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Pawar AS
 Ph.D. Scholar,
 Department of Agriculture
 Biotechnology, Bhagwant
 University, Rajasthan, India

Dr. Kunvar Gyanendra Kumar
 Faculty of Agriculture,
 Department of Biotechnology,
 BU, Rajasthan, India

Waghmare DH
 Research Scholar, Department
 of Biotechnology, VNMKV,
 Maharashtra, India

Dr. RP Singh
 Dean of Agriculture,
 Bhagwant University,
 Rajasthan, India

Quality analysis of orange wine

Pawar AS, Dr. Kunvar Gyanendra Kumar, Waghmare DH and Dr. RP Singh

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Abstract

Fermentation is a widely studied technique in the development of new products with modified physicochemical and sensory qualities especially flavor and nutritional components. The term 'wine' is applied to the product made by the alcoholic fermentation by yeast (*Saccharomyces cerevisiae*) in which the sugars are converted into alcohol and carbon dioxide. Orange wine was produced from the different strains of yeast and analyzed for its qualitative parameters. In between the observation in the view of days for fermentation, pH, titrable acidity, reducing sugar, specific gravity and alcohol content. The pH of all the wines produced from different yeast strains found in the range of 3.4 to 3.05. titrable acidity (%) during fermentation of orange wine was increased from 0.64 to 0.96. TSS was adjusted to 22°Brix. There was rapid decrease in TSS at initial stage of fermentation and it goes with slow rate further. Reducing sugar in wine varies with strains and their efficiency. The results revealed that wine strain NCIM 3215 utilized the sugar more efficiently and least reducing sugar observed was 2.39%.

Keywords: Wine, fermentation, yeast, alcohol, pH, titrable acidity and reducing sugar

Introduction

Oranges (*Citrus reticulata Blanco*) constituted by far the most important class of commercial citrus grown in the world [4]. The fermentation with yeast is used for the production of wine that is considered as one of the oldest alcoholic beverages [7]. The core reaction involved in winemaking is the transformation of grape must sugars, glucose and fructose into ethanol and CO₂ [9]. Usually, grapes were taken as the substrate for winemaking but in recent years preferences have been given to other fruits such as apricot, banana, and citrus fruits, and so on [19]. Various fruits have been used for the production of wine since the dawn of human civilization. Wine is an alcoholic beverages made from fermented foods. Since from ancient times generally it is made from grapes, by fermenting grapes for specific duration of time, adding them in oak barrels followed by storage in wood barrels covered with leather cloth [18]. Tropical fruits have been used as substrates for the production of wines [3, 10, 13, 14, 15]. Citrus is most commonly consumed fruit as a good source of vitamin C and other nutrients [8].

Present investigation Analysis Physicochemical Characteristics of Orange wine such as pH, Titrable Acidity, Total Soluble Sugar, Specific Gravity, Alcohol Content and reducing sugar.

Material and Methods

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 (40 ml) of different yeast (*S. cerevisiae*) strains for different flasks containing 800 ml orange juice at room temperature. Cotton plug was replaced every day in aseptic condition by using laminar air flow. Must sample was collected

Corresponding Author:
Pawar AS
 Ph.D. Scholar,
 Department of Agriculture
 Biotechnology, Bhagwant
 University, Rajasthan, India

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.

Results and Discussion

Physicochemical analysis of juice/ wine sample

Table 1: Physicochemical analysis of juice/wine sample Before and after Fermentation.

Characteristics	Before fermentation	After fermentation (Average)
pH	3.4	3.08
TA (%)	0.64	0.93
TSS (° Brix)	22	8.95
Specific Gravity	1.088	1.027
Alcohol (%)	0.00	7.80
Reducing sugars (%)	12.78	3.49

A. Days required for fermentation

Time taken for fermentation ranged between 6 to 9 days. Among ten of them NCIM 3215, 3205 required six days, while the strains 3045, 3185, 3189, 3095, 3315 had taken seven days, 3200 and 3283 completed fermentation in eight days and the strain 3287 taken nine days for fermentation.

B. pH

pH of orange wine during fermentation was decreased from initial to last stage of fermentation of all strains. The pH of all the wines produced from different yeast strains found in the range of 3.4 to 3.05. Variation in pH is observed in wine produced by all yeast strains. According to the data observed pH of the wines varies only in fraction.

C. Titrable Acidity

Titration acidity was minimum at initial stage of fermentation and there after slightly increased till the end of fermentation. Titrable acidity (%) during fermentation of orange wine was increased from 0.64 to 0.96, despite fluctuations in their concentration were found throughout the different stages of wine elaboration.

D. TSS

During fermentation of grape juice, T.S.S. was found to decrease throughout the fermentation period. Strain NCIM

3205 and 3215 bearing the value 6°Brix which was lowest among the all the strains while strain 3045 and 3095 showed highest value i.e, 7.5°Brix,

E. Reducing sugar

At initial stage non reducing sugar was maximum but during fermentation it was slightly decreased up to last stage. Strain NCIM 3215 utilized the sugar more efficiently and least reducing sugar observed was 2.39%. Highest reducing sugar was recorded by strain 3045 (4.16%) followed by 3095 (3.93%) and 3185 (3.81%).

F. Specific gravity

The specific gravity decreased throughout the fermentation process. The average SG was 1.028. According to results obtained strain NCIM 3215 and 3205 recorded lowest SG (1.024). Highest SG recorded by strain 3045 and 3095 (1.03) and all other strain showed SG (1.028) at the end of fermentation.

G. Ethanol content

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) lowest alcohol was observed by strain 3045 and 3095 (7.48%).

Conclusion

Titration Acidity, Specific gravity and ethanol content were found to be slightly increased during fermentation of wine. The pH, TSS and reducing sugars were decreased during fermentation of wine.

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Conflict of Interest - None

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