

“Prepare a sample of mixed fruit wine”

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Abstract

This study was aimed at investigating the suitability of 3 and more fruits, where the increase in number of fruits handles the same properties of generating fermentation for wine making. During the fermentation process the daily lid was opened to stir inner material for better and efficient result of fermentation. Accurate parameters and quantity has been taken for the process. On alternate days the taste of wine was gradually changing as the fermentation period was increasing. Particular condition and climate was maintained for the wine making process. It (fermentation) takes 21 to 25 days to complete efficiently. Till that less contact of oxygen prevents it from forming the undesirable product i.e. vinegar.

Keywords : Pineapple, Orange, Yeast, Jaggery, Sugar, Fermentation

Introduction

Background of wine and wine making

Wine is an alcoholic drink typically made from fermented grapes. Yeast consumes the sugar in the grapes and converts it to ethanol, carbon dioxide and heat. Different varieties of grapes and strains of yeasts are major factors in different styles of wine. These differences result from the complex interactions between the biochemical development of the grape, the reactions involved in fermentation, the grape's growing environment (terroir), and the wine production process. Many countries enact legal appellations intended to define styles and qualities of wine. These typically restrict the geographical origin and permitted varieties of grapes, as well as other aspects of wine production. Wines not made from grapes involve fermentation of additional crops, including rice wine and other fruit wines such as plum, cherry, pomegranate, currant and elderberry. Wine has been produced for thousands of years. The earliest evidence of wine is from ancient China (c. 7000 BC), Georgia (6000 BC), Persia (5000 BC), and Italy (4000 BC). New World wine has some connection to alcoholic beverages made by the indigenous peoples of the Americas but is mainly connected to later Viking area of Vinland and Spanish traditions in New Spain. Later, as Old World wine further developed viticulture techniques, Europe would encompass three of the largest wine-producing regions. Today, the five countries with the largest wine-producing regions are in Italy, Spain, France, the United States, and China.

Types of wine:

Red Wine: Red wine is a type of wine made from dark-colored grape varieties. The actual color of the wine can range from intense violet, typical of young wines, through to brick red for mature wines and brown for older red wines. The juice from most purple grapes is greenish-white, the red color coming from anthocyanin pigments (also called anthocyanins) present in the skin of the grape;

White Wine: exceptions are the relatively uncommon teinturier varieties, which produce a red-colored juice. Much of the red-wine production process therefore involves extraction of color and

flavor components from the grape skin. It is a delicacy around the world. White wine is a wine that is fermented without skin contact. The colour can be straw-yellow, yellow-green, or yellow-gold. It is produced by the alcoholic fermentation of the non-colored pulp of grapes, which may have a skin of any colour. White wine has existed for at least 4000 years. The wide variety of white wines comes from the large number of varieties, methods of winemaking, and ratios of residual sugar. White wine is mainly from "white" grapes, which are green or yellow in colour, such as the Chardonnay, Sauvignon blanc, and Riesling. Some white wine is also made from grapes with colored skin, provided that the obtained wort is not stained. Pinot noir, for example, is commonly used to produce champagne. Among the many types of white wine, dry white wine is the most common. More or less aromatic and tangy, it is derived from the complete fermentation of the wort.

Rose Wine: A rose (from French, rose is a type of wine that incorporates some of the color from the grape skins, but not enough to qualify it as a red wine. It may be the oldest known type of wine, as it is the most straightforward to make with the skin contact method. The pink color can range from a pale "onion-skin" orange to a vivid near-purple, depending on the grape varieties used and winemaking techniques. Usually, the wine is labeled rose in French, Portuguese, and English-speaking countries, Rosado in Spanish, or rosato in Italian. There are three major ways to produce rose wine: skin contact, *soignée*, and blending. Rose wines can be made still, semi-sparkling or sparkling and with a wide range of sweetness levels from highly dry Provencal rose to sweet White Zinfandels and blushes. Rose wines are made from a wide variety of grapes and can be found all around the globe. When rose wine is the primary product, it is produced with the skin contact method. Black-skinned grapes are crushed and the skins are allowed to remain in contact with the juice for a short period, typically two to twenty hours. The grape must is then pressed and the skins discarded, rather than left in contact throughout fermentation (as with red wine making). The longer the skins are left in contact with the juice, the more intense the color of the final wine.

