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ANALYSIS OF RHODAMIN B AND METHANYL YELLOW IN SCHOOL CANTEEN SNACKS IN THE SELINDUNG HEALTH CENTER AREA OF PANGKALPINANG CITY IN 2024

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Abstract

The Government of Indonesia through the Regulation of the Minister of Health (Permenkes) No.239/Menkes/Per/V/85 stipulates 30 dangerous dyes. Rhodamin B and Methanyl Yellow are among the dyes that are declared as dangerous dyes and are prohibited from being used in food products. Illegal food additives such as Methanyl yellow and Rhodamin B dyes are able to attract buyers' eyes. The location of this research was carried out in the Canteen of SDN 6, SDN 22, Pangkalpinang, and SMPN 7 Pangkalpinang, the researcher sampled snacks with the School Canteen at the Tahfizh al-Quran Attauhid Islamic Foundation, namely SD Islam Tahfizh al-quran Attauhid and SMP Santo Paulus Pangkalpinang which is one of the Private Schools that are members of Kindergarten, Elementary School and Junior High School in Gabek District. The current situation of school canteens in the city of Pangkalpinang is still found with several colorful canteen snacks such as packaged ice, food skewered with snack skewers, instant drinks, packaged snacks and instant noodles. This assessment aims to find out Rhodamin B and Methanyl Yellow in the School Canteen Snacks of the Selindung Health Center Work Area, Pangkalpinang City. This research method is an experimental method by conducting an examination of snack food samples at the Bangka Regency Health Laboratory with a sample of 20 samples consisting of 12 food samples, 8 beverage samples spread across 3 elementary schools and 2 junior high schools in the Selindung Health Center working area. From the results of the examination of the Bangka Regency Health Laboratory, 20 samples consisting of 12 food samples and 8 beverage samples, all of which were found to be harmful Dyes, namely Rhodamin B and Methanyl Yellow. There is no content of Rhodamin B and Methanyl Yellow in School canteen snacks in the work area of the Selindung Health Center, Pangkalpinang City and is safe for consumption.

Keywords: Food Snacks, Rhodamin B, Methanyl Yellow, Beverages, Food

Introduction

Access to healthy and nutritious food is essential for improving health and productivity. Unhealthy foods containing bacteria, viruses, parasites, and harmful chemicals can cause more than two hundred diseases, including diarrhea and cancer (1). Consumption of unsafe or contaminated food with harmful bacteria, viruses, parasites, and chemicals causes about 600 million people, or 1 in 10 people, to die each year. According to WHO data and according to a 2019 World Bank report on the economic burden caused by foodborne diseases, work productivity decreased by US$ 95.2 billion per year and annual medical costs were estimated at US$ 15 billion (2).

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Until now, the Food and Drug Supervisory Agency (BPOM) claims that there are still several types of Food Additives (BTP) that are dangerous and should not be present in food such as borax, formalin and Rhodamin B found in food (3). The use of unsafe food ingredients can cause dangerous diseases There are a number of variables that can affect the selling value of a food product. The coloring and taste factors are very important to increase the attractiveness of food products. The color of food not only improves its quality, but also makes consumers interested in it (4) As a result, many manufacturers are trying to improve the quality of their food products through attractive colors and flavors. While synthetic dyes are easy to use and beneficial, they are also harmful to our health. Synthetic dyes can even cause diseases.

Currently, it has been shown that synthetic food coloring can harm human health. Some of them are Methanyl Yellow and Rhodamin B, which have toxic effects that can damage organs and cause cancer (5). However, many food manufacturers, especially small entrepreneurs, still use prohibited and harmful dyes because they only think about financial benefits without considering the risks they will pose to their consumers. Regulation of the Minister of Health (Permenkes) No.239/Menkes/Per/V/85 stipulates thirty dangerous dye ingredients. The dyes Rhodamin B and Methanyl Yellow, which are declared to be harmful dyeing substances, are prohibited from being used in food products. The use of illegal food additives like this can attract the attention of buyers. In Malang, East Java, Indonesia, a test has been carried out for the content of Rhodamin B and Methanyl Yellow dyes in school children's snacks. The results showed that no harmful food substances were found (6). This research has also been conducted in Lubuk Linggau, South Sumatra, about the content of Rhodamin B and Methanyl Yellow in beverages. The results showed that out of 15 Rhodamin B samples, there were 3 Rhodamin B positive substances, and of the 13 Methanyl Yellow samples, there was no Methanyl Yellow substance (7).

