

Production of Wine from *Daucus Carota* and Standardizing the Method of Carota Wine Waking

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Abstract

Carrots are rich sources of vitamins and minerals and it has its applications in many diseases but they are seasonal crops and many carrots are wasted as it has high moisture content and it is used as early as possible to overcome this problems and increase its consumption, carrot wines are made which require less sugar concentration and due to its natural sweetness we can prepare carrot wine. In this present work 5 different varieties of carrots are collected from Maharashtra-Karnataka region and juice was extracted by them using curtained defined procedures and 22Brix of sugar concentration is maintained along with 4.5 pH which is a favourable environment for wine production among 5 different types of carrots [1-5]. Chantenay variety showed highest production of alcohol with 8.5% of alcohol production with decrease in sugar concentration by sensory evaluation Chantenay variety has been accepted. Hence Chantenay variety is found to be a good source for wine production.

INTRODUCTION

Carrots are rich sources of vitamins and minerals and it has its applications in many diseases but they are seasonal crops and many carrots are wasted as it has high moisture content and it is used as early as possible to overcome this problems and increase its consumption, carrot wines are made which require less sugar concentration and due to its natural sweetness we can prepare carrot wine. In this present work 5 different varieties of carrots are

collected from Maharashtra-Karnataka region and juice was extracted by them using curtailed defined procedures and 22 Brix of sugar concentration is maintained along with 4.5 pH which is a favorable environment for wine production among 5 different types of carrots. Chantenay variety showed highest production of alcohol with 8.5% of alcohol production with decrease in sugar concentration by sensory evaluation Chantenay variety has been accepted. Hence Chantenay variety is found to be a good source for wine production [6,7].

MATERIALS AND METHODS

Materials

In this investigation we have collected five varieties of carrot samples from different region of Karnataka like Bangalore (Babette), Bellary (Touchon), Gadag (Nantes), Raichur (Chantenay) and Gulbarga (Imperator) and chemicals are procured from Himedia and *saccharomyces cerevisiae* (NCIM-3054).

Preparation of inoculum for wine production

The obtained *saccharomyces cerevisiae* stain was inoculated in a freshly prepared carrot juice. The inoculated broth was kept in an incubator at 37°C in a shaker for 48 hrs for the increscent of the organism [8,9]. After 24 hrs the count of the organism was done by using haemocytometer to determine the optimum number of the yeast cells. The cell count was adjusted to 3×10^8 was taken for further investigation [10].

Preparation of juice from carrot

The juice was extracted from the fully matured and fresh carrot collected from various regions as mentioned, the carrots are washed in running water and with the help of knife the outermost layer of carrot is peeled off. The carrots are then heated at 100°C in a sterile distill water once it is boiled the carrot becomes smooth and juice is extracted from it using a juice maker about around 500 ml of juice is extracted from 1 kg of carrot.

Fermentation setup for wine production

Fermentation of wine is carried out in lab by making a simple set up of fermenter in a lab by using lab equipment's i.e., 5 liter of empty brown bottle and distillation pipes and paraffin are used for the preparation of wine and the setup is kept in a dark room for up to 6-10 days (Figure 1).

Figure 1. Fermentation setup.



Physico-chemical properties of wine

The physico-chemical properties contain pH, Sugar concentration, Titrabale Acidity (TA). Whereas sugar concentration is checked by using Brix meter and pH is determined by using pH meter and Titrabale Acidity (TA) was

determined using AOAC, 1990 chart. The percentage of alcohol produced is determined using the Jacobson's alcohol equation [11].

$$\text{I.e. Alcohol (\%)} = 0.592 (S_i - S_f)$$

S_i = Initial sugar content (°Brix)
 S_f = Final sugar content (°Brix)

All the parameters like pH, Sugar concentration and the alcohol percentage present in wine is checked on the daily basis up to 6 days of fermentation.

Determination of Malic acid fermentation

Malic acid fermentation monitoring is important during the wine production because the traces of Malic acid are able to produce turbidity in wine [12]. To determine the Malic acid fermentation is completed or not. Thin-Layer chromatography technique is used in which mobile phase of n-butyl acetate-acetic acid (2:1) is used. The plates are loaded with the 5 ul of samples and placed in a mobile phase in a closed chamber and run should be performed after the completion of the run, plates are dried for 15-20 mins after drying the plates are sprayed with bromophenol blue, yellow color spots are observed on blue background reveals that there is complete fermentation of Malic acid is done.