Making of Wines

Winemaking or vinification is the production of wine, starting with the selection of the fruit, its fermentation into alcohol, and the bottling of the finished liquid. The history of wine-making stretches over millennia. The science of wine and winemaking is known as oenology. A winemaker may also be called a vintner. The growing of grapes is viticulture and there are many varieties of grapes. Winemaking can be divided into two general categories: still wine production (without carbonation) and sparkling wine production (with carbonation – natural or injected). Red wine, white wine, and rosé are the other main categories. Although most wine is made from grapes, it may also be made from other plants. (See fruit wine.) Other similar light alcoholic drinks (as opposed to beer or spirits) include mead, made by fermenting honey and water, and kumis, made of fermented mare's milk. There are five basic stages to the wine making process which begins with harvesting or picking. After the harvest, the grapes are taken into a winery and prepared for primary ferment. At this stage red wine making diverges from white wine making. Red wine is made from the must (pulp) of red or black grapes and fermentation occurs together with the grape skins, which give the wine its color. White wine is made by fermenting juice which is made by pressing crushed grapes to extract a juice; the skins are removed and play no further role. Occasionally white wine is made from red grapes; this is done by extracting their juice with minimal contact with the grapes' skins. Rosé wines are either made from red grapes where the juice is allowed to stay in contact with the dark skins long enough to pick up a pinkish color, or (less commonly) by blending red wine with white wine. White and rosé wines extract little of the tannins contained in the skins. To start primary fermentation yeast may be added to the must for red wine or may occur naturally as ambient yeast on the grapes or in the air. Yeast may be added to the juice for white wine. During this fermentation, which often takes between one and two weeks, the yeast converts most of the sugars in the grape juice into ethanol (alcohol) and carbon dioxide. The carbon dioxide is lost to the atmosphere. After the primary fermentation of red grapes the free run wine is pumped off into tanks and the skins are pressed to extract the remaining

juice and wine. The press wine is blended with the free run wine at the winemaker's discretion. The wine is kept warm and the remaining sugars are converted into alcohol and carbon dioxide.

Fermentation Process:

- ✓ Ethanol fermentation, also called alcoholic fermentation, is a biological process which converts sugars such as glucose, fructose, and sucrose into cellular energy, producing ethanol and carbon dioxide as by-products. Because yeasts perform this conversion in the absence of oxygen, alcoholic fermentation is considered an anaerobic process. It also takes place in some species of fish (including goldfish and carp) where (along with lactic acid fermentation) it provides energy when oxygen is scarce.
- ✓ Ethanol fermentation has many uses including alcoholic beverage and ethanol fuel production, and bread dough rising.

Effect of oxygen in fermentation process:

- ✓ Fermentation does not require oxygen. If oxygen is present, some species of yeast (e.g., *Kluyveromyces lactic*) will oxidize pyruvate completely to carbon dioxide and water in a process called cellular respiration, hence these species of yeast will produce ethanol only in an anaerobic environment (not cellular respiration). This phenomenon is known as the Pasteur Effect.
- ✓ However, many types of yeast such as the commonly used baker's yeast *Saccharomyces cerevisiae* or fission yeast *Schizosaccharomyces pombe* under certain conditions, ferment rather than respire even in the presence of oxygen. In wine making this is known as the counter-Pasteur effect. These yeasts will produce ethanol even under aerobic conditions, if they are provided with the right kind of nutrition. During batch fermentation, the rate of ethanol production per milligram of cell protein is maximal for a brief period early in this process and declines progressively as ethanol accumulates in the surrounding broth. Studies demonstrate that the removal of this accumulated ethanol does not immediately restore fermentative activity, and they provide evidence that the decline in metabolic rate is due to physiological changes (including possible ethanol damage) rather than to the presence of ethanol. Several potential causes for the decline in fermentative activity have been investigated. Viability remained at or above 90%, internal pH remained near neutrality, and the specific activities of the glycolytic and alcohologenic enzymes (measured in vitro) remained high throughout batch fermentation. None of these factors appears to be causally related to the fall in fermentative activity during batch fermentation.

