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Research Article

Food Safety Alert: Traces of Formalin and Rhodamine B Found in Children's Snacks Near Schools in Lubuklinggau, South Sumatra

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Abstract

Security food is an important global issue, especially in the context of snack child school. The research aims to test the existence of content material addition food, such as formalin and rhodamine B, in snacks school at Public Elementary School 58 Lubuklinggau City. Testing was done using descriptive qualitative with a special test kit to detect formalin and rhodamine B content in various types of snacks. Research results show that all sample snacks from Elementary School 58 Lubuklinggau City negative contain formalin and rhodamine B. This is to signify that snacks sold at SDN 58 Lubuklinggau City are safe for consumption by children, but education for the community still needs to be done to prevent children from snacking carelessly. Education this can give through inspection laboratory tours and activities Communication, Information and Education (KIE) by the POM Center in Lubuklinggau City has contributed positively to increasing awareness among the public about choosing safe food for children in school.

Keywords: *Food Safety; Formalin; Rhodamine B; Snacks; School.*

Introduction

The problem food in Indonesia is often coloured existence case poisoning food so security food is often neglected [1]. Law Article 1 number 5 Number 18 of 2012 concerning food mentions that security food is a condition and effort to prevent food from possibility pollution biological, chemical, and other objects that can disturbing, detrimental and dangerous health man as well as No contradictory with religion, beliefs and culture public so that safe for consumed. In childhood age, school is a growing period of flowers, so they need nutrition or food to support the growth process [2]. This is what causes existence desire to consume snacks in the neighbourhood school Because of big time they are at school. However, snacks or food in the environment school sometimes do ensure cleanliness and content nutrition in snacks The various types of Snacks in the environment school like drinks, food and snacks usually consumed during break time or at the time go home school so security requires attention from party school and parents for ensure security snacks child school especially child school base Because still very vulnerable exposed disease [3].

Sulis [4], reported the existing case of poisoned snacks at a school in Palembang in July 2024 which caused several students to experience vomiting, shortness of breath, and seizures. Incidents This is categorized as an Extraordinary Event (KLB) for food, considering its significant impact on the health of children. Responding incident This is the POM location in Lubuklinggau City quick do action supervision to snacks child schools in their area. The steps taken include doing a quick test to detect formalin and rhodamine B content, to ensure the security of food and prevent incident similar in the future [4]. School 58, Lubuklinggau City is one of the school bases located in the city of Lubuklinggau and has several canteen and snacks outside the fence school, thing This needs to be careful not to be sold at SDN 58 city Lubuklinggau which sells snacks containing material addition food dangerous so that influence health child school [5].

The Regulation of the Indonesian Minister of Health No. 033 of 2012 concerning Food Additives states that Food Additives, hereinafter referred to as BTP (Bahan Tambahan Pangan), are substances added to food to influence its characteristics or form. These include colorants, flavorings, aromas, preservatives, and thickeners. Examples of food additives are Rhodamine B (red dye), Methanyl Yellow (yellow dye), Dulsin (synthetic sweetener), and Potassium Bromate (hardener). Specifically, formalin and Rhodamine B are still commonly found in food products [6]. Therefore, it is essential to conduct food testing using formalin and Rhodamine B test kits [7]. The test kits are tools that use the principle of antigen-antibody reactions to detect dangerous contaminants in food products, such as mycotoxins, antibiotic residues, hormones, pesticides, and others. These test kits serve the purpose of testing the safety of food products in either a qualitative or quantitative manner. They provide fast, sensitive, specific, and accurate results [2].

Formalin is a compound consisting of formaldehyde dissolved in water, typically with a concentration of 37%, and contains 15% methanol, with the remainder being water [8]. Formalin can cause irritation and a burning sensation in the mucous membranes of the nasal cavity, mouth, and respiratory tract if inhaled. At higher concentrations, formalin can reach the bronchioles and alveoli, inducing pulmonary edema and pneumonia. When ingested in high concentrations, it can lead to symptoms such as irritation in the mouth and esophagus, ulcers in the digestive tract, chest and abdominal pain, nausea, vomiting, diarrhea, gastrointestinal bleeding, metabolic acidosis, kidney failure, and even death [2], [9].

Rhodamine B is a synthetic dye commonly used in the textile and paper industries, but its use in food products is prohibited under the Indonesian Ministry of Health Regulation No. 239/Menkes/Per/V/85. According to Saputri, Rhodamine B is an odorless, purplish-red crystalline powder that, when dissolved, forms a bright fluorescent red solution [3]. Despite its widespread use in non-food applications, it poses serious health risks when ingested. This dye is classified as a carcinogen, meaning it can cause cancer, and can also irritate the gastrointestinal and respiratory systems. Long-term exposure or ingestion of even small amounts may lead to liver damage. Given these dangers, it is critical to monitor the presence of Rhodamine B in food products [8]. The aim of this study is to investigate whether hazardous substances like formalin and Rhodamine B are present in school snacks at Public Elementary School 58, Lubuklinggau City. This research seeks to evaluate potential risks to children's health from consuming contaminated food, ultimately contributing to greater awareness and the need for stricter food safety regulations in school environments, ensuring that children are protected from harmful additives.

