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Indian Journal of Pharmacy and Pharmacology

Journal homepage: <https://www.ijpp.org.in/>

Original Research Article

Formulation and evaluation of medicated guava (*Psidium guajava* L.) wine using *Saccharomyces cerevisiae* Var. HAU 1

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ARTICLE INFO

Article history:

Received 06-05-2021

Accepted 05-06-2021

Available online 17-06-2021

Keywords:

Guava

Wine

Saccharomyces cerevisiae

Fermentation

ABSTRACT

Background: The present work encompasses production of wine from over ripe guava using *Saccharomyces cerevisiae*.

Materials and Methods: The juices of guava were analyzed for pH, total Sugar, color, odour, test and reducing sugar. Guava is easy to culture. Guava & possess high nutritive value and its products like juices, beverages, nectars, spices etc. are largely appreciated by the consumers. Guava juice requires 'capitalization' so as to prepare a perfect wine out of it. Thus, the samples was fermented at 30 °C by using *Saccharomyces cerevisiae*.

Result and Conclusion: It was shown that guava juices having pH 4 yield higher alcohol as compare to samples having different pH. It was also seen that there was very less production of alcohol percentage. So, it improves the activity of wine.

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1. Introduction

Wine is one of the functional fermented foods and has many health benefits. These include anti-ageing effects in red grape skins, improvement of lung function from antioxidants in white wine, reduction in coronary heart disease, development of healthier blood vessels in elderly people, reduction in ulcer-causing bacteria, destruction of cancer cells by protein present in red grape skins, prevention of stroke by keeping the arteries clean by polyphenols in red grape skins, decreasing ovarian cancer risk in women and making the bones stronger. Many wines are made from fruits having medicinal value and such wines have many additional benefits.¹⁻⁵ The nutritional role of wine is important during the past few decades; grapes have been the main fruit of wine production there is abundance of

tropical fruits in India which includes Guava, watermelon, pineapple, plum, orange etc. Those fruits are also used for wine production.⁶ The Guava is one of the most important commercial fruit crops in India consumed locally. It is a good source of ascorbic acid, pectin, sugars and certain minerals. Its skin and flesh colors vary from variety to variety depending on the amount and type of pigments. Tropical Fruit juices have become important in recent years due to the overall increase in natural fruit juice consumptions as an alternative to the traditional caffeine-containing beverages such as coffee, tea or carbonated soft drink. The Guava fruit is used for wine production. Guava is tropical fruit produced by the guava tree large quantities of the guava fruit are produced in Brazil, Colombia, Venezuela & Mexico.^{7,8} The fruit is commonly eaten fresh or made into beverages, jama & juice are also used in medicine. People use guava for Colic, Diarrhea, Diabetes, Cough, Cataracts, High cholesterol, Heart disease & Cancer.⁹⁻¹⁴

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Currently, most of the wine production processes rely on *S. cerevisiae* strains that allow rapid and reliable fermentations, reduce the risk of sluggish or stuck fermentations and prevent microbial contaminations.¹⁵ Yeast starter cultures that are specifically selected for the wine making process on the basis of scientifically verified characteristics typically complement and optimize the raw material quality and individual characteristics of the wine, creating a more desirable product. Generally, wines produced with selected yeasts have a higher quality than wines produced by spontaneous fermentation. In modern wine making, specific yeast strains have been preferentially used to guarantee the desired quality of the product. Yeasts are the prominent organisms involved in wine production and determine several characteristics of the wine, including the flavor, by a range of mechanisms and activities. Guava wine is the product of anaerobic fermentation by yeast in which the sugars are converted into alcohol & carbon dioxide. Ethanol production from guava pulp is reported in literature for guava must fermentation for guava fruit wine production.¹⁶ Wine is one of the functional fermented foods having many health benefits like anti-ageing effects, improvement of lung function, reduction in coronary heart disease, development of healthier blood vessels and reduction in ulcer-causing bacteria.

The aim of the present study was to prepare wine using the pulp of guava. Furthermore, to evaluate the physicochemical parameters of the prepared wine so that they can be further standardized and used commercially

2. Materials and Methods

2.1. Materials

Guava fruit is obtained from plant *Psidium guajava*. It is used as antioxidant, used as immunity booster, it used in treatment of cancer, it used in diabetes. Also used in weight loss. Jaggery is obtained from sugar cane juice. It acts as a digestive agent, also used as energy booster, used as sweetener, also used as cleansing agent. Yeast is obtained from *saccharomyces cerevisiae*. Used in wine making, also used in ethanol production, also used as probiotics.