In Bangka Belitung, precisely in Pangkalpinang City, BPOM (Food and Drug Supervisory Agency) conducted sampling on 103 Takjil foods to break the fast. The inspection is carried out to determine whether there is a content of harmful food ingredients. Of the 103 foods inspected, ranging from light to heavy snacks for breaking the fast, including pearl porridge, pempek, lakso, serabi, then there are layer cakes, sponges and various kinds of drinks. The results of the sample examination were carried out using borax, rhodamin B, and formalin parameters. All 103 Food Samples were found to contain no harmful substances and were safe for consumption (8).

Of the 15 elementary schools in Pangkalpinang, especially at SDN 22 Pangkalpinang, there are still colorful packaged snacks and packaged drinks and there are still several snack food sellers outside the school. So the researcher is interested in taking food samples to check whether there are harmful Food Additives (BTP) content, and the researcher took samples of snack food at SDN 6 Pangkalpinang because this elementary school is included in the category of canteen sanitation which is quite good in the working area of the Selindung Health Center.

Of the 4 Junior High Schools (SMP) in Gabek District, Pangkalpinang City, the researcher conducted research at SMPN 7 Pangkalpinang because there are still some striking snacks found and there are still many sellers outside the school selling outside the school when outside school hours. The researcher made a comparison with Private Schools in Gabek District, namely, the Tahfizh al-quran Attauhid Islamic Foundation (SD Yayasan Islam Tahfizh al-quran Attauhid) and the St. Paulus Pangkalpinang Foundation (SMP Santo Paulus) because the Tahfizh al-Quran Attauhid Islamic Foundation and the St. Paul's Junior High School are included in the working area of the Selindung Health Center in Pangkalpinang City, and many foods of various types of food or snacks are sold, The children sold are relatively cheap.

The location of the research was carried out in the Canteen of SDN 6, SDN 22, Pangkalpinang and SMPN 7 Pangkalpinang, and the researcher took samples of snacks at the Foundation school, namely in the School Canteen at the Tahfizh al-quran Attauhid Islamic Foundation school, namely

SD Islam Tahfizh al-quran Attauhid and the St. Paulus Foundation, namely the St. Paulus Junior High School which is one of the Private Schools that are members of the kindergarten, Elementary and junior high schools in Gabek district. This school has sanitation and canteen conditions that are quite good and the snacks sold are also up to standard. The current situation of school canteens in the city of Pangkalpinang is still found with several colorful canteen snacks such as packaged ice, food skewered with snack skewers, instant drinks, packaged snacks and instant noodles.

So that the author is interested in doing knowledge about whether there is Rhodamin B and Methanyl yellow content in the snack food of the school canteen in the working area of the Selindung Health Center, Pangkalpinang City.

Method

This study uses an experimental method with the aim of identifying the content of Rhodamin B and Methanyl Yellow in snack food samples sold in school canteens in the working area of the Selindung Health Center, Pangkalpinang City. Samples were taken purposively from five schools, namely SDN 6, SDN 22, SMPN 7, SDIT Attauhid, and SMP Santo Paulus, on July 16 and 17, 2024. Visually striking snack samples were tested at the Bangka Regency Health Laboratory using the Colorimetric Test Kit. In the Rhodamin B test, the purple color on the test tube indicates the presence of the substance, while the red to purple color indicates the presence of Methanyl Yellow. Data was collected through purposive sampling techniques and analyzed with the help of laboratory health workers to ensure the validity of the research results.

1. How sampling works
    1. Sterill all tools for sampling with 100% boiling water
    2. Wear sterile gloves and use palms with 70% alcohol
    3. Sample 100 gr food with sterile tongs
    4. Samples are labeled: code number, date and time of sampling
    5. Put the sample into the thermos and send it to the laboratory (9).
6. Rodamin B Content Testing
    1. After reagents A and B are put into the test tube, they are beaten until homogeneous
    2. Five milliliters of the sample are inserted into the test tube along with the mixture. Whisk the mixture well and let it sit for ten to twenty minutes.
    3. If the color of the red drink changes to a lavender purple color, it indicates that there is Rhodamin B
4. Metanhyl Yellow Content Testing

    Test the content of Metanhyl Yellow by taking five milliliters of sample and putting it in a test tube to test the content of Metanyl Yellow. After adding four drops of reagents A and B, the color of the drink will turn purple. This suggests that there is a Metanyl Yellow (10).