Materials and Methods

Materials used in testing These include formalin test kits, rhodamin B test kits, and several others. Snacks from the seller who is around SDN 58 Lubuklinggau like pempek, pempek contents chicken, model, fritters, tofu, pempek telok, pempek skin, risol, basreng, doughnuts, nuggets, sausages, mochi, red agar, chocolate agar, pizza, cilok, jam strawberry, jam

blueberry, churros and pentol. While tools used in testing this, among others rack tube, tube reaction, dropper, zip-lock plastic, hand scoop and bottle swan.

Types of research This is Descriptive Qualitative. The object study is snacks located at State Elementary School 58 Lubuklinggau City. Focus study this is about formalin and rhodamine -b content in snacks SDN 58 School, Lubuklinggau City. Data collection techniques in the study This method involves taking samples from several canteen and snacks outside the fencing environment of SDN 58 Lubuklinggau City, then testing at the Loka POM laboratory in Lubuklinggau City. Retrieval samples use *purposive sampling.* Samples of snacks taken are suspected processed and contain material food addition dangerous. Next samples obtained will conducted a test qualitative for know snacks the positive contain BTP or not.

1. Procedure Formalin Test Kit Work

Ways of working using a formalin test kit, namely with preparing the sample to be checked moreover first. Each sample is Then mashed. A little water is added. To make the sample more fine or homogeneous with water. After that, the water that has homogeneity with a sample taken as much as 1 ml using Spet, with notes that No There are solids that come with taken. Water that has been taken entered into an in-tube reaction. Then, 3 to 5 drops of formalin reagent I are added. In a way Be careful with in in-tube reaction, with the addition of drops, and the bottle reagent quickly closed back. After that, formalin reagent II in the amount of ± 1 mg was added to in tube reaction using an end stick that was available, then the tube was shaken until homogeneous. The last step is to leave tube the in a silent state for 5 minutes after observing change the in colour if the colour becomes purple (bluish) then sample the stated positively containing formalin.

2. Procedure Rhodamine B Test Kit Work

Ways of working using the rhodamine b test kit, namely by preparing the sample to be checked moreover first. Solid sample Then smoothed. After pureed, a little water is added to make the sample more fine or homogeneous with water. Water that has been homogeneous with sample Then taken as much as 1 ml, with notes No some solids come with taken. The water furthermore entered to in tube reaction. Then, 10 to 20 drops of rhodamine -B reagent I were added. In a way Be careful in tube reaction, with the addition of drops, and the bottle reagent quickly closed back. Then, 5 drops of reagent II rhodamine -B were added. The next step is to add 10 to 20 drops of reagent III rhodamine -B using the existing dropper, then tube reaction shaken Be careful until a solution is mixed up well after that look change colour if happens change colour becomes purple (violet) then sample the stated positive contain rhodamine-B.

Results and Discussion

The test results for formalin and Rhodamine B in school snacks, using the test kits, show that all tested samples were negative for the presence of both substances. No formalin, commonly used as a preservative but harmful if consumed, was detected. Similarly, Rhodamine B, a synthetic dye not permitted for use in food, was also absent. These results, shown in Table 1 and Table 2, indicate that the snacks sold in the schools are safe for consumption by children. The efforts of supervision and education provided to the sellers have positively impacted the maintenance of food quality and safety.

The qualitative formalin test method using a sour chromophore reagent kit is highly effective for detecting formalin in food. This method is advantageous as it produces distinct, clear color changes, making it an essential tool for ensuring that food sold in the market is free from formalin, a substance that poses significant health risks. The qualitative analysis of formalin is conducted using the sour chromophore reagent method, where chromotropic acid is employed to bind formalin, facilitating its release from the sample material (table 1). When formalin reacts with the sour chromophores, a red-purplish colored complex forms, indicating

the presence of formalin. The reaction can be accelerated by adding sour phosphate and hydrogen peroxide (serving as a positive control) [4]. This approach provides a simple, rapid, and reliable way to detect formalin in various food products, thereby supporting food safety regulations and protecting public health.

