

## Alcohol Content In Wine Uses GC-FID

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### ABSTRACT

In Indonesia the type of drinks are very diverse, one of them is alcoholic beverages. One of the drinks that contains alcohol is alcohol. Wine is an alcoholic beverage (ethanol) known in India, Srilanka and Indonesia since ancient times. Wine is generally made from coconut nira, nira aren or nira thunder, But there's also wine made of rice or glutinous rice with fermentation. This study attempts to know what percentage of alcohol content to the liqueurs march and he knew the drink liquor containing alcohol is in hamlet taruminding organoleptik with this, the a chemical reagent and GC-FID instruments. The method used a total sampling technique where the population is equal to the number of samples of 3 samples. The results of research on testing the alcohol content of arak using gas chromatography (GC-FID) in Bambu Village, Taruminding Hamlet, the results of organoleptic observations from 3 samples have a liquid texture, as well as different colors, smells and tastes, but they are all the same as characteristics of alcohol, the results of observations using reagents showed that 3 samples were positive for containing alcohol and the results of testing using gas chromatography (GC-FID) found that all samples contained alcohol but the levels were below 5%.

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## 1. INTRODUCTION

Food and beverage products, as part of our daily lives, are regulated by Islamic law regarding their halalness (1). Alcohol in food and beverage products is a serious problem and is prohibited for Muslim consumption. Therefore, halal verification and authentication of food products is an issue of major concern regarding the alcohol content and levels in food and beverage products(2). Ethanol as an analyte from the alcohol group most commonly identified in laboratories is found in fermented foods and drinks(3). According to the Republic of Indonesia Minister of Health Decree No.86/Menkes/Per/IV/77 concerning liquor, what is meant by liquor is all types of alcoholic drinks, but not drugs, including class A liquor with an alcohol content of 1-5%, class B liquor with an alcohol content of 5-20%, and class C alcoholic drinks with an alcohol content of 20-55%(4).

Ethanol analysis to control the fermentation process and product quality can be carried out using a simple, fast and economic analysis method. In research, determining the ethanol content in various fermented food and beverage products was carried out using the GC method(5). Quantitative analysis for ethanol using the GC method was obtained by comparing it with standard ethanol and using n-butanol as the internal standard(6). The results of the GC method are used to verify the determination of ethanol content in the home industry. Halal verification and authentication using GC for fermented food and beverage products can eliminate doubts among Muslims about consuming these products (3). He problem formulation from this background is to determine the alcohol content in arak with the physical characteristics of alcohol through organoleptic tests, chemical reagents and the percentage of alcohol contained in arak in Taruminding Hamlet using GC-FID.

## 2. RESEARCH METHODS

This research uses a qualitative descriptive method with laboratory testing using GC-FID to determine the percentage of ethanol content in Arak. The population in this study is Arak, a drink that is sold in Taruminding Hamlet, 3 types. The sample selection in this study used a total sampling technique where the population was equal to the sample size of 3 Arak samples. The location for sampling was carried out in Taruminding Hamlet, then testing was carried out at the STIKes Andini Persada Mamuju laboratory which is located on Jalan Poros Mamuju Kalukku, Bambu Village, Mamuju District, Mamuju Regency, West Sulawesi Province(7).

Testing samples using the Organoleptic method, namely taking a 15 ml sample of Arak and putting it in a chemical glass, then testing it using human senses, namely by looking at the color, smell and taste of the Arak. Then move on to testing chemical reagents. To test with chemical reagents, with the following steps, take a 3ml sample of Arak into a test tube, then add 1-2 drops of hydrochloric acid and nitric acid each, heat the solution for 5 minutes and close it using aluminum foil, wait for the solution to cool, then add 1-2 drops of potassium iodide to the Arak sample solution, then look at the results of changes in the Arak sample that has been added with potassium iodide, if it is positive for alcohol, there will be a change in color or a yellow ring. Meanwhile, for the test using GC-FID, a sample is taken and then tested for the level of alcohol contained in the sample. If the alcohol sample is above 5% then it does not meet the standard, and if it is below 5% then it meets the alcohol use standard(8).

