% of fruit weight. The seed, embedded in pulps, constitute 12-15% of fruit weight. Jackfruit performs well in humid regions up-to an elevation of 1000m. Deep well drained soils are ideal for jackfruit cultivation. Among the types of jack fruit *viz.*, Soft fleshed (koozha) and firm fleshed (varikka), firm fleshed type is highly tasty, sweet and crisp. The fruit has a delicious taste, captivating flavour, attractive colour and excellent quality, which make it suitable for processing and value addition. Different types of value-added products can be prepared by processing of jackfruit bulbs, seeds and rind. Besides alternate ways of using jackfruit in on-season place a significant roles in postharvest losses. Among them, processing is important one. Hence a study was conducted to prepare wine from Jackfruit and analyse the quality of the wine for acceptability.

2. MATERIALS AND METHODS

Fresh matured and well ripened jackfruit was collected from the local market in Chidambaram of Tamil Nadu, while other ingredients used in formulations were purchased from different stores. To develop wine from jackfruit, the experiments were conducted with four formulations and five replications of each processed products. Completely Randomized Design (CRD) was applied for analysis of experimental data**.** Matured and well ripened jackfruit bulbs were taken for the preparation of wine. Four formulations were prepared with variation in sugar concentration (Table 1). The bulbs were removed and seeds were extracted. Well ripened bulbs were cut into small cubes and all the spices (Cinnamon- 2 inch bark; Poppy seeds- 10 in number; Cardamom- 2-3 in number; Star anise- 1 in number; Cloves- 2-3 in number) were wrapped in a muslin cloth and kept aside. Water was boiled and cooled in a vessel with lid.Jack pieces, sugar, and the wrapped spices were added to the boiled water and finally yeast was added for fermentation. The lid was closed tightly and stirred regularly for 30 days. After 30 days, the wine was strained and stored in a clean glass bottle.

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3. RESULTS AND DISCUSSION

The nutritional analysis of wine was carried out by evaluation of different nutritional properties, such as alcohol percentage, ascorbic acid content and total sugars. The results was presented in the Fig. 1.Among the treatments, T_4 with 35% of sugar significantly recorded higher alcohol percentage (15.72%) over rest of the treatments followed by T_3 with 40% sugar (15.36%). The treatment, T_1 with 50% of sugar recorded significantly lower alcohol percentage (14.53%). The highest ascorbic acid content was recorded in T_1 with 50% sugar (1.78 mg/100g) followed by T_2 with 45% of sugar (1.63 mg/100g) and lowest ascorbic acid content was recorded in T_4 with 35% of sugar(1.58 mg/100g).

The average sensory scores for taste (7.7), colour (8.5), flavour (8.1) and overall acceptability (8.1) of jackfruit wine was initially maximum in T_1 with 50% of sugar concentration and the scores got increased during storage period. The scores recorded for all the parameters were maximum (taste-8.5, colour-8.8, flavour-8.7 and overall acceptability-8.8) in T_1 till the last month of evaluation (Table 2). The sensory scores for all the formulations showed increasing trend during the period of evaluation. Good aroma was also recorded as maximum in T_1 and T_4, and this might be due to the formation of esters by reduction of both alcohol and acids (Singh and Manjrekar, 1976) upon aging. The taste of wine was associated to reduction in acidity and mellowing of its harshness upon aging. Both flavour and taste increased, whereas astringency decreased upon aging due to the reduction in acidity and precipitation of potassium tartarate (Kundu *et al*., 1980 and Padshetty *et al*., 1982). From the table 3, it could be inferred that the total cost of production estimated was Rs.177.23 and the cost for sale of 1 litre of wine was Rs.310.00, thus the net profit obtained was Rs.132.77 and the benefit cost ratio for developing of jackfruit wine was 1.74.

4. CONCLUSION

In wine, T_4 (35% of sugar) was evaluated as the best treatment when compared to others with an alcohol content of 15.72%, ascorbic acid content of 1.58 mg/100g, total sugar of 4.08 mg/100g and TSS of 1.70˚ Brix. T_4 was observed as a sample with maximum shelf life period of more than eight months. The average sensory scores for taste, colour, flavour and overall acceptability of jackfruit wine was initially maximum (colour- 8.5, taste- 7.7, flavour- 8.1 and overall acceptability- 8.1) in T_1 with 50% of sugar concentration followed by T_4 (colour- 7.5, taste- 8.0, flavour- 7.7 and overall acceptability- 8.1) during 1st month of evaluation. The same trend was maintained in all months of evaluation with gradual reduction in scores. Cost of production of 1litre of wine was also estimated with a net profit of Rs.132.77 and the benefit cost ratio of 1.74.

