

# A COMPARATIVE STUDY ON HOME-MADE WINES

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**Abstract:** Fruits are the most important food for mankind as they play a major role in maintaining good health by enhancing the immune system. In general fruit harvests are spoiled due to improper quality control activity. So they are preserved by fermentation process in the form of wine. Wine restores most of the nutrients present in the original fruit juice. The nutritive value of wine is increased due to release of amino acids and other nutrients from microbial fermentation. The most commonly used fruit for wine production is grape. Guava, cheekoo, plums, cherries, black berry, peaches, pears also have the ability of producing wine. Of which, guava and cheekoo are easily available seasonal fruits. They are the powerhouse of minerals and vitamin and they have antioxidant properties. The objectives of the study are to make a comparative account of nutrient rich home-made wines, to identify their phytochemical components and to determine their antimicrobial activity against members of Enterobacteriaceae family.

**Keywords:-** Antioxidant, Fermentation, Guava, Wine, Yeast.

## I. INTRODUCTION

Nutrients play a major role in enhancing immune system. Fruits are the most important foods for mankind as they act as a backbone in maintaining good health (Tiwari, 2011). It is estimated that 30% of fruit harvests are spoiled due to improper quality control activity. Hence they are preserved by fermentation process in the form of wine. Fruit wines are undistilled tasty alcoholic beverages, mild stimulants that delay the signs of aging, treat hypertension and are affordable. Wine thus restores nutrients present in the original fruit juice. The nutritive value of wine is increased with the release of amino acids and nutrients from microbial fermentation. Yeast act as a key material of fermentation process. Natural wine tannin and other goodies that reside in the pulp are eventually released into the juice. By this we are producing a wine that is more stable and will retain its flavor and color for longer periods of time. Fruits are the powerhouse of minerals and vitamins and they have antioxidant properties (Ahmed, 2001). Commonly used fruit for wine production is Grapes. Plums, Cherries, Black berry, Peaches, Pears also have the ability of producing wine. Guava and cheekoo are easily available seasonal fruits. *Vitis vinifera* (grapes) belongs to family Vitaceae, *Psidium guajava* (guava) belongs to family Myrtaceae and *Manilkara zapota* (cheekoo) belongs to family Cheekooceae. Common nutrients present in these fruits are vitamin B6, B12, C, Carbohydrate, Potassium and sodium. *Psidium guajava* and *Manilkara zapota* have antioxidant property and helps in reducing blood clot, blood pressure, low density lipids (bad cholesterol) and prostate cancer. The survey of USDA states that there are high benefits in wine when compared to juice which forms the reason for choosing this work and also antimicrobial activity against members of Enterobacteriaceae family was recorded (Romero, 2005).

## II. MATERIALS AND METHODS

### 2.1 Sample collection:

Fresh fruits of grapes, cheekoo and guava were selected and procured from Gandhi market, Trichy.

### 2.2 Preparation of the wine:

The collected fruits were washed thoroughly with water and the juice was obtained by squeezing the pulp through a muslin cloth. Palm jaggery was added as an additional sweetener. Some amounts of yeast granules were added to enhance primary fermentation. After 21 days, the wine was filtered and it was undergone for clarification process. (Veeranjaneva Reddy, 2009)

### 2.3 Qualitative analysis of phytochemicals

Preliminary phytochemical screening was carried out (Harborne, 1980) and (Karthiswaran, 2010)

**2.3.1 Test for alkaloids (Mayer's test)**

To 1ml of extract, 1 ml of Mayer's reagent (Potassium iodide solution) was added. Formation of whitish yellow or cream coloured precipitate indicates the presence of alkaloids.

**2.3.2 Test for steroids (Liebermann Burchard test)**

To 1ml of extract, 2ml of acetic anhydride and 2ml of concentrated sulphuric acid were added. Formation of violet to blue or green colour indicates the presence of steroids.

**2.3.3 Test for terpenoids (Salkowski test)**

To 1 ml of extract, 2ml of chloroform and few drops of sulphuric acid were added. Formation of reddish brown ring indicates the presence of terpenoids.

**2.3.4 Test for flavanoids (Alkaline reagent test)**

To 1 ml of extract, few drops of dilute ammonium solution and few drops of concentrated hydrochloric acid were added. A yellow colouration indicates the presence of flavanoids.

**2.3.5 Test for saponins (Froth test)**

To 1 ml of extract, 5 ml of distilled water was added and shaken vigorously. Formation of froth indicates the presence of saponins.

**2.3.6 Test for phenols (Lead Acetate test)**

To 1ml of extract, 1 ml of lead acetate solution was added. Formation of precipitate indicates the presence of phenols.

**2.3.7 Test for tannins (Lead acetate test)**

To 1ml of extract, 1ml of lead acetate was added. A formation of white precipitate indicates the presence of tannins.

**2.3.8 Test for tannins (Ferric chloride test)**

To 1ml of extract, 1ml of ferric chloride solution was added. Formation of blue, black or brownish green colour indicates the presence of tannins.

**2.3.9 Test for cardiac glycosides (Keller killiani test)**

To 1ml of extract, 5ml of distilled water was added and evaporated to dryness. Then to the Sample 2ml of glacial acetic acid containing trace amount of ferric chloride solution was added. Then 1ml of concentrated sulphuric acid was added along the sides of the tube. Formation of brown ring underlaid with blue colour indicates presence of cardiac glycosides.