Results

Table 1. Results of Rhodamin B and Methanyl Yellow Examination on Snacks and Drinks in the Working Area of the Selindung Health Center

NO	Research Location	Sample Type	Parameter	Hasil Sampel	Sample Results
1	SDIT Attauhid	Ice Pink	Rhodamin B	Negative	Colorimetric
		Ice Yellow	Methanyl Yellow	Negative	Colorimetric
2	SMP Santo Paulus	Taro Drink	Rhodamin B	Negative	Colorimetric
		Syrup ABC	Methanyl Yellow	Negative	Colorimetric
3	SMP 7 Pangkalpinang	Coco Pandan Drink	Rhodamin B	Negative	Colorimetric
		Ice Blue	Rhodamin B	Negative	Colorimetric
4	SDN 22 Pangkalpinang	Ice Small	Methanyl Yellow	Negative	Colorimetric
		Ice Big	Methanyl Yellow	Negative	Colorimetric

(Source: Primary Data, 2024)

Table 2. Results of Rhodamin B and Methanyl Yellow Examination on Food Snacks in the Working Area of the Selindung Health Center

NO	Research Location	Sample Type	Parameter	Hasil Sampel	Metode Pemeriksaan
1	SDN 6 Pangkalpinang	Papeda	Rhodamin B	Negatif	Colorimetric
		Sosis	Rhodamin B	Negatif	Colorimetric
		Coco Crunch	Methanyl Yellow	Negatif	Colorimetric
2	SDIT Attauhid	Sauce Sempol	Rhodamin B	Negatif	Colorimetric
3	SMP Santo Paulus	Sauce Bakso	Rhodamin B	Negatif	Colorimetric
		Chicken Katsu	Rhodamin B	Negatif	Colorimetric
4	SMP 7 Pangkalpinang	Brown Pink	Rhodamin B	Negatif	Colorimetric
		Chips	Rhodamin B	Negatif	Colorimetric
		Sauce Omelette	Rhodamin B	Negatif	Colorimetric
		Yellow Rice	Methanyl Yellow	Negatif	Colorimetric
5	SDN 22 Pangkalpinang	Wet Noodles	Methanyl Yellow	Negatif	Colorimetric

(Source: Primary Data, 2024)

Discussion

The implementation of this research was carried out by sampling on July 16, 2024 at SDN 06 Pangkalpinang and St. Paul's Junior High School. On July 17, 2024, sampling was carried out at SDN 22, SD Tahfidz al-quran Atatuhid Pangkalpinang and SMPN 7 Pangkalpinang. This sampling was carried out to find out whether the snack food contained Rhodamin B or Methanyl Yellow or not. Sample examination was carried out at the Bangka Regency Health Laboratory with the following explanation:

1. Results of Rhodamin B Test in Beverages
   Drink sampling was carried out in several schools, such as SDIT Attauhid which served ice pink, SMP St. Paulus with taro drinks, and SMPN 7 which provided coco pandan and blue ice drinks. In total, there were 4 samples from 3 schools that were tested related to the alleged content of Rhodamin B. At SDN 6 Pangkalpinang, the canteen does not sell drinks, but only water and milk sold by the school cooperative. Meanwhile, in SDN 22, more drinks with striking yellow dyes were found. The results of the examination of the four samples, conducted by the Bangka Regency Health Laboratory using the colorimetric test kit method, showed that none of the samples contained Rhodamin B dyes, and all drinks were declared safe for consumption.
2. Results of Rhodamin B Substance Test in Food
   Food sampling was carried out in several schools, such as SDN 6 Pangkalpinang which includes

ice papeda and sausages, SDN 22 Pangkalpinang with sausages, SDIT Attauhid with sempol sauce, SMP Santo Paulus with meatball sauce, and SMPN 7 Pangkalpinang which provides chicken katsu, pink chocolate, chips, and omelet sauce. In total, there were 9 samples from 5 schools that were tested for the suspected content of Rhodamin B dyes. The results of the examination showed that all samples were negative for Rhodamin B content, so it was safe to consume.

3. Results of Methanyl Yellow Substance Test in Beverages
   Drink sampling was carried out in several schools, including SDN 22 Pangkalpinang which provided small ice and ice, St. Paul's Junior High School with ABC syrup, and SDIT Attauhid with yellow ice. In total, there were 4 samples from 3 schools that were tested related to the alleged content of Methanyl Yellow dyes. At SDN 6 Pangkalpinang, the canteen does not sell drinks with striking colors, while at SMPN 7 Pangkalpinang, more drinks were found that were suspected of containing Rhodamin B dye.
4. Results of Methanyl Yellow Substance Test in Food
   Food sampling was carried out in several schools, including SDN 6 Pangkalpinang with coco crunch samples, SDN 22 Pangkalpinang with wet noodles, and SMPN 7 with yellow rice. A total of 3 samples from 3 schools were tested for suspected Methanyl Yellow dyes. At SDIT Attauhid and St. Paul's Junior High School, Methanyl Yellow dye is more commonly found in beverages, so there is no indication of a striking yellow dye in food. The results of laboratory examinations of the three samples, conducted by the Bangka Regency Health Laboratory using the colorimetric test kit method, showed that the three samples were negative for Methanyl Yellow content and were safe for consumption.