## 3. RESULTS AND DISCUSSION

### 3.1 Organoleptic Examination

**Table 1.** Sample Distribution Based On the Results of Organoleptic Examination of Arak Drinks

Sample code	Color	Smell	Taste
S.1	Yellowish white	Typical aroma of alcohol	Tasteless
S.2	White is a bit clear	Smells sour	Sour
S.3	White is a bit clear	Slightly sour smell	A Bit Sour

Data Source: Research Results In 2023

Organoleptic examination is a testing method that uses human senses as the main tool to see the color, smell and taste of the sample(9). After an organoleptic examination was carried out at the STIKes Andini Persada Mamuju laboratory in Arak with a total of 3 samples. For the first, second and third examinations, namely knowing the smell, color and taste. Sample S1 has a time of 1 day 1 night, sample S2 has a time of 3 days 3 nights, and sample S3 has a time of 1 day 1 night. Of the 3 samples, it was physically observed through smell, namely that each had a different odor, sample S1 had a slightly pungent odor, sample S2 had a slightly sour odor, and sample S3 had an odor that was not too sour. Next, the samples were physically observed through color, namely there were 2 samples which were slightly clear white (samples S2 & S3), and sample S1 which was yellowish white. Next, the samples were physically observed through taste, namely that each had a different taste, sample S1 had a tasteless taste, sample S2 had a minimally sour taste, and sample S3 had a taste that was not too sour(10). The sample requires chemical examination to determine whether the Arak sample is positive for alcohol or not

### 3.2 Examination Using Chemical Reagents

**Table 2.** Results of Examination Of Alcohol Content With Qualitative Test Using Chemical Reagents

Sample Code	Observation		Description
	Kontrol positif	Pengujian	
S.1	Yellow Ring	Yellowish clear ring	Positive
S.2	Yellow Ring	Yellowish white ring	Positive
S.3	Yellow Ring	Yellow Ring	Positive

Data Source: Research Results In 2023

You can find out the results from checking the alcohol content using a qualitative test using reagents on Arak in Taruminding Hamlet. It can be seen above that there are 3 samples of Arak, all of which are

positive. In the S1 sample, the initial color was yellowish white after adding potassium iodide (KI), the color changed to a clear yellowish ring, indicating that S1 was positive. In sample S2, the initial color was slightly clear white, after adding potassium iodide (KI), the color changed to a yellowish white ring, so S2 was positive. In the S3 sample, the initial white color was slightly clear after adding potassium iodide (KI) to a yellow ring so that S3 was positive for containing alcohol. From the results of the positive control of real alcohol which was used as a comparison, it can be said that there were no errors in the examination of the Arak sample. Alcohol content was found in 3 (three) samples of Arak.

### 3.3 Sample Test Using the GC-FID Instrument

**Table 3.** Percentage of Ethanol Content in Ethanol Samples Based on the GC-FID Instrument

Sample Code	Standart	Ethanol Percentage (%)
S.1	1-5%, 0,5%	2.01681
S.2	1-5%, 0,5%	2.73122
S.3	1-5%, 0,5%	2.66632

Data Source: Research Results In 2023

This research uses gas chromatography (GC-FID) for the technical separation of mixtures into components with a process that relies on the distribution of components between a stationary phase or supporting material in the form of liquid, solid or a combination of both and a gas mobile phase(11). This mechanism applies to substances or their derivatives evaporated below the temperature used. In sample S1 there is 2.0% Ethanol content in Arak, for sample S2 there is 2.7% Ethanol content in Arak, and in sample S3 there is 2.6% Ethanol content in Arak. The standard provisions for the use of alcohol in food are 5%, if it is above 5% then the sample is said to be unfit for use and consumption because it does not comply with the provisions of the Minister of Health Regulation and the MUI Fatwa, and if it is below 5% then the Arak sample can be used because it meets the standard percentage of alcohol use in food or drink.

## 4. CONCLUSION

Based on the results of research carried out on testing the alcohol content of Arak using gas chromatography (GC-FID) in Bambu Village, Taruminding Hamlet, the results of organoleptic observations from the 3 samples have a liquid texture, as well as different colors, smells and tastes different but all contain the same alcohol and the results of observations using reagents there was 3 sample which produced a yellowish ring and was declared Positive and the results of Gas Chromatography (GC-FID) testing found that all samples contained alcohol levels below 5%.

## 5. SUGGESTION

Public awareness and vigilance in producing and consuming alcoholic drinks is really needed, because if you consume alcoholic drinks excessively and continuously, it will have a bad impact on health and can cause dependence for consumers.

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