IOSR Journal Of Environmental Science, Toxicology And Food Technology (IOSR-JESTFT)
e-ISSN: 2319-2402,p- ISSN: 2319-2399.Volume 8, Issue 1 Ver. IV (Feb. 2014), PP 93-96
www.iosrjournals.org

Production of wine from over ripe guava (Psidium guajava L Cv. Safada) and ber (Ziziphus mauritiana L Cv. Umran) fruits using Saccharomyces crevices Var. HAU 1

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Abstract: *For the production of wine from over ripe guava and ber fruits using Saccharomyces crevices Var. HAU 1 the juices of both guava and ber were extracted and analyzed for TSS, pH, total Sugar and reducing sugar. Further the juices were adjusted with different TSS as 10, 15, 20, 25 and 30% by adding cane sugar in powder form and samples were fermented at 30 °C by using Saccharomyces cerevicesvar HAU 1. It was seen that juice having TSS 15% showed higher ethanol production as compare to juices having different TSS in both guava and ber fruit juices. 15% TSS juices were further adjusted with different pH by using diluted NaOH& H_2SO_4 and kept for fermentation at 30 °C. It was shown that ber and guava juices having pH 4 yield higher alcohol as compare to samples having different pH. It was also seen that there was very less production of alcohol percentage in case of ber juices.*
Key words*: Wine, Guava, Ber, TSS, Saccharomyces cerevices, Fermentation.*

I. Introduction

Guava *(PsidiumguajavaL.Safada)* is the important commercial fruit in India consumed. It is a good source of ascorbic acid, sugars, pectinand some minerals. Its flesh and skin colours vary from variety to variety depending on the pigment type and the amount [1]**.** Tropical Fruit juices have turn out to be important in recent years due to the overall increase in natural fruit juice consumptions as an alternative to the conventional caffeine-containing beverages such as coffee, tea or carbonated soft drink [2]. The flavour and aroma of guava are highly appreciated and is able to compete in the market, either as guava juice or as mixtures with other juices or guava wine. However, the fresh guava juice is gray in colour, turbid, very viscous and tends to settle during storage, and therefore, before commercialization it must be clarified [3].

Guava (*PsidiumguajavaL.Safada*) wine is produced by anaerobic fermentation by yeast in which the sugars are converted into alcohol & carbon dioxide. Ethanol production from guava pulp is reported still there is no study found in literature for guava must fermentation for guava fruit wine production [4]. Therefore, the aim of the present study was to optimization of the fermentation parameter for guava wine production S cereviceVar HAU 1 strains for guava fruit wine production.

Beris a tropical and subtropical fruit native to the northern hemisphere [5]. It belongs to the genus Ziziphus of the family Rhamnaceae and order Rhamnales. Ber is considered an underutilized fruit crop in semi-arid regions of the world and can be successfully cultivated in the marginal ecosystem of the subtropics and tropics [6].

Ber fruit is generally eaten fresh and is a rich source of ascorbic acid, essential minerals and carbohydrates [7]. It is richer than apple and mango in vitamin C, protein and minerals and contains higher phosphorus and iron than orange [8]. In general, the fruits contain 85.9% moisture, 12.8% carbohydrates, 0.8% protein, 0.1% fats, 0.8% iron, 0.03% each of calcium and phosphorus, and 70 I.U. vitamin A/100 g with an energy value of 55 calories/100 g [9]. Lot of studies have been carried out using ber fruits to prepare various processed products, such as candy [10], dehydrated products [11], juice and wine [12], jam and jelly [13], and shreds and powder [14]. The storage life of ber fruits is extremely short and the rapid perishability of the fruits is a problem. At ambient temperature a shelf-life of 2–4 days is common. Due to the surplus of fruits in the local markets during peak season, a substantial quantity goes to waste, resulting in heavy postharvest losses. A cost and returns analysis showed that ber production is highly profitable but requires proper handling with respect to preharvest, harvesting and postharvest treatments, packaging, transportation, storage, postharvest pathology, processing, etc. [15, 16]. Profits could be enhanced if efforts to increase production are supplemented with efforts to maximize the value addition of ber fruit such as wine production.