Table 1: Formulations for jackfruit Wine (Variations in sugar concentration)

Ingredients	**T_1 (50%)**	**T_2 (45%)**	**T_3 (40%)**	**T_4 (35%)**
Chopped Jackfruit	1 kg	1 kg	1 kg	1kg
Sugar	**500g**	**450g**	**400g**	**350g**
Yeast	½ tsp	½ tsp	½ tsp	½ tsp
Water (ml)	450	450	450	450

Table 2: Sensory scoring for Jackfruit Wine for six months

	T_1 (50% of sugar)				**T_2 (45% of sugar)**				**T_3 (40% of sugar)**				**T_4 (35% of sugar)**			
Months	Taste	Colour	Flavour	Overall acceptability	Taste	Colour	Flavour	Overall acceptability	Taste	Colour	Flavour	Overall acceptability	Taste	Colour	Flavour	Overall acceptability
1	8.0	9.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	9.0	8.0	8.0	8.0	8.0
2	9.0	8.0	9.0	9.0	8.0	9.0	8.0	9.0	8.0	8.0	8.0	8.0	9.0	8.0	8.0	9.0
3	9.0	9.0	9.0	9.0	8.0	9.0	8.0	9.0	9.0	9.0	8.0	8.0	9.0	8.0	9.0	9.0
4	9.0	9.0	8.0	9.0	8.0	9.0	8.0	8.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
5	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	8.0	9.0	8.0	9.0	9.0	8.0	8.0	8.0
6	8.0	9.0	9.0	9.0	9.0	8.0	8.0	9.0	9.0	9.0	8.0	9.0	9.0	8.0	9.0	9.0

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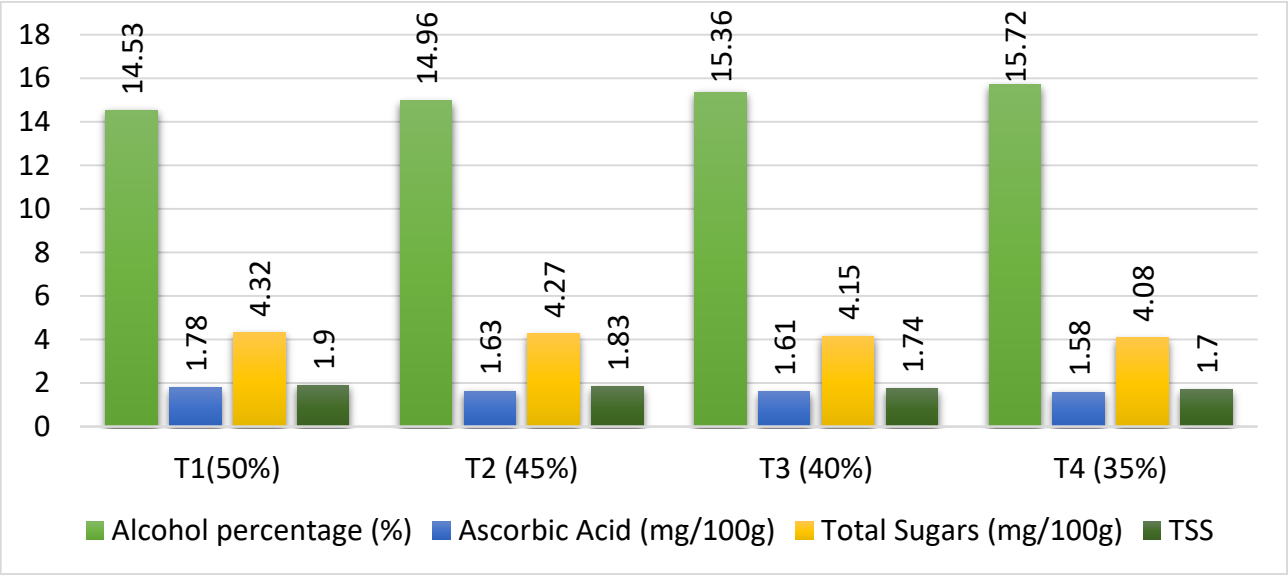
Table 2. Nutritional analysis of Jackfruit Wine



T_1 - 50% of sugar concentration; T_3 - 40% of sugar concentration

T_2 - 45% of sugar concentration; T_4 - 35% of sugar concentration

Table 3: Cost economics of Wine

Descriptions	Quantity	Rate (Rs)
Chopped Jackfruit	2kg	200.00
Sugar	850g	34.00
Yeast	2g	5.30
Water (ml)	900ml	23.00
Mud pot	1 no.	55.00
Total		Rs.317.30
Cost of Packaging material		Rs.25.00
Labour cost		Rs.187.50
Total variable cost for 1 hr.		Rs.176.60
Total fixed cost		Rs.0.63
Total cost of production		Rs.177.23
Sale of product/kg		Rs.310.00
Net Profit		Rs.132.77
Benefit Cost Ratio		1.74

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