Sensory evaluation

Sensory evaluation of all the 4 carrot wines are carried out by the method prescribed by 5-point hedonic scale which have a 5 different categories: Excellent=5; Very Good=4; Good=3; Fair=2 and Poor=1. 15 volunteers are selected for the sensory evaluation from the Gulbarga University. The wines are served in chilled conditions and their opinions are taking down simultaneously. The characteristics are tested namely color, clarity, aroma, alcohol taste and etc. for testing.

RESULTS AND DISCUSSION

Preparation of juice from carrots

A total of five varieties of carrot samples from different region of Karnataka like Bangalore (Babette), Bellary (Touchon), Gadag (Nantes), Raichur (Chantenay) and Gulbarga (Imperator), and these samples are named as sample 1-5 and these samples are cleaned, heated and juices was extracted from these and the physico-chemical analysis of the juice extracted from the carrots are done (Table 1).

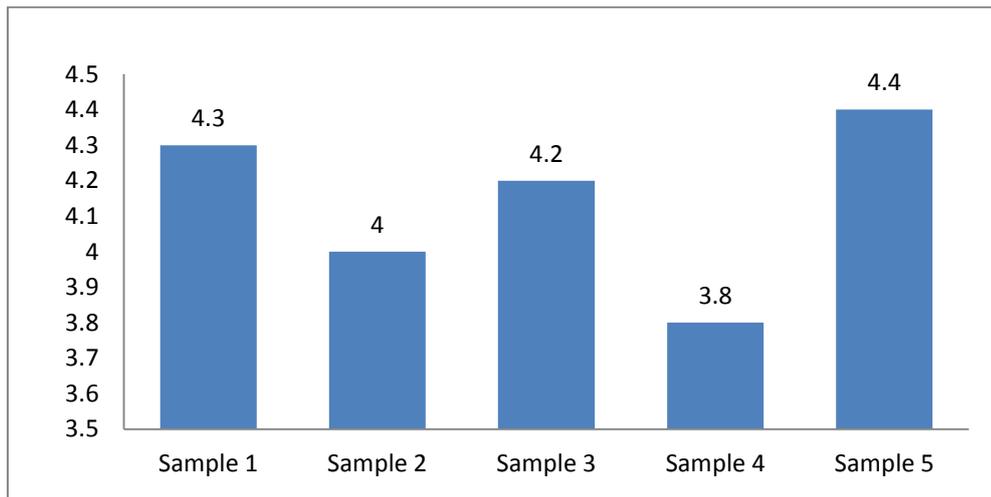
Table 1. Different types of carrots.

Sl.No	Types of Carrot	Sample
1	Babette	Sample-1
2	Touchon	Sample-2
3	Nantes	Sample-3
4	Chantenay	Sample-4
5	Imperator	Sample-5

Determination of pH of the wine

The initial concentration of wine is maintained at pH 4.5 ± 5 by using pH meter after the fermentation there is a decrease in pH is observed in all the fermented wine, as it is observed decrease in pH is the reason of the fermentation (Figure 2).

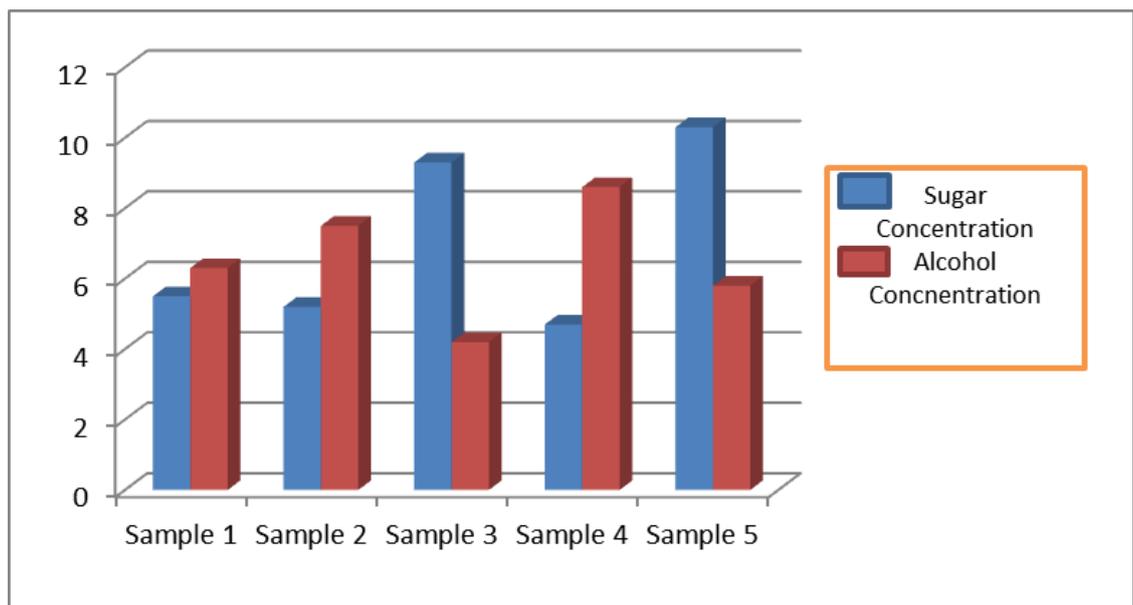
Figure 2. pH of different carrot samples after fermentation.