Materials and Methods

Details about Manufacturing Process

1. Firstly we have to take collect fruits(pineapple, apple and orange), then wash it and clean it with the help of cloth
2. Then we have to collect all the ingredients which we need for making wine i.e spices,yeast, wheat, brown sugar, etc
3. Now we have to firstly add fruits,wheat, brown sugar, beetroot juice for color, yeast hot water respectively
4. After adding all the ingredients, stir it with a wooden stick.

5. Now seal all the glass containers with the help of food wrapper as it should not come in Contact with air
6. After 24 hrs open the container and stir it properly for 10 mins
7. Do this process in every 2 to 3 days
8. After 28 days filter the wine, hence the wine is ready to serve



Making of mixed fruit wine. (Pineapple and apple)

1. Firstly, I have taken 5 to 5.25 kg of pineapple and apple and washed off it properly with gloves(without skin contact), and cleaned.

2. Then I crush it together in the big vessel and divide it into 2 plates equally. On the other hand water is being prepared to be boiled(2 litre of water).
3. While boiling the water, warm active yeast is prepared (total quantity 5teaspoon). Later 2 fibre containers are taken and each 1 liter of boiled water.
4. In the time being the crushed fruits were distributed equally in each 2 containers where boiled water is supplied to the containers (1 liter each container).
5. Onwards 1.25 kg jaggery was added with spices like lavang, elaichi, dalchini, 1 and half teaspoon of warm active yeast, 100gm of brown sugar and 130 gm of wheat in the first i.e. A1 container, where it mixed thoroughly.
6. In the second i.e. A2 container 850 gm of sugar was added with spices lavang, elaichi, dalchini, 1 and half teaspoon of warm active yeast, 100gm of brown sugar and 130 gm of wheat, where it get mixed thoroughly.
7. All 2 samples or containers containing samples were packed with the lid and went under fermentation for 28 days without excess contact of air. Each day the 2 samples should be stirred for 2 to 3 mins.
8. On the 29th day the wine get ready, filtered and bottled properly for the ageing



Making of mixed fruit wine. (Pineapple, Apple and Orange)

1. Firstly, I have taken 5 kg of pineapple, apples and orange and washed them off properly, removed the peel from them.
2. Then I crush them together in the big vessel and divide it into 4 plates equally. On the other hand water is being prepared to be boiled(4 litre of water).
3. While boiling the water, warm active yeast is prepared (total quantity 4teaspoon). Later 2 fibre containers are taken and each 1 liter of boiled water.
4. In the time being the crushed fruits were distributed equally in each 2 containers where boiled water is supplied to the containers (1 liter each container).
5. Onwards 1.25 kg jaggery was added with spices like lavang, elaichi, dalchini, 1 teaspoon of warm active yeast, 125gm of brown sugar and in the first container
6. In the second container 850 g of sugar was added with spices lavang, elaichi, dalchini, 1 teaspoon of warm active yeast, 125gm of brown sugar.

7. All 2 containers containing samples were packed with the lid and went under fermentation for 28 days. Each day the 2 samples should be stirred for 5 to 10 mins.
8. And hereby wine is ready.



