

Analysis Of Rhodamine B Dyes And Benzoate Acid Preservatives In Tomato Sauces In Banjarmasin City

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Abstract. Red tomato sauces are often misused by producers by adding dyes that are prohibited from using food such as Rhodamin B. Tomato sauce is also usually made by adding preservatives such as Benzoic Acid which cannot be dissociated, causing toxic effects on overuse. The purpose of this study was to analyze dyes and preservatives in terms of qualitative analysis and quantitative analysis in some tomato sauce products circulating in Banjarmasin City. The research method used was the survey method with Rhodamin B analysis technique using Thin Layer Chromatography (TLC) and UV-VIS Spectrophotometry with a wavelength of 555 nm in samples of sauce A and B, then Benzoate Acid analysis technique was carried out with qualitative analysis namely color test with FeCl₃ reagent, titration acid base and UV-VIS spectrophotometry method with a wavelength of 230 nm in samples of sauce C and D. The results obtained in the tomato sauce samples examined were positive containing Rhodamin B and the level of Benzoic Acid content in tomato sauce in the traditional market of Banjarmasin City met the standards of ± 1000 mg / kg.

Keywords: Tomato sauce, Rhodamin B, Benzoic acid, TLC, Acid-base titration, UV-VIS spectrophotometry.

1 Introduction

Food is a very important thing in human life, therefore the food we eat must not only fulfill nutrition and have an attractive shape, but also must be safe in the sense of not containing microorganisms and chemicals that can cause disease poisoning. Food and beverage packaging companies in Indonesia are currently developing very rapidly. It was found that food and beverage packaging produced only concerned with aspects of consumer tastes without regard to health aspects (Yuliarti, 2007). The color of a food or beverage product is an important feature. Color is one of the basic criteria for determining food quality, among others color can provide clues about chemical changes in food, such as browning (deMan, 1997).

One of the food coloring contained in tomato sauce is circulating in the street vendors. Tomato sauce is a complement to food ingredients that are popular with the community because it adds flavor to food. In the tomato sauce contains many food additives such as preservatives and coloring. Therefore the researcher intends to examine whether preservatives

and dyes used are safe for humans because the level of consumption of tomato sauce by the community is relatively high by comparing it to the regulations in SNI-0222-1995 (Wijaya, 2011). Rhodamin B coloring is prohibited for use by the government and its misuse in food is mostly found especially in bright red food. Besides tomato sauce with a red color is often misused by manufacturers by adding dyes that should not be present in foods such as rhodamin B (Wijaya, 2011). The milled red chili traders use dyes to improve the red color of the milled red chillies (fade) due to the addition of mixed ingredients such as carrots and garlic peels (Djarismawati, et al., 2007; Anonymous b, 2007).

Likewise, the preservative in food is to make food look more quality, durable, attractive, and taste and texture more perfect. The use of preservatives can make food free from microbial life both pathogenic and nonpathogenic which can cause damage to food ingredients such as spoilage (Tranggono, et al, 1990). One preservative that is often used in food is benzoic acid (C_6H_5COOH). Benzoate that is commonly used is benzoate in the form of salt because it is more soluble than the acid. In food, benzoic salt decomposes into an effective form of undissociated form of benzoic acid. This form has a toxic effect on overuse of consumers, so the administration of this preservative does not exceed 0.1% in food ingredients (Winarno, 1992).

Samples were taken from fried and wagon cart traders in the East Banjarmasin area. Determination of this location is because there are many traders who sell fried foods and bulbs that are widely sold along the streets around East Banjarmasin considering the red tomato sauce and certainly contain preservatives, an analysis is carried out to determine whether the traders use tomato sauce containing rhodamin B and asthma levels benzoate contained whether it meets the requirements or not, so an analysis is carried out by knowing the rhodamine B content using a qualitative test and analysis of benzoate acid in qualitative and quantitative tests.