Table 1. Results of Testing Rapid *Test* for Formalin in Snacks Processed at SDN 58 Lubuklinggau City

No.	Sample	Formalin Test Results*
1.	Fishball	Negative
2.	Pempek Filled with Chicken	Negative
3.	Model	Negative
4.	Fritters	Negative
5.	Know	Negative
6.	Egg Pempek	Negative
7.	Pempek Skin	Negative
8.	Risoles	Negative
9.	Basreng	Negative
10.	Doughnuts	Negative
11.	Nuggets	Negative
12.	Sausage	Negative
13.	Pizza	Negative
14.	Meatballs	Negative
15.	Churros	Negative
16.	Bulb	Negative

*Notes: *) Safe for consumption. No formalin detected.*

Table 2. Results of Testing Rapid *Test*: Rhodamine B Test in Snacks Processed at SDN 58 Lubuklinggau City

No.	Sample	Rhodamine B Test Results*
1.	Mochi	Negative
2.	Red Agar	Negative
3.	Chocolate Agar	Negative
4.	Strawberry Jam	Negative
5.	Blueberry Jam	Negative

*Notes: *) Safe for consumption. No Rhodamine B detected.*

Formalin is commonly used as a synthetic preservative to maintain food safety, as it prevents changes in shape, texture, color, and aroma [10]. The formalin test, as shown in the image below, produced a negative chemical analysis, as no red-purplish colored complex was formed. Instead, the resulting color from the tested sample was yellow-brownish, indicating that the sample did not contain formalin or any other synthetic preservatives. This confirms that the sample was free from formalin, a harmful substance.

Formalin is known to be hazardous to human health. It is classified as toxic, carcinogenic, mutagenic (causing changes in cells and tissues), corrosive, and irritating. Inhalation of formaldehyde vapor can be extremely dangerous as it irritates the respiratory tract, while ingestion of formalin can lead to severe irritation and damage to internal organs. Formalin is also recognized as a neurotoxic substance, meaning it can harm the nervous system, leading to potential long-term neurological issues. Additionally, formalin exposure can disrupt reproductive health, causing damage to the testes and ovaries, menstrual disorders, and even infertility [11].

In general, formalin is used as a pesticide due to its ability to effectively kill viruses, bacteria, fungi, parasites, algae, amoeba (cellular animals), and other unicellular organisms at high concentrations. However, even small doses of formalin in food can lead to poisoning. At higher concentrations, formalin can react chemically with various substances in the body's cells, impairing their function and causing cell death, which can be fatal [12].

Rhodamine B is a synthetic red dye primarily used in the textile industry to color fabrics (table2). However, it has also been found in food products as a coloring agent, making the food appear more visually appealing [10]. While it is effective at enhancing the appearance of food, Rhodamine B is harmful to human health. It is not metabolized by the body and can accumulate in organs such as the heart, potentially causing poisoning and other severe health issues [13]. The long-term accumulation of Rhodamine B in the body can lead to chronic health problems, as the substance is not easily excreted and remains in tissues, exerting toxic effects.

In a study conducted at SDN 58 in Lubuklinggau City, the Rhodamine B content in various school snacks was tested, and the results showed that none of the snacks contained Rhodamine B. This is reassuring, as it indicates that the snacks provided to children, including those with red coloring, are safe for consumption. The negative test results confirm that the snacks are free from the harmful dye. However, it is essential to maintain constant surveillance on food products, particularly those with bright or artificial coloring, to prevent any future risks. This is crucial as even small amounts of Rhodamine B, when consumed over time, can accumulate in the body and pose serious health risks, especially for children, whose developing bodies are more vulnerable to toxins.

According to Anggiruling *et al* [14], Rhodamine B can have severe health consequences, particularly when it is used in excessive amounts or consumed over a long period. Even small quantities of Rhodamine B can accumulate in the body and contribute to the development of cancer, as well as other long-term health conditions. The carcinogenic nature of Rhodamine B has raised concerns about its use in food products, especially considering the increasing number of cases where synthetic dyes are being used improperly in the food industry [15]. This highlights the need for stricter regulations and more thorough testing of food products to ensure that harmful substances, such as Rhodamine B, do not find their way into food consumed by the public, particularly vulnerable groups like children [14].

It is important for regulatory bodies to continue monitoring food safety and for consumers to be aware of the potential dangers posed by synthetic food colorants. This research emphasizes the importance of food safety testing to prevent exposure to harmful chemicals and protect public health. Regular monitoring, education for food sellers, and public awareness are key to ensuring that food products, particularly those consumed by children, are free from harmful substances like Rhodamine B [14].

Research by Antika *et al* [16], explains that Rhodamine B in a tested sample can extracted in an environment language using ether, producing a solution coloured red. In this process, distilled water is used to dissolve Rhodamine B in the sample, then 10% NaOH to increase pH and reduce the solubility of Rhodamine B in water. Rhodamine B, as dye language, is more late in non-polar solvents such as diethyl ether. After shaking, phase ether containing Rhodamine B is in the layer above, because ether's mass type is lower than water. Next, the addition of HCl is carried out to extract Rhodamine B to the water phase marked with the formation colour red, indicating the existence of Rhodamine B in the sample.