Result :

Sr. no.	Samples	Quantities of fruit.	Fermenting Period (Days)	pH value
A1.	1.25 kg of jaggery	1.25 kg of apple and pineapple.	29	3.57
A2.	850 gm of sugar	1.25 kg of apple and pineapple	29	3.98
A3.	1.25 kg of jaggery	1.25 kg of apple and pineapple and Orange	29	3.88
A4	850 gm of sugar	1.25 kg of apple and pineapple and Ornge	29	3.93



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Ref: NHRDF/RRS-NSK/RD-12/2024-25/

Date: 26.04.2024

TEST REPORT OF _____

Wine

Page 1 of 1

Name & Address of Costumer : Prafull Gangurde
 A/P.Harsul, Tal. -Chandwad, Dist. Nashik (MS),
Name & Kind of sample : Wine-A
Batch No. & MFG Date : -
Lab Registration No. : STBC-241738-01
Money receipt No. : -
Date of sample received : 24.04.2024
Sample Drawn by : Costumer
Test required by the farmer : As under



TEST RESULTS

S. No.	Parameters	Range	Value
1.	pH (pH meter)	Maximum 3.8	3.57
2.	Brix(Hand Refractometer)	-	24.8
3.	Alcohol % (Pycnometer method)	Max. 15.5%	10.34
4.	Volatile acidity (g/lit) (Titric methods)	Max 1.3 g/lit	1.92
5.	Titriable acidity (g/lit) (Titric methods)	10 g/lit	8.85
6.	Reducing sugar (g/lit) (Gold Coast method)	Max. 150 g/lit	136.30
7.	Total sulphur dioxide (mg/lit) (OIV method)	Max. 300 mg/lit	16.0
8.	Free sulphur dioxide (mg/lit) (OIV method)	Max. 150 mg/lit	ND

Please Note: The results contained in this Test Report relate only to the sample tested. This Report is intended only for your guidance and not valid for advertisement. This Report shall not be reproduced without the written consent of NHRDF. According to the test result of above mentioned sample it can be considered fit for human consumption.

Note: ND= not detected

----- End of the result -----

(Signature)
 (Deepak Singh)
 Technical Officer (Soil)

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Ref: NHDRF/RSR-NSK/RD-12/2024-25/

Date: 26.04.2024

TEST REPORT OF _____

Wine

Page 1 of 1

Name & Address of Customer : Akshay Latpate
 A/P.Pantnager, Ghatkopar, East Mumbai
 Name & Kind of sample : Wine-B
 Batch No. & MFG Date : -
 Lab Registration No. : ST9C-241738-02
 Money receipt No. : -
 Date of sample received : 24.04.2024
 Sample Drawn by : Customer
 Test required by the farmer : As under



TEST RESULTS

S. No.	Parameters	Range	Value
1.	pH (pH meter)	Maximum 3.8	3.68
2.	Brix(Hand Refractometer)	-	11.0
3.	Alcohol % (Pycnometer method)	Max. 15.8%	15.16
4.	Volatile acidity (g/lit) (Titric methods)	Max. 1.3 g/lit	0.20
5.	Titriable acidity (g/lit) (Titric methods)	10 g/lit	6.45
6.	Reducing sugar (g/lit) (Gold Coast method)	Max. 180 g/lit	28.6
7.	Total sulphur dioxide (mg/lit) (OIV method)	Max. 300 mg/lit	16.0
8.	Free sulphur dioxide (mg/lit) (OIV method)	Max. 150 mg/lit	ND

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Note: ND= not detected

(Dnyanesh Singh)
 Technical Officer (Soil)

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----- End of the result -----



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Date: 26.04.2024

TEST REPORT OF Wine Page 1 of 1

Name & Address of Costumer : Samadhan Jadhav
 A/P.Gonde Dumal, Tal. -Igatpuri, Dist. Nashik (MS).
 Name & Kind of sample : Wine-C
 Batch No & MFG Date : -
 Lab Registration No. : STBC-241738-3
 Money receipt No. : -
 Date of sample received : 24.04.2024
 Sample Drawn by : Costumer
 Test required by the farmer : As under



