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Comparative Analysis of Papaya Wine from other Fruit Wine

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Wine was produced from various selected fruits such as papaya, banana, tomatoes, pumpkin and beetroot using strains of *Saccharomyces cerevisiae* and subjected to physico-chemical analysis using standard analytical methods. The alcohol content after one month aging papaya wine was 11.13%, Banana wine was 11.20%, Tomato wine was 6.00%, Pumpkin wine was 4.57% and Beet root wine was 4.50%. The sensory evaluation was done using 8 judge panels after aging for 1 month. Observations were recorded for color, clarity, body & taste on a 5 point scale with 5 points for excellent quality & 1 point for bad quality. The papaya wine fetched an overall quality score of 4.5, followed by banana wine 3.80, Tomato wine 3.75, beet root wine 3.25 and pumpkin wine 3.00. When compared to papaya wine from other wine the papaya wine show good quality and alcohol content.

Key words: Fruits wine, *Saccharomyces cerevisiae*, Physico-chemical analysis, Sensory evaluation.

Non- availability of grapes, the fruit of choice for wine production in the tropics has necessitated the use of alternative fruits in the production of wine in Negiria and other tropical countries (Amerine *et al*., 1980; Alobo, 2002). Tropical wines are subjectively perceived as inferior in quality on the basis of flavour, aroma, bouquet and colour. The major problems associate with the use of tropical fruits in wine production include their low sugar content, high acidity and the presence of an array of microorganisms other than wine yeast (*Saccharomyces cerevisiae* var *ellipsodeus*). Fruits are very essential for our health. Wine is one of the functional fermented foods and many health benefits. In this present investigation papaya wine was prepared and compared to various selected fruit wine.

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MATERIAL AND METHODS

Procurement of various selected fruits and Yeast strain

The papaya, banana, tomatoes, bumpkin and beet root were used for the preparation of various selected fruits wine were procured from local market. The yeast *Saccharomyces cerevisiae* culture isolated from rotten papaya fruits. The culture was maintained on malt agar medium and stored at refrigerator.

Inoculum preparation

The inoculum was prepared by inoculating the slant culture into 10ml test tube incubated overnight then 3% inoculum transferred to 100ml of the sterile malt broth medium taken in 250ml flask and grown it on a rotary shaker for 48 h. After incubation period the culture was used for preparation of wine.

Tomato wine preparation

One kg of Tomato was taken and it was completely peeled off. This yielded 850 ml of tomato pulp. The pulp was mascerated in mixie / blender and pasteurized at 85 – 90°C to 5 minutes. After cooling required amount of cane sugar was added to adjust final TSS to 24ºBrix. The pure culture of the wine yeast *Saccharomyces cerevisiae* was added and mixed thoroughly and was allowed to ferment at a controlled temperature of 24 to 26°C. Egg albumin at a rate of 20ml was added as a source of nitrogen and phosphorous to yeast. During the primary fermentation, the must was aerated daily up to 9 days. The treatments were kept for primary fermentation at 24 to 26°C 9 days with periodic aeration. After 9 days all the treatment were filtered through muslin cloth and the filtrate was kept for secondary fermentation in plastic bottle with air Lack / water seal to prevent the entry of external oxygen into the bottle and for release the carbon dioxide (CO_2) developed during fermentation. The Secondary fermentation was carried out for a period of 2 weeks at same temperature. After two weeks the evaluation of CO_2 ceased and the wine was clarified by centrifugation at 5000rpm. The sediment was discarded and the clear wine was filled in sterile bottles of 200ml capacity and crown corked. The same bottles were pasteurized at 50°C for 15mins. The pasteurized bottles of wine were kept for aging at ambient temperature.

Papaya wine preparation

One kg of papaya fruits was taken, and it was completely peeled off. This yielded 950 kg of beetroot pulp was mascerated in mixie / blender and pasteurized at 85 – 90°C for 5 minutes. Similar procedure was carried out by tomato wine preparation.

Beetroot wine preparation

One kg of two hundred g Beetroot was taken, and it was completely peeled off. This yielded one kg of beetroot pulp was mascerated in mixie / blender and pasteurized at 85 – 90°C for 5 minutes. Similar procedure was carried out by tomato wine preparation.