The high use of material preservative food risky in food snacks can caused by the level of education of lowly traders as well as a supportive environment. Traders with education low tend to notice the factor of health and safety in their food. As well as the environment social that has Already used to use material preservatives risky in food especially in snacks children school [17]. Healthy food become A necessity, moreover for child school. To realize food snacks Healthy for children in school base is a hard thing to obtain because Lots very factors influence it [13].

The supervision of school snacks (PJAS), carried out by BPOM, plays a crucial role as one of the primary sources of nutrition intake for children in schools. Snacks, although typically considered supplementary foods, can play a significant role in meeting children's daily nutritional needs. The nutritional content of these snacks varies depending on their type, whether they are main meals, smaller snacks, or beverages. The quantity of snack consumption significantly contributes to a child's overall nutritional status, directly impacting their health. Therefore, proper and balanced snack consumption helps in fulfilling energy and nutrient requirements during the school day. Street food, often found around schools, also plays a significant role in providing energy intake for school children. However, if not properly regulated, these foods can pose health risks [16].

Knowledge about food and health is essential, especially since poor food choices that do not meet health standards can seriously affect children's well-being. Inadequate, non-nutritious, or unhygienic food can lead to serious health issues such as digestive disorders, food poisoning, and infections. Furthermore, poor health due to improper food consumption can reduce a child's concentration and hinder their academic performance. In addition, inadequate nutrition can slow down a child's physical and cognitive development. During their school years, children require optimal nutrition to support their growth, as this period is crucial for their brain and body development [18].

School canteens play an essential role in providing safe and healthy food for students. This requires not only the availability of adequate facilities and infrastructure that meet established standards, but also consistent supervision [19]. Ensuring safe food in the school canteen begins with preparing quality ingredients, followed by appropriate cooking and handling practices. All food and beverages sold in the canteen must meet regulatory standards for safety and quality. Continuous supervision is necessary to prevent the misuse of harmful chemicals or the use of unsafe food products [20].

However, the increasing use of food additives and improper use of chemicals in food processing is an emerging concern. Many processed foods and snacks contain additives such as artificial sweeteners, flavorings, preservatives, antioxidants, emulsifiers, thickeners, and colorants. The use of artificial food coloring in the food industry, particularly in snack production, has raised concerns. Bright and attractive colors are often added to appeal to consumers, especially children, who are more likely to be attracted to brightly colored products. Unfortunately, some artificial colorants used in food production can cause allergic reactions or have long-term health risks when consumed in excess [21].

Education about the importance of consuming healthy, safe, and nutritious food must be consistently carried out among students, teachers, and parents. A comprehensive approach is needed to change the mindset of society about the importance of healthy food and its impact on children's academic performance and quality of life. Governments and related institutions must collaborate to enhance supervision of school canteens and ensure that food safety and hygiene standards are met. Implementing policies that support the provision of healthy food in schools is also crucial in creating an environment that supports children's optimal growth and development [22].

Ingredients such as formalin and rhodamine B should not be present in food products, as they pose serious health risks. However, due to cost-cutting pressures in production and the desire to extend shelf life, many manufacturers continue to use these harmful substances. This is particularly concerning when it comes to food items commonly consumed by children, such as snacks, especially those sold in school environments [22]. These food products often contain dangerous chemicals, which can adversely affect the health of young consumers whose bodies are still developing and are more susceptible to the harmful effects of toxic substances.

To better protect children, who are especially vulnerable to the dangers posed by these toxins, it is crucial to establish a more transparent and robust food safety system. This system should include enhanced collaboration between local health authorities, educational institutions,

and the broader community. Such cooperation will help create a safer environment where food products are regularly monitored for compliance with safety standards, and harmful practices, such as the use of illegal chemicals, are minimized. With these measures in place, we can ensure that the food children consume is not only safe and nutritious but also free from harmful additives. Ultimately, this approach will contribute to the promotion of better health and well-being for children, laying the foundation for a healthier future generation [22].

Conclusion

From the results of supervision snacks child schools that have done that with test formalin and rhodamine B content, is known that snacks in the canteen of SDN 58 Lubuklinggau City No indicated contain material addition dangerous food (BTP) such as formalin and rhodamine B. This is possibly caused by the implementation method of proper management with Good Processed Food Production Practices (CPPOB). Test results This show that food snacks child schools for sale in the SDN 58 Lubuklinggau City environment are safe from material addition dangerous such as formalin and rhodamine b. Education conducted by the POM Center in Lubuklinggau City through inspection laboratory going around schools as well as activity Communication, Information, and Education (KIE) has helped increase awareness among the community, including teachers, students, parents students, and traders, to select and provide food-safe snacks for child school

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