TEST OF BORAX AND FORMALINE ON SNACKS AT MUHAMMADIYAH ELEMENTARY SCHOOL PADANGSIDIMPUAN CITY

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Abstract

According to data from the Food and Drug Supervisory Agency (BPOM), throughout 2012, the incidence of poisoning due to consuming food occupied the highest position, at 66.7%. One of the causes of food poisoning is the presence of food additives such as formalin, borax. At Muhammadiyah Elementary Schools 1, 2 and 3, there are a lot of street food vendors, such as; fried noodles, meatballs, sausages, snacks. This research aims to find out which snacks contain borax and formalin and to find out which snacks are safe and unsafe for children. Sampling used a simple random technique with the assumption that a lot of samples were purchased by children and were thought to contain borax and formalin, so that a sample of 15 snacks were obtained from 6 snack sellers. Then given code seller 1 until 15. In this research, the borax and formalin tests were carried out qualitatively, using test kit. The results of the research show that of the 15 samples of snacks that have been tested, there are no samples that are positive for borax and formalin. It is proven by the absence of color changes that occur in the samples of snacks that have been tested.

Keywords: Food safety; Street food; Borax; Formalin

INTRODUCTION

Food safety is something that must be considered because it can have an impact on health, both for children and adults. According to data from the Food and Drug Supervisory Agency (BPOM), throughout 2012, the incidence of poisoning due to consuming food was in the highest position, at 66.7%, compared to poisoning due to other causes, such as drugs, cosmetics, and others. One of the causes of food poisoning is the presence of food additives such as formalin, borax, and textile dyes in food (Paratmanitya & Aprilia, 2016).

At Muhammadiyah Elementary Schools 1, 2 and 3 located in Padangsidimpuan City, there are many street food vendors, such as: fried noodles, meatballs, nuggets, tofu, sausages, snacks, and various drinks. This research aims to find out which snacks contain borax and formalin and to find out which snacks are safe and unsafe for children. Borax or commonly called boric acid has another name, sodium tetraborate is commonly used for antiseptics and cleaning agents besides that it is also used as a raw material for making detergents, wood preservatives, wood antiseptics, controlling cockroaches (pests), ant exterminators and others (Adinugroho, 2013).

The use of borax in food has been strengthened by the Decree of the Minister of Health of the Republic of Indonesia No. 235/Menkes/VI/1984 concerning food additives, that sodium tetraborate, which is better known as an additive, is prohibited from being used in food, but in reality there are still many forms of abuse of these substances. Meanwhile, the permitted preservatives for food include benzoic acid and Na-benzoic salt, K-benzoate, propionic acid, sorbic acid and their salts. The allowable dosage varies depending on the nature of the product (Tubagus, 2013). Although borax has been banned from being used as a food preservative, there are still manufacturers who use this preservative to preserve food (See et al., 2010). Borax has toxic for cells, poses a risk to human health who consumes food containing borax (Halim et al., 2012). Frequent consumption of foods containing borax can cause brain, liver, fat and kidney disorders, while consumption of relatively high amounts of borax can cause fever, anuria (not forming urine), coma, apathy, cyanosis, decreased blood pressure, kidney damage and death (Kabu et al., 2015).

Formalin is a formaldehyde compound in water with an average concentration of 37% and methanol 15% and the rest is water. Formaldehyde is used
as a germ killer, so it is used as a cleaning agent for floors, warehouses, clothes and ships, repellent for flies and other insects, for making artificial silk, dyes, glass mirrors and explosives (Muhasidah et al., 2019). In the world of photography, it is usually used to harden gelatin and paper layers, fertilizer-forming materials in the form of urea, ingredients for making perfume products, preservatives for cosmetic products and nail hardeners, corrosion inhibitors for oil wells, materials for foam insulation, adhesives for plywood products (playwood), in very small concentrations (<1%) are used as preservatives, household cleaners, dishwashing liquids, softeners, shoe care, car shampoos, waxes and carpets (Astawan, 2006).