2 Methodology

2.1 Tools

In this study, an analysis of two compounds, Rhodamin B and Benzoate Acid, was suspected to be contained in tomato sauce in the city of Banjarmasin. Samples were obtained in the city area of Banjarmasin using the random method. In this study, an analysis of two compounds, Rhodamin B and Benzoate Acid, was carried out using two test methods, qualitative and quantitative. Qualitative analysis of Rhodamin B dye was performed using the Thin Layer Chromatography method. The research began with a sample extraction step, then continued with the sample analysis stage with TLC. In this study also conducted a quantitative test of Rhodamin B using a UV-VIS spectrophotometer.

2.2 Material

In this study the analysis of benzoic acid preservatives was carried out by covering several stages, namely the preparation of the samples and then the extraction of samples. Meanwhile, for the qualitative test the benzoic acid preservative was carried out by the color test method. In quantitative tests the benzoic acid coloring agent is carried out by the acid-base titration method.

Observed variables

1. Identifying the presence of Rhodamin B compounds in sauces in Banjarmasin.
2. Identifying the presence of Benzoate Acid compounds in sauces in the city of Banjarmasin.

Research Location

This research will be conducted at the chemical laboratory of Sari Mulia University, Banjarmasin.

Data Collection and Analysis

1. Data Collection

Data were collected qualitatively and quantitatively to determine the presence of Rhodamin B and Benzoate Acid compounds

2. Data Analysis

Data were analyzed using the amount of content for quantitative tests to determine the presence of Rhodamin B and Benzoate Acid while the qualitative test was analyzed by observing variables.

3 Results and Discussion

In the first study conducted by analyzing rhodamine B on two different tomato sauce samples in Banjarmasin City marked by sample 3 and sample 4. The study was conducted qualitatively by analyzing the TLC method (Thin Layer Chromatography) and analyzing quantitatively using UV Spectrophotometer -VIS. In the previous qualitative analysis, the sample was extracted first. then using the TLC method of the solvent used by using solvent butanol: ethyl acetate: ammonia in a ratio of 10: 4: 5 using 20 ml of butanol, 8 ml of ethyl acetate and 10 ml of ammonia. According to the literature Rhodamin B will give Yellow Fluorescence if observed in UV light of 254 nm and red color easily if seen visually (DG of POM, 1997). The results do not indicate that visually rhodamine B does not show any pink color and when tested using UV light, the results obtained do not indicate the presence of yellow spots but the resulting patches are blackish brown. Then for the difference between the Rf values according to the literature states that the results are stated positive if the color of the sample and standard spots are the same or close to each other with the difference in price ≤ 0.2 (MOH, 1998). The results show that the Rf value for sample 3 and sample 4 is 0.9966 cm. However, the research did not compare the Rf value of the sample with the standard Rf value due to the limitations of the unavailability of rhodamin B in the study so that for the qualitative test the results were not seen with the significant presence of rhodamin b that was identified or not involved. compare with the standard solution of rhodamin B that should be. On the visualization results, the color appearance of rhodamin B does not show pink and when it is in UV light.

The second analysis is the identification of rhodamin b using the UV-VIS spectrophotometer method with a wavelength of 543 nm using a standard curve that has been revised with a calibration curve according to the article in "Analysis of Rhodamin B in Lipstick Circulating in the Manado City Market" the results obtained indicate that the concentration obtained at 25,277 mg for sample 3 and for sample 4 showing a result of 24,195 mg. Basically, synthetic dyes such as rhodamin b which are commonly used as textile dyes are prohibited for use in food products. But the results of quantitative analysis in sample 3 and sample 4 show the presence of the compound rhodamin B. There are several studies that show that when testing toxicity to mice and rats it can cause carcinogenic so that the substance is dangerous if consumed.

In the third analysis is to analyze benzoic acid compounds qualitatively and quantitatively. Where the test qualitatively uses the color reagent test by reacting samples 1 and 2 using FeCl_3 because rhodamin B will precipitate the compound rhodamin B if it is reacted so that it will be marked by the presence of brown deposits. The results obtained for samples 1 and 2 show the formation of brown deposits. This is in accordance with the sample packaging that stated on the composition containing benzoate so that the qualitative test showed positive results identified the presence of acid. The precipitate formed is Iron (III) benzoate, $[\text{Fe}(\text{C}_6\text{H}_5\text{COOH})_3]$.