2.2. Preparation of wine

Table 1: Wine formulation

S. No.	Name of Ingredient	Quantity Taken	Use
1	Guava	$\frac{1}{2}$ kg	Antioxidant
2	Jaggery (depending on sweetness)	$\frac{1}{2}$ kg	Source of sugar
3	Yeast	1 tbsp	Used for Fermentation
4	Boiled cooled water	Up to 500 ml	Solvent

3. Method of preparation

Ripe guava purchased from local market. Washed the guava thoroughly in tapped water & cut in small pieces. Took water and jaggery in a large container. Brought it to boil. Turn off the heat. Let it cool for 5 minutes. Took the glass jar. Put piece of guava in the jar. Added equal quantity of sugar solution & yeast in the jar. Guava would float in the solution and color of the guava would change. Put the lid loosely around the mouth of the bottle. Stir the mixture every day with a wooden ladle. Stirred for 4 to 5 minutes. Stir the mixture every day for 20 days. The wine needs 20 days to ferment. In case if you saw any fungal growth on the top layer, carefully removed and discard. On the 21st day, passed the mixture through a muslin cloth and transfer to wine bottles. The taste and color of the guava wine improves with time. In one year, from greenish white color, the wine becomes sparkling honey color. The wine was evaluated by sensory parameters.

3.1. Evaluation of physicochemical parameters of the prepared formulations¹⁷

The samples of wine were analysed for pH, titrable acidity, colour, odour, total reducing sugar and alcohol content.

3.1.1. Titrable acidity

Acidity of guava fruit pulp and wine were determined by A.O.A.C. (1990) method.

3.1.1.1. Reagents.

1. Sodium hydroxide (0.1 N)
2. Phenolphthalein indicator

3.1.1.2. Procedure. 25 ml of fruit wine was taken in 250 ml conical flask and to this 2 drops of phenolphthalein indicator was added and titrated against 0.1 N sodium hydroxide till a permanent pink colour was obtained. The acidity of fruit juice was calculated by following formula.

$$\text{Total acidity \%} = \frac{\text{Titre value} \times \text{Normality of alkali} \times \text{meq wt. of acid}}{\text{Volume of sample}} \times 100$$

3.1.2. PH

The pH of medicated wine were measured by pH meter.

3.1.3. Color

The color of wine is faint yellow.

3.1.4. Odour

The odour of wine is Aromatic.

3.1.5. Determination of reducing sugar

5 ml Fehling's A and B solution were taken in a 300ml conical flask and diluted with 40 ml water. The wine sample in a burette was added slowly in hot boiling Fehling's

solution till the appearance of slight red colour. Now three drops of methylene blue indicator were added and titration was continued till brick red precipitate occurred by destroying the blue colouration. The reducing sugar was calculated with the help of following formula.

$$\text{Reducing sugar (\%)} = \frac{1.25}{\text{Titre value}} \times 100$$

3.1.6. Determination of alcohol content

The alcohol content is measured by hydrometer, by specific gravity.

4. Results and Discussion

Table 2: Physicochemical parameters of prepared medicated wine

S. No.	Test	Standard	Observation
1	Color	Yellow	Yellow
2	pH	2 to 4	2.91
3	Odour	Aromatic	Aromatic
4	Alcohol content	12 to 16	13.23%
5	Titration acidity %	0.1 to 1.2	0.71
6	Total reducing sugar %	5.5 to 8.9	6.17

Various sensory quality characteristics has been studied viz. colour, flavour, taste and overall acceptability of wine prepared from over-ripe guava fruits using *Saccharomyces cerevisiae*. Various observations presented in Table 2 on the sensory quality evaluation of guava fruit wine revealed that guava fruit wine samples many workers have also reported the sensory quality characteristics of fruit wine as the sensory quality analysis of wine is an important parameter in determining its quality. The increase in aroma and flavour of guava wine with supplementation of nitrogenous and phosphorus rich compounds in the must. The higher initial sugar in guava must show better retention of ascorbic acid and increase in concentration of total esters and phenols and thereby improving the wine quality.

5. Conclusion

It may be concluded from the present study that Guava can act as a suitable for production of wine with all the important properties of wine having high content of phenols and ascorbic acid. Thus, Guava wine may prove to be a quality health wine besides increasing the shelf life of this fruit. So, developing technology for production of guava wine in India can found to be of great benefit.

6. Source of Funding

None.

7. Conflict of Interest

None.

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Cite this article: Mulani SA, Tamboli FA, More HN, Kolekar YS, Mali N. Formulation and evaluation of medicated guava (*Psidium guajava* L.) wine using *Saccharomyces cerevisiae* Var. HAU 1. *Indian J Pharm Pharmacol* 2021;8(2):168–170.