**2.3.10 Test for aminoacids (Ninhydrin test)**

To the 1ml of sample, 3 to 4 drops of Ninhydrin solution was added and boiled in water bath for 10 minutes. Formation of purple or blue colour indicates the presence of amino acids.

**2.3.11 Test for proteins (Biuret test)**

To the 1ml of extract, 1ml of 40% sodium hydroxide solution and 2 drops of 1% copper sulphate solution were added. Formation of violet colour indicates the presence of proteins.

**2.3.12 Test for carbohydrates (Barfoed test)**

To the 2ml of extract, 1ml of Barfoed's reagent was added and boiled in water bath for few minutes. Formation of reddish brown precipitate indicates the presence of carbohydrates.

**2.3.13 Test for reducing sugars (Fehling's test)**

To the 1ml of extract, equal quantities of Fehling solution A and B were added and heated. Formation of brick red precipitate indicates the presence of reducing sugars.

**2.4 Parameters:**

Daily monitoring of wine was done to estimate the parameters like pH, total sugars, specific gravity and alcohol content. pH was measured by using pH meter (Okafor, 007). The total sugars were estimated by Nelson Somogyi method (Kunkee, 2002). Specific gravity was measured by using densitometer (Fawole, 2008). Titratable acids were estimated by titrimetric method using 0.1N NaOH in terms of tartaric acid. Alcoholic content of the wine was estimated by using specific gravity method (Fawole, 2008). The wine was screened for various components (alkaloids, saponins, tannins, quinones, flavanoids, alcohols) using standard protocol (Kokate, 1985).

## 2.5 Antimicrobial study Assay of antibacterial activity using Disc diffusion method

2.5.1 Test microorganisms: *Proteus sp.*, *E. coli* and *Klebsiella pneumonia*.

2.5.2 Preparation of sterile disc: Whatman No. 1 filter paper was used to prepare disc of 6 mm diameter.

The antibacterial activity of guava wine was evaluated by agar disc diffusion method (Murray, 1995). The microorganisms was activated by inoculating a loopful of inoculums in the Muller hinton broth and incubated for 24hrs. 20ml of sterilized Muller hinton agar was poured into sterile petriplates, after solidification, fresh culture of human pathogens was swabbed on the respective plates. Disc of 6 mm diameter was impregnated with wine extract and was placed on the medium. Disc soaked in antibiotic (Chloramphenicol) discs were used as positive control. The plates were then incubated at 37°C for 24h. The antibacterial activity measured in terms of zone on inhibition (mm) of microbial growth after incubation.

### III. RESULTS AND DISCUSSION

Home-made wine was prepared from grapes, cheekoo & Guava as in Fig 1. The qualitative of important phytochemicals of the leaves is summarized in Table 1. The qualitative analysis shows that the home made wine contains significant phytoconstituents such as alkaloids, flavanoids, terpenoids, saponins, alcohol, aldehyde, proteins, carbohydrates, and reducing sugars. The nutritive content was estimated and found that guava contains less sugar and carbohydrates than grape and cheekoo. This is shown in table 2. In our study among the pathogens a maximum inhibition zone (18mm) was found against *Proteus*, and *E. coli* and the moderate inhibition zone (16mm) was recorded against *Klebsiella pneumonia* as in Table 3. This was compared with the standard.



Fig. 1 A. Grape wine B. Cheekoo wine C. Guava wine

Table1. Qualitative results of Home-made Wines

Tests	Grapes	Cheekoo	Guava
Alkaloid	+	-	-
Steroids	-	-	-
Flavanoids	+	+	+
Terpenoids	+	+	+
Saponins	+	+	+
Phenols	+	-	+
Tannins	-	-	-
Alcohol	+	+	+
Aldehyde	+	+	+
Proteins	+	+	+
Carbohydrates	+	+	+
Reducing sugars	+	+	+

**Table 2. Nutritional content of home-made wines**

Beverages	Grape		Cheekoo		Guava	
	Wine	Juice	Wine	Juice	Wine	Juice
Calories	125	152	121	156	116	165
Fat (g)	0.0	0.3	0.0	0.9	0.0	0.6
Carbohydrates (g)	3.8	33.0	2.9	26	2.7	23.0
Sugar (g)	0.9	35.9	0.11	34.7	0.8	33.9

**Table 3. Antibacterial activity of Guava Wine against some human pathogenic bacteria (Zone of inhibition measured in mm).**

Test organism	Guava wine and their zones of inhibition (mm)	Chloramphenicol +ve Control (mm)
<i>Proteus</i>	18	19
<i>E. coli</i>	16	29
<i>Klebsiella pneumonia</i>	15	16

#### IV. CONCLUSION:

The qualitative analysis shows that the home made wine contains significant phytoconstituents such as alkaloids, flavanoids, terpenoids, saponins, alcohol, aldehyde, proteins, carbohydrates, and reducing sugars. Thus, the study reveals that the plant can act as a source of many bioactive compounds acting against some human pathogens. Compared with Grape and cheekoo, guava is less in sugars and carbohydrates. The nutritive value of guava is also compared with the fresh unsweetened juice of grape and cheekoo. Hence guava is found to be most suitable home-made wine. Thus, the study reveals that the plant can act as a source of many bioactive compounds acting against some human pathogens belonging to enterobacteriaceae family.

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