Production of Bayberry (*Myrica Nagi*) Wine using Baker Yeast

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***Abstract*—** *Bay berry have very less shelf life up to 3 days under ambient condition. Fortunately, presence of good amount of sugar makes desirable for substrate for wine production. Novelty of this work is to find the suitability of bayberries for wine production using yeast strain Saccharomyces cerevisiae. Juice was extracted from bayberries and analysed for TSS, titrable acidity, pH and alcoholic content and sensory evaluation, it was done at every 2 month intervals till 8th month's tenure. Further juice was adjusted by adding sugar syrup (5g) for initial 30, 60 and 90 days. Roasted wheat granules were added to ameliorate flavour. Sample was stored for the fermentation at 24± 2^0 C. Results have shown that pH was decreased as storage time progressed, initial pH was 3.18 and end pH was 2.40. Titrable acidity showed increased to certain point (2.74% - 3%) than slightly abated to 2.88%. TSS was reduced from 19.3^0 Brix to 17.1^0 Brix was recorded. Alcoholic content showed increase from 6.46% to 9.03%. The study have shown that acceptable and better wine can be produced from bayberry (myrica nagi) using saccharomyces cerevisiae.*

***Keywords*— Wine, Bayberry, TSS, pH, Saccharomyces cerevices, Fermentation, Titrable acidity, alcoholic content.**

I. INTRODUCTION

Bayberry also known as box berry and belongs to the family Myricaceae. It contain good amount of medicinal properties, phytochemicals such as polyphenols, carotenoids and vitamin C (Steinmetz and Potter et al, 1996). Of these phytochemicals, polyphenols are largely recognized as anti-inflammatory, antiviral, antimicrobial and antioxidant agents (Narayana et al, 2001).

It contains 80.60 percent moisture, TSS of about 19.50 % and 12.6 % total sugars. Also, 0.97 per cent protein (Parmar and Kaushal, 1982), Seal (2011) has reported crude fibre content as 7.53 ± 0.22 per cent in Myrica nagi fruits and also, very high amount of carbohydrates found was 76.33 ± 0.26 percent.

Wine is an alcoholic beverage produced from manifold fruit juices through fermentation action of microorganisms either spontaneous or seeding with a particular strain mainly of yeast species to adopt a particular quality of wine. Wine is resulted of anaerobic fermentation by yeast in which the sugars are converted to alcohol and carbon dioxide. (Zoeklein et al, 1995). It is most salient high value added products from fruits.

Commercially produced wines are commonly made from fermented grapes; current research would not using any chemicals or sugars despite different species of yeast to the crushed grapes. Yeast has the ability of changing fruit sugars into alcohol compounds. Wins can be produced from different types of fruits such as mango, pineapple, berries, grapes, Paw-Paw etc., wine name is given same as it is produced from particular fruit name or mixed fruits (Robinson, 2006).

Studies conducted in 2015 has showed that the global wine production has crossed 28 billion litres. Indian wine market has been flourishing from the past decade. The market size was about Rs. 3 billion in 2008 and by 2015 it had already reached Rs. 6 billion (Satish et al, 2018).

There merely less literatures are available for production of wine from bayberries. Therefore, the novelty of this experiment is to study was to optimize of the fermentation parameter also, effect of change in physicochemical parameters such as TSS, titrable acidity, alcoholic content, Sensory analysis such as aroma, taste and colour.

II. MATERIALS AND METHODS

2.1 Sample Collection:

Fruits were collected from farmer in Nainital hills of Uttarakhand in morning and directly brought to lab DRDO DIBER, Haldwani. Then fruits were washed with sterile water and air dried after that juice was extracted.

FIGURE 1: Bay berry fruit juice before clarification

FIGURE 2: Bay berry wine (2th month)

2.2 Methodology:

2.2.1 Experimental detail:

All experiments such as alcoholic content, TSS, titrable acidity, pH were recorded after every two months intervals up to a year. Sample was stored under 24±2^0 C during fermentation. Statistical analysis was done by following complete randomized design. TSS content of fruit was recorded by using digital refractometer H196801 and pH was measured by using pH mater titrable acidity was estimated following the method mentioned in the book Rangana, 1977. And alcoholic content of wine was analysed as per the FSSAI recommendation for alcoholic beverages.

2.2.2 Methodology:

Yeast strains was procured from Biotechnology lab, DIBER, DRDO, haldwani. Rehydration (Murli, Wine yeast) of yeast was done. Then 5% of sugar and yeast were added to the juice after transferring to conical flask after that pasteurisation (water bath) was done for 13-15 min at 60^0 C, Small amount of roasted broken wheat granules were also added to enhance the flavour. Aftermath, sample was placed at anaerobic condition (24±2^0 C). At the end for maturation sample was kept at 4^{0}C for 30 days tenure (Randall, 1987).