Determination of sugar and alcohol concentration

Sugar concentration in all the samples are maintained at 22 Brix before the fermentation of the samples. After fermentation there is decrease in the sugar concentration is found which is proportional to the alcohol concentration i.e., Decrease in the sugar concentration is equal to the increase in the wine concentration (Figure 3).

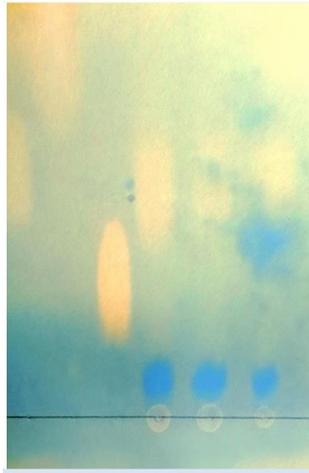
Figure 3. Sugar and alcohol concentration of different carrot samples. Note: (■) Sugar concentration; (■) Alcohol concentration.



Thin-layer chromatography

TLC method is used for the determination of Malic acid fermentation in wine. It is done to determine the production of Malic acid if yellow color spot is produced showed the completion of fermentation of wine (Figure 4).

Figure 4. TLC of fermented wine samples.



In this yellow color is developed against blue background in the sample 4, dark yellow color is seen which shows that the sample 4 is have completed full fermentation when compared with other samples.

Sensory evaluation

The 5 carrot wines had got a very good appreciation in regarding to the aroma, taste, color and clarity in reference to volunteers, in case of clarity sample 4 has had a good result whereas in color sample 2 has developed a vibrant color, whereas in aroma again sample-4 had showed a good and acceptable taste. Out of 15 volunteers 10 volunteers are good going with sample-4 whereas other 5 volunteers are liked sample-3 whereas it is similar to sample-4 but fewer aromas. So from this test we came to conclusion that sample-4 has acceptable taste and color and it is further considered for testing.

DISCUSSION

The alcohol content varied from one grape variety to other grape variety. They observed different values of alcohol contents ranging from 8.9% to 10.8% from the wines of nine grape varieties. It was between 8.8% to 10.8% in wines of 21 red grape varieties [13]. Alcohol per cent in fresh cider varied between 6.46 and 7.09. The lowest alcohol per cent was recorded in Ambri Kashmiri and it was highest in Red Delicious and Granny Smith ciders [14]. The initial alcohol content of orange juice beverage was 8.0%-0.2% and slight increase was observed in the samples stored at 40°C under air head space for 10 weeks of storage [15]. The alcohol content in apple wine was 6%-7% by weight but in case of wines it was 8%-10% by weight [16]. In the present investigation out 5 different varieties of carrot sample-4 showed highest alcohol percentage of 8.6% which is acceptable for consuming and it is further tested for the large-scale fermentations.

CONCLUSION

The wine made from the different carrot varieties showed that if pH of the must should be 4.2 and the sugar concentration was to be 22° brix and the T.A of wine should be 0.52% then the alcohol concentration of above 8% should be produced which is produced from Chantenay variety of carrot to be a good and healthy quality of wine when compared to another fruit wines because carrot has a vitamin A content in it which helps in decrease the night blindness. And it's antibiotic resistant to *E.coli* and *S.aureus* showed that it also has an inhibitory effect to the micro-organisms, it somewhat gives us the resistant to *E.coli* and *S.aureus* born infections. Thus the wines

produced from carrot not only have economical values but an also medical value which is high when compared to the other fruit wines.

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