



Production and Determine alcohol content of Orange wine

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Abstract: Wine is a fermented beverage prepared from different fresh fruit juices. It is produced by fermentation of juice of ripe fruits using a microscopic single-celled organism called yeast (*Saccharomyces cerevisiae*) which digest sugars found in fruit juice, producing alcohol and carbon dioxide gas. Alcohol production is one of the most important parameters to test the efficiency of different strains. Alcohol is a major solvent in wine. Alcohol production is one of the most important parameters to test the efficiency of different strains. Alcohol is a major solvent in wine. Among selected wine producing strains of yeasts the highest alcohol (8.30%) was observed by the yeast strain 3205 and 3215.

Keywords: Wine, Alcohol, Yeast, (*Saccharomyces cerevisiae*) and Orange.

1. INTRODUCTION:

Fermentation has made it possible to obtain wine from the fruits with the application of a variety of microorganisms, especially yeasts. The microbial cell utilizes the nutrition present in the fruits to produce alcohol through fermentation. The alcoholic content in the wine is mainly due to ethanol production. Wines are the healthful beverage that has been seen as a natural remedy for man's illness from early day and are said to aid recovery during convalescent period¹⁰. The quality of wine produced greatly depends on the yeast strain^{6,11}. The physical and chemical characteristics of most commercial orange varieties have been studied thoroughly¹². Fruit wines are undistilled alcoholic beverages usually made from grapes or other fruits such as peaches, plums or apricots, banana, elderberry or black current etc. which are nutritive, more tasty and mild stimulants. These fruits undergo a period of fermentation and ageing. They usually have an alcohol content ranging between 5 to 13 percent⁵.

2. MATERIALS AND METHOD:

A. Collection of yeast strains:

Ten (*S. cerevisiae*) Yeast Strains (NCIM-3045, NCIM- 3185, NCIM-3189, NCIM-3200, NCIM-3283, NCIM-3287, NCIM-3205, NCIM-3095, NCIM- 3315, and NCIM-3215).

B. Collection of Fruits :

The experimental material included in present study consists of orange fruits. Fruits of oranges collected from market of Ahmednagar district of Maharashtra state for production of wine.



C. Flask fermentation of the orange juice:

5% starter culture was used for inoculation of orange juice. Anaerobic fermentation was carried out by using starter cultures (40ml) of different yeast (*S. cerevisiae*) strains for different flasks containing 800ml orange juice at room temperature. Cotton plug was replaced every day in aseptic condition by using laminar air flow. Must sample was collected every day for daily analysis of wine. The fermentation was allowed to last for 9 days and terminated on the 9th day.

D. Racking of orange wine :

After fermentation wine samples was filtered by using muslin cloth and racked to settle down the cell biomass and other debris in wine. Secondary i.e. malolactic fermentation was carried out in this stage. Filtration by using muslin cloth was done at every week; this was done for 4 weeks.

E. Clarification of orange wine :

Clarification of wine is carried out by using gelatin, a fining agent. Settled debris in wine again filtered by using muslin cloth every week, this was done for 4 weeks.

F. Centrifugation orange wine:

Centrifugation of wine was also carried out by using ultra centrifuge for purification of wine.

G. Filtration, Storage and Aging orange wine:

Wine was filtered by using filter of Pure-it to make it free from microbial population. After filtration wine was stored in pre-sterilized glass bottles by appropriate labeling of different strains used in present research and kept at room temperature for aging.

H. Alcohol Determination :

The Total alcohol of the wine samples was determined According to (A.O.A.C, 2000), Present investigation Alcohol Content of Orange wine.

3. RESULT AND DISCUSSION:

Table 01: Physicochemical analysis of juice/wine sample before and after Fermentation.		
Characteristics	Before fermentation	After fermentation (Average)
Alcohol (%)	0.00	7.80

Alcohol Physicochemical Character of Orange wine studied Periods of Zero to Nine Day

A. Ethanol content (%):

Table 02: Variation in Ethanol content (%) during fermentation of orange juice by Selected wine yeast strains										
Days of fermentation	3045	3185	3189	3200	3283	3287	3205	3095	3315	3215
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	3.51	4.02	4.02	4.02	4.02	3.51	3.51	4.02	4.02	4.02
2	5.07	5.60	5.60	5.60	5.60	5.60	6.13	5.60	5.07	6.13
3	6.13	5.8	6.13	6.13	6.13	6.13	7.21	6.13	5.60	6.40
4	6.40	6.67	6.67	6.67	6.67	6.67	7.48	6.67	6.40	7.48
5	6.67	7.21	6.94	7.21	6.94	6.94	7.75	6.94	6.67	7.75
6	7.21	7.48	7.21	7.48	7.21	7.21	8.30	7.21	6.94	8.30



7	7.48	7.75	7.75	7.48	7.48	7.48	8.30	7.48	7.75	8.30
8	7.48	7.75	7.75	7.75	7.75	7.48	8.30	7.48	7.75	8.30
9	7.48	7.75	7.75	7.75	7.75	7.75	8.30	7.48	7.75	8.30

Alcohol production is one of the most important parameters to test the efficiency of different strains. Alcohol is a major solvent in wine. Among selected wine producing strains of yeasts the highest alcohol (8.30%) was observed by the yeast strain 3205 and 3215 followed by 3185, 3189, 3200, 3283, 3287 and 3315 (7.75%) and lowest alcohol was observed by strain 3045 and 3095 (7.48%). These results are in conformity with data reported by ^{3, 14, and 11}. The variation in alcohol production by different yeast strains could be due to variation in their alcohol tolerance limit ¹⁰. During anaerobic growth the yeast utilizes intermediate products like acetaldehydes as hydrogen acceptors for alcohol production. Acetaldehyde serves as the terminal electron acceptor; pyruvate is first decarboxylated, by pyruvate decarboxylase, to yield CO₂ and acetaldehyde. Acetaldehyde is then reduced to ethanol by alcohol dehydrogenase (enzyme present in *S. cerevisiae*), thus regenerating NAD⁺¹³. Quality of wine depends upon the growth and activity of yeast strains. Overall chemical analysis of orange wine indicates that strain NCIM 3205 and 3215 were most efficient wine producing yeast among all.

4. CONCLUSION:

Among selected wine producing strains of yeasts the highest alcohol (8.30%) was observed by the yeast strain 3205 and 3215 followed by 3185, 3189, 3200, 3283, 3287 and 3315 (7.75%) and lowest alcohol was observed by strain 3045 and 3095 (7.48%).

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