II. Materials and Methods

Raw material

Guava fruits were taken from the department of Agriculture of HAU, Hisar. The fruits were washed with fresh water. Guava was cut into pieces andber weredestoned.Juiceswere extracted by using simplejuice extractor.

Culture

*Saccharomyces cerevisiae*Var.HAU 1 was obtained from Microbiology Department of HAU, Hisar. The inoculums were prepared by inoculating loopful culture into 10 ml test tubes containing medium broth (YEPD) under sterile conditions. The tubes were kept at 30 degreetemperature for 24 hours and a full test tube along with media is poured into one litter juice of guava and ber juices and incubated at 30 °C for 24 hours under aerobic conditions.

TSS adjustment

The TSS of both juiceswas adjusted by adding cane sugar in powder form and dissolved by heating.

Hand refractometer

Hand refractometer of range 0 to 32 was used to determine the°Brix of the juice.

Sterilization of juice

Juice is sterilized by heating it for 3 minutes on 100 °C in order to reduce the microbial load of juice.

Anaerobic fermentation

For anaerobic fermentation glassbeakers were used. The beakerswere kept air tight.

Determination of ethanol

Standard ethanol cure is obtained by using spectrophotometer. Sample and standard concentrations were prepared by distillation in potassium dichromate solutions per [17].

Determination of total sugar and reducing sugar

Sugar as estimated by the method of Hulme and Narain [18].

III. Results and discussions

Physiochemical properties of fresh guava and ber juices.

The guava and berjuices were analyzed for TSS, total sugar, reducing sugar and pH.The results were 12.467±0.451 and 10.033±0.172 °brix TSS, 11.633±0.401% and 7.667±0.416 total sugar, 5.443±0.401% and 2.567±0.351 reducing sugar, 4.6±0.507 and 4.633±0.153 pH respectively.

Estimation of alcohol percentage of guava and ber juices having different TSS after fermentation.

The data given below in the table shows that the maximum production of alcohol was seen in the fermented juices of guava and ber having initial TSS 15°brix and as the TSS was increased or decreased the alcohol concentration got decreased due to inhibitory action of sugars and lack of nutrients respectively. All the samples were inoculated with 10% v/v S cerevices var. HAU 1 and maintained at 30 degree C for a week of fermentation. It was also seen that alcohol percentage in ber juiceswas very lowas compare to guava. This suggests that the S cerevices var. HAU1 is not suitable for ber fermentation.

TSS °brix	Alcohol Percentage of guava	Alcohol percentage of ber
10	3.798^{a}±0.476^{b}	0.558^{a}±0.042^{b}
15	7.618±0.338	1.847±0.169
20	6.361±0.547	0.962±0.035
25	1.544±0.436	0.548±0.406
30	0.670±0.286	0.379±0.046

Mean = a, Standard deviation = b

Estimation of alcohol percent of guava and ber in juices having different pHafter fermentation.

The optimized TSS juices of both guava and ber were further optimized for pH change on S cerevises var. HAU 1 for alcohol production. It was seen that the alcohol production of both juices were higher on pH 4 and as the pH was decreased the alcohol percentage decreased. In case of ber the alcohol percentage was very less.

pH	Alcohol percentage of guava	Alcohol percentage of ber
4	10.653^{a}±0.615^{b}	2.246^{a}±0.374^{b}
4.5	7.380±0.470	1.879±0.305
5	5.192±0.484	1.430±0.417
5.5	3.419±0.440	0.744±0.228
6	2.112±0.191	0.338±0.158

Mean = a, Standard deviation = b

Fig.1: Guava wine before clarification

Fig.2: Ber wine before clerification

Fig. 3: Yeast Saccharomyces cerevices var. HAU 1

IV. Conclusion

Wine was prepared from guava and ber fruit juices by using yeast Saccharomyces cereviceVar HAU 1. The fermentation process was optimized by adjusting TSS and pH. It was seen that wine prepared from juices having TSS 15 degree brix and pH 4 yield higher alcohols. The maximum alcohol yield in guava fermented juice was 10.653% and that of ber fruit juice it was 2.246%.from the results it was also concluded that Saccharomyces cereviceVar HAU 1 is not suitable for ber wine production.

Acknowledgments

I am very thankful to Centre of Food Science and Technology CCS HAU, Hisar for providing me the financial assistance to carry out this work.

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