In the next analysis which is to analyze benzoic acid with quantitative methods, namely by using acid-base titration method. This titration determines the levels of acid solution or base solution. The color change shown in the addition of the pp indicator to pink indicates the TAT conditions in the analyzed sample. The results showed that the determination of levels using 3 replications in each sample showed the average levels obtained in sample 1 was 4.754%. In sample 2 shows the average levels of benzoic acid that is equal to 4.713%. According to the literature that benzoic acid contains not less than 99% and not more than 100.5% so that the results obtained are not in accordance with the literature due to factors that influence such as when the extraction of samples is not appropriate because when the separation does not occur separation so that the levels of benzoic acid contained are inappropriate.

In the last analytical study using UV-VIS spectrophotometer sample 1 showed results of 25.4805 mg and sample 2 showed results of 39.909 mg. According to the requirements of SNI-0222-1995, for tomato sauce that is less than 1 g / kg so that the tomato sauce analysis in sample 1 and sample 2 shows results that meet the conditions of using benzoic acid in food.

4 Conclusion

Determination of compounds in food such as synthetic dyes and preservatives is very important because these compounds can cause conditions that can be dangerous if consumed or exceed the levels that have been previously required. Analysis of tomato sauce obtained at tomato sauce sellers in the city of Banjarmasin. Testing can be done by using qualitative and quantitative analysis such as analyzing the presence of rhodamine B according to our analysis positively identified the presence of rhodamine B which should be used for textile dyes and identifying levels of preservatives such as benzoic acid according to our analysis the samples used were in compliance with the requirements. The right experiment is expected to get results that are truly appropriate because if the experiments carried out have factors that are not appropriate it will affect the results obtained.

References

- [1] Cahyadi, W., Analisis dan Aspek Kesehatan Bahan Tambahan Pangan, Penerbit Bumi Aksara, Jakarta (2005).
- [2] Cahyadi, W. Analisis Dan Aspek Kesehatan Bahan Tambahan Pangan. Jakarta.: Bumi Aksara (2008).
- [3] Cahyadi, W. Analisis dan Aspek Kesehatan Bahan Tambahan Pangan. Bumi Aksara: Jakarta (2009).
- [4] deMan, M John. Kimia Makanan. Bandung : ITB (1997).

- [5] Departemen Kesehatan Republik Indonesia. Peraturan Menteri Kesehatan RI Nomor 722/Menkes/Per/IX/1988 Tentang Bahan Tambahan Makanan. Jakarta: Depkes RI (1998).
- [6] Djarismawati, dkk. Pengetahuan dan Perilaku Penjamah tentang Sanitasi Pengolahan (2004).
- [7] Makanan pada Instalasi Gizi Rumah Sakit di Jakarta. Media Penelitian dan Pengembangan. Vol 14 NO. 03, 31-37.
- [8] Erliza. Produk Saos. Jakarta :Erlangga (2007).
- [9] Lee TA, Sci BH, Counsel. The food from hell: food colouring. The Internet Journal of Toxicology. Vol 2 no 2. Queers Network Research China (2005).
- [10] Margono. Metodologi Penelitian Pendidikan. Jakarta: Rineka Cipta (2000).
- [11] Noviana, Analisa Kualitatif Dan Kuantitatif Zat Pewarna Merah Pada Saus Tomat dan Saus Cabe Yang Dipasarkan Di Pasar Lambaro Kabupaten Aceh Besar Tahun 2005, Skripsi FKM USU, Medan (2005).
- [12] Tranggono dan Sutardi. Biokimia dan Teknologi Pasca Panen. Gajah Mada University Press. Yogyakarta (1990).
- [13] Winarno, F. G. Kimia Pangan dan Gizi. Jakarta: PT. Gramedia Pustaka Utama (2002).
- [14] Yulianti, Nurheti. Awas Bahaya di Balik Lezatnya Makanan, Yogyakarta : Penerbit Andi (2007).