Bumpkin wine preparation

One and half kg of pumpkin was taken and it was completely peeled off. This yielded one kg of pumpkin pulp. The pulp was mascerated in mixie / blender and pasteurized at 85 – 90°C for 5 minutes. Similar procedure was carried out by tomato wine preparation.

Physico-chemical analysis

The TSS content was determined using Erma hand refractometer. The pH was determined using an ELICO model digital pH meter. The acidity volatile acidity and total sugar were determined as per the procedure described as by Ranganna, 1986. The alcohol content was determined as per the standard procedures (AOAC, 2005).

Banana wine preparation

One kg of Tomato was taken and it was completely peeled off. This yielded 850 ml of tomato pulp. The pulp was mascerated in mixie / blender and pasteurized at 85 – 90°C to 5 minutes. Similar procedure was carried out by tomato wine.

RESULTS AND DISCUSSION

The TSS of must on the initial day on 24ºBrix it kept on the decreasing all the fruit wine during fermentation and aging. The final TSS after one month aging papaya wine was 11.10, Banana wine was 11.41, Tomato wine was 10.80, Pumpkin wine was 16.42 and Beet root wine was 16.42º Brix. In the total acidity after one month aging papaya wine was 0.84%, Banana wine was 0.65%, Tomato wine was 0.86%, Pumpkin wine was 0.63% and Beet root wine was 0.60%. In the Volatile acidity after

Table 1. Physico-chemical analysis of various fruit wine

Various fruits wine	TSS (Brix)	Acidity (%)	Volatile acidity (%)	pH	Total sugar	Alcohol (%)	Clarity	Microbial count	Organoleptic evaluation
Papaya	11.10	0.84	0.600	3.84	0.43	11.13	0.849	320 ×10³	4.50
Beetroot	16.42	0.60	0.004	3.6	1.80	4.50	0.671	325 ×10³	3.25
Pumpkin	15.43	0.63	0.080	4.5	1.80	4.57	0.691	350 ×10³	3.00
Tomato	10.80	0.86	0.065	3.5	0.68	6.00	0.859	285 ×10³	3.75
Banana	11.41	0.65	0.018	3.9	0.70	11.20	0.678	328 ×10³	3.80

one month aging papaya wine was 0.600%, Banana wine was 0.018%, Tomato wine was 0.065%, Pumpkin wine was 0.080% and Beet root wine was 0.004%. The pH of the must varied 4 to 3.5 initially subsequently these value is decreased in all the fruit wine indicating an increase in acidity. The alcohol content after one month aging papaya wine was 11.13%, Banana wine was 11.20%, Tomato wine was 6.00%, Pumpkin wine was 4.57% and Beet root wine was 4.50%.

The total sugar content after one month aging papaya wine was 0.43%, Banana wine was 0.70%, Tomato wine was 0.68%, Pumpkin wine was 1.80% and Beet root wine was 1.84% (Table 1). The microbial population showed all fruits Logarithmic increase during primary fermentation. Subsequently decrease in one month aging. The clarity of the wine showed and increase as reflected by higher transmittance and lower optical density. It could be due to the reason that a lot of yeast cell and their metabolic by products suspended in the wine. The sensory evaluation was done using 8 judge panels after aging for 1 month. Observations were recorded for color, clarity, body & taste on a 5 point scale with 5 points for excellent quality & 1 point for bad quality. The papaya wine fetched an overall quality score of 4.5, followed by banana wine 3.80, Tomato wine 3.75, beet root wine 3.25 and pumpkin wine 3.00.

In this fruits wine significant difference in the content of TSS, total acidity, alcohol content, total sugars, pH of wine samples. This also depends upon the content of alcohol in wine. As the alcohol content increases in wine, the content of total sugar, TSS and pH decrease. Other parameters such as acidity and volatile acidity increase at initial stage and gradually decreases during fermentation storage (Mandeep singh *et al*., 1998; Kulkarni *et al*., 1980; Kotecha *et al*., 1994; Ronnie *et al*., 2001; Maragatham and Panneerselvam, 2008). The reason might probably be due to either precipitate as tartarates or decarboxylated to yield some other products like esters.

CONCLUSION

It can be concluded that all the fruits suitable for wine making. In this study, the papaya given more alcohol production compared to other fruits wine. Next to that banana showed better results. Tomato, Pumpkin and Beet root produced very low quantities of alcohol compared with other fruits wine.

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