The improvement of the characteristics in question includes the shape, color, texture, taste, stability, shelf life (durability) and nutritional value of the food that is added to BTP. BTP is usually added for technological purposes in the process of preparation, cooking, packaging, storage or at the time of distribution or delivery of food. The addition of BTP to food products occurs due to changes in people's consumption patterns who currently prefer instant or fast food, the need for producers to attract consumers, food ingredients are expected to be more durable and stable during distribution, and improving the quality of food products (11).

Through the Regulation of the Minister of Health (Permenkes) No. 239/Menkes/Per/V/85, the Indonesian government stipulates thirty dyestuffs, including red methyl, as hazardous substances that should not be used in food. Metanly Yellow is often used as a dye in textiles, paints, wool, nylon, leather, paper, aluminum, detergents, wood, wool, and cosmetics. However, some irresponsible manufacturers abuse Rhodamin B and Metanly Yellow to create attractive food colors. The use of methanyl yellow if consuming food can have a negative impact on the nervous system and cause damage to the brain. The results of the study showed that exposure to yellow metanhyl can cause damage to the adult brain and interfere with brain development in wistar rats. These dyes can affect the levels of *neurotransmitter amines* in different areas of the brain such as the brainstem and stratum when consumed orally, even changes can be observed in the hypothalamus. The effect on the nervous system cannot return to normal after the discontinuation of methanyl yellow administration (12).

From the results of the examination by the Bangka Regency Health Laboratory using the Colorimetric (Test Kit) method, based on the results of the examination carried out from 20 samples of snack food, both food and beverages, 12 samples were negative for Rhodamin B, 8 samples were negative for Methanyl Yellow, so from the results of the examination there was no content of harmful dyes when examining Rhodamin B and Methanyl Yellow samples. This study was sampled from several school canteens and around schools in the working area of the Selindung Health Center in Pangkalpinang City, where this research was carried out to find out whether the snack food taken in

the form of sauce, drinks, ice, yellow noodles, rice noodles, sausages, papeda, coco crunch, chips, pink chocolate, and others contained harmful food additives or not. So it can be concluded that, of the 20 samples that have been carried out in the Colorimetric Method (Test Kit) test, 12 samples are Negative for Rhodamin B, 8 samples are Negative for Methanyl Yellow, so that this snack food is safe for consumption and does not contain Dye substances containing Rhodamin B and Methanyl Yellow.

Supporting Research in this study is the research of Mareta Widiya et al., (2021), the results of the study showed that from 15 samples of drinks examined in the canteen of SD Lubuklinggau Selatan II District, the research showed that there were 3 out of 15 samples indicated to contain rodamin B and no samples were indicated to contain yellow methanol.

The raw material of Methaneyl Yellow, a synthetic dye, is difficult to find and is not commonly used in processed beverages because its use has been banned for food and beverages. This dye is considered harmful to health if consumed in the long term. Several studies show that drinks in the school environment generally do not contain this harmful substance, but supervision is still needed to ensure the safety of processed food products and beverages sold (13). The low level of beverage safety is still an important problem. The insecurity of beverages is generally caused by the addition of harmful ingredients because it can affect human health (14). Methaneyl yellow in the body suppresses cell function and causes changes in cell function (15). Yellow methanol destroys human body cells, so that tissue growth is irregular, as a result of which the structure of rusan tissue and causes cancer (16).

According to the Researcher, in conducting this study, the current condition in five schools in several samples taken at SDN 6, SDN 22, SDIT attauhid, SMPN 7 and SMP St. Paul from 20 samples of snack food did not use Food Coloring Additives which means that there were no harmful substances Rhodamin B and Methanyl Yellow in the food, But not necessarily with other schools that have not been checked for harmful substances at all on the snacks and are not necessarily free from other harmful food substances. For producers who sell snacks around the school environment, producers can use food and beverage raw materials by paying attention to the type of product and the expiration date of the raw materials, not using harmful food substances, and using preservatives and dyes from natural ingredients.

Conclusion

The results of the research and examination of snack food samples conducted by the Bangka Regency Health Laboratory showed the following results:

1. Based on the results of the identification that snack foods suspected of containing Methanyl yellow dye substances were sold in the school environment, including: 4 Beverage Samples Methanyl Yellow Sample Examination and 3 Food Samples Methanyl Yellow Sample Examination, from 7 food and beverage samples were found no Methanyl Yellow dye in the snacks and safe to consume.
2. The identification results showed that the food suspected of containing Rhodamin B dye sold around the school included: 4 drink samples Rhodamin B sample examination and 9 food samples Rhodamin B sample examination, from the 13 food and beverage samples no Rhodamin B dye was found in the snack and was safe to consume.

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