TEST RESULTS


S. No.	Parameters	Range	Value
1.	pH (pH meter)	Maximum 3.8	3.98
2.	Brix(Hand Refractometer)	-	23.0
3.	Alcohol % (Pycnometer method)	Max. 15.5%	13.16
4.	Volatile acidity (g/lit) (Titric methods)	Max. 1.3 g/lit	0.32
5.	Titriable acidity (g/lit) (Titric methods)	10 g/lit	4.57
6.	Reducing sugar (g/lit) (Gold Coast method)	Max. 150 g/lit	127.2
7.	Total sulphur dioxide (mg/lit) (OFV method)	Max. 300 mg/lit	18.0
8.	Free sulphur dioxide (mg/lit) (OFV method)	Max. 150 mg/lit	ND

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Note: ND= not detected

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(Deepika Singh)
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TEST REPORT OF Wine Page 1 of 1

Name & Address of Customer : Yodraj Naikwade
 A/P.Nandur Madhmashwar, Tal. -Niphad, Dist. Nashik (MS).

Name & Kind of sample : Wine-D

Batch No & MFG Date : -


Lab Registration No. : STBC-241738-04

Money receipt No. : -

Date of sample received : 24.04.2024

Sample Drawn by : Customer

Test required by the farmer : Aa under




TEST RESULTS

S. No.	Parameters	Range	Value
1.	pH (pH meter)	Maximum 3.8	3.96
2.	Brix(Hand Refractometer)	-	17.0
3.	Alcohol % (Pycnometer method)	Max. 15.5%	15.24
4.	Volatile acidity (g/lit) (Titric methods)	Max 1.3 g/lit	0.36
5.	Titreshle acidity (g/lit) (Titric methods)	10 g/lit	6.8
6.	Reducing sugar (g/lit) (Gold Coast method)	Max. 150 g/lit	162.55
7.	Total sulphur dioxide (mg/lit) (OFV method)	Max. 300 mg/lit	16.0
8.	Free sulphur dioxide (mg/lit) (OFV method)	Max. 150 mg/lit	ND

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Note: ND= not detected


 (Deepak Singh)
 Technical Officer (Soil)

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Applications –

- Preventing heart disease, heart attack, stroke, hardening of the arteries (atherosclerosis), and chest pain (angina). There is some evidence that drinking alcohol can benefit the heart. Drinking one alcoholic beverage per day or drinking alcohol on at least 3 to 4 days per week is a good rule of thumb for people who drink alcohol. But don't drink more than 2 drinks per day. More than two drinks daily can increase the risk of over-all death as well as dying from heart disease. Here is what researchers have found:

- Drinking of alcoholic beverages, including wine, by healthy people seems to reduce the risk of developing heart disease. Moderate alcohol use (one to two drinks per day) reduces the risk of coronary heart disease (CHD), hardening of the arteries (atherosclerosis), and heart attack by approximately 30% to 50% when compared with nondrinkers.
- Light to moderate alcohol use (one to two drinks per day) reduces the risk of having the type of stroke that is caused by a clot in the blood vessel (ischemic stroke), but increases the risk of having the type of stroke caused by a broken blood vessel (hemorrhagic stroke).
- Light to moderate alcohol consumption (one to two drinks per day) in the year before a first heart attack is associated with a reduced risk of death from the heart attack or any other cause compared with non-drinkers.
- In men with coronary heart disease (CHD), consumption of 1-14 alcoholic drinks per week, including wine, doesn't seem to have any effect on the risk of death from heart disease or any other cause, compared with men who drink less than one drink per week. Drinking three or more drinks per day is associated with increased likelihood of death in men with a history of heart attacks.

Conclusion

1. We may say that a limited wine or alcoholic beverage is good for health.
2. The fine wine can be also manufactured from home.
3. This study showed that acceptable wine can be produced from mixed fruits using yeasts especially *Saccharomyces cerevisiae* isolated from palm wine.

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