III. EXPERIMENTAL RESULTS

3.1 Total soluble solids:

A gradual decreasing trend of TSS was recorded at every 2 months intervals of time throughout the fermentation process till 8 months days. Initial TSS was 19.3^0 Brix and final TSS was 17.1^0 Brix. A gradual decrease trend in TSS was noted by many workers like Ezeronye, (2004) in their experiment with fruit wine.

3.2 Titrable acids:

It gives the total acids present in the wine also, it is the amount of citric acid (E. J. Ajit et al, 2018). Constant increasing in titrable acidity along with fermentation process was reported. Initial titrable acidity was 2.74 % and the final was found 2 .92%. Potty et al. (1978) also recorded increase in acidity in the wines, it is due to production of acids.

3.3 pH:

The pH decreased significantly in the wine, it is due to the increase in acidity (Patil et al., 1995). Initial pH was 3.18 subsequently it abated to 2.40 in 8th month.

3.3.1 Percent alcohol:

In the initial stage alcohol found 6.46%, it showed increase up to 9.13 in 4th. 6th and 8th months.

TABLE 1
MONTH WISE INCREASE IN ALCOHOL

Parameters	Days in month (2nd)	4th month	6th month	8th month
TSS	19.3	18.74	17.82	17.1
Titrable acidity	2.74	2.85	3.0	2.88
pH	3.18	2.9	2.52	2.40
Alcohol content	6.46	7.21	8.65	9.03

3.3.2 Sensory evaluation:

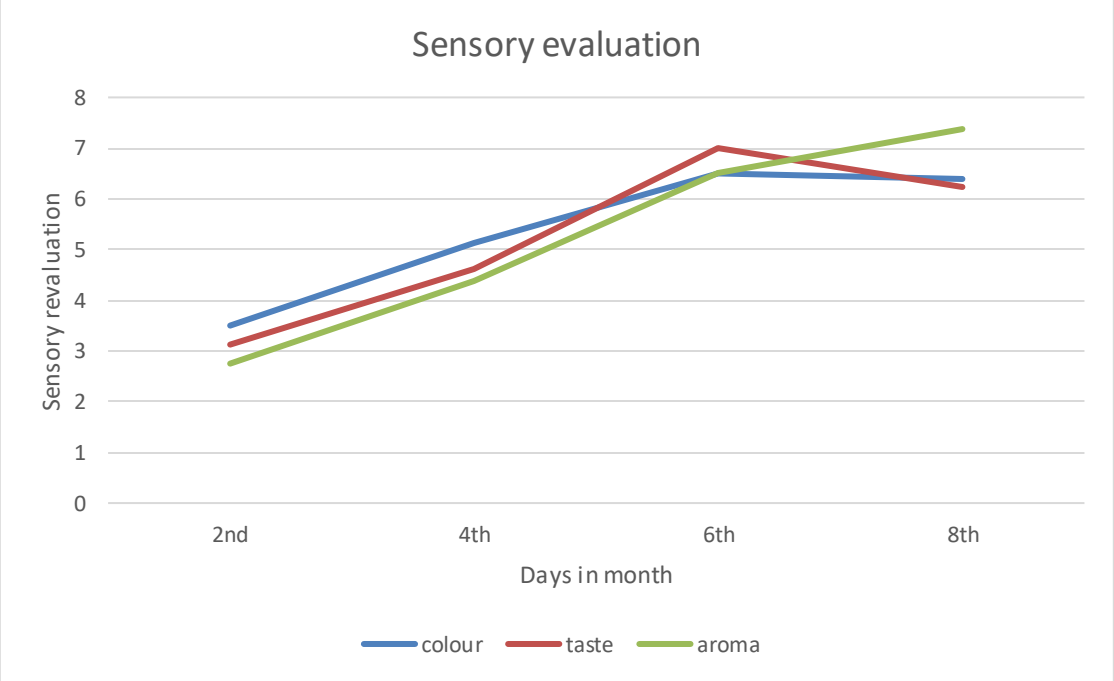

FIGURE 1: Sensory Evaluation Month wise

Sensory evaluation such colour, taste, aroma were done every after 2 months by semi trained members based on 7 hedonic scale points. This was followed up to 8th month duration. In beginning increase in colour and taste was seen over a period aftermath slight decline was seen. And in case of aroma evaluation, trainers reported that there was increasing in aroma throughout fermentation tenure.

IV. CONCLUSION

Bayberries contains good amount of sugar for production of wine. Our current research focused on production of good quality wine using yeast strain *Saccharomyces cerevisiae*. Ultimately 9.03% alcohol has produced in 8th month tenure. Also, broken wheat granules adds good acceptable flavour.

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