The misuse of formalin as in Indonesia still make many threats to society. there are still many violations in the small food industry (Lestari et al., 2016). According to (Hidayat & Muharrami, 2014) that formalin is very dangerous if swallowed, because it can cause the mouth, throat and stomach to burn. It can also cause damage to the liver, heart, brain, and kidneys.

Although not a food preservative, borax and formalin are often used as food preservatives. Borax and formalin are often misused to preserve various foods such as meatballs, fried noodles, banana molen, siomay, lontong, ketupat, dumplings, etc. Besides aiming to preserve, borax and formalin can also make food texture more chewy and improve the appearance of food, intact, not damaged, reducing production costs, practical and effective in preserving food (Kholifah & Utomo, 2018).

Anton (2019) through his research found that out of 12 food samples from two elementary schools tested in Samarinda City, there were 8 positive samples containing formaldehyde, 1 sample containing formalin and contamination with Coliform bacteria, 11 samples of snacks were positively contaminated with Coliform bacteria and there are 2 samples of noodle snacks with TBUD coliform contamination. Likewise, Napitupulu & Abadi (2018) in her research at the Medan Denai District Elementary School, she found that there were three samples of grilled meatballs that were checked for borax and samples of sauce on grilled meatballs containing rhodamine B. The results of research conducted by (Suhariyadi et al., 2015) reported that the snacks of elementary school students in Surabaya were found to contain 0.29% borax.

Food additives are widely used by street food sellers who are sold in schools and on the roadside, so that they can be consumed easily and cheaply by the public, especially elementary to high school (Damat et al., 2020).
Several efforts have been made by authorized agencies such as BPOM to carry out the Movement Towards Safe, Quality and Nutritious School Snack Foods, one of which is through the preparation of Guidelines for School Snack Foods for Achieving Balanced Nutrition for Parents, Teachers and Canteen Managers. But in reality the circulation of unsafe snacks continues to increase. This is because the actions taken do not touch the primary source of food distribution for school children. The findings of borax and formalin in various snacks in the school environment due to the use of hazardous food ingredients in snacks should be a common concern. Based on the problems above, it is necessary to do the same thing to analyze the snacks for children at Muhammadiyah Elementary Schools 1, 2 and 3 in Padangsidimpuan City.

**MATERIALS AND METHODS**

The population of this research is snack seller in Muhammadiyah Elementary School 1, 2 and 3 Padangsidimpuan City. Sampling was carried out using a simple random sampling technique with the assumption that a lot of samples were purchased by children and suspected to contain borax and formalin, so that a sample of 15 snacks was obtained from 6 snack sellers. Then the sample code. The borax and formalin tests were carried out qualitatively on the snack samples is using a borax test kit and a formalin test kit. The materials used in this study were samples of snacks taken from several snack sellers in Muhammadiyah Elementary Schools, borax and formalin test kits (chemkit) and aquades. The tools used in this research are label paper, cutting board, knife, 10 ml test tube, 50 ml and 500 ml beaker glass, spatula, pipette and pen.

**Borax Test**

The sample is chopped into small pieces. Enter the sample as much as 1 gram into a 10 ml test tube. Add 2-3 ml of distilled water. Stir the sample using a spatula until well blended.

Add 20 drops of borax reagent. Then dip the test kit paper (litmus paper) and paste the test kit paper beside the test tube, wait for 10 minutes under the hot sun. With the aim that the borax reagent reacts optimally. After 10 minutes, look at the color change on the test kit paper. If the test kit paper changes color to brick red or brownish red, then the sample is declared positive for borax. And if there is no color change, then the sample is declared negative containing borax.
**Formalin Test**

The sample is chopped into small pieces. Enter the sample as much as 10 grams into a 50 ml glass beaker. Soak the sample with distilled water. Take 1 ml of the sample solution into a 10 ml test tube. Add 5 drops of reagent 1 formalin, then add reagent 2 which is powder as much as 1 small spoon (part of the tool in the test kit). Then wait for 10 minutes to determine the color change that will occur in the sample solution. If the solution changes color to purplish pink, then the sample is declared positive for formalin. And if there is no color change, then the sample is declared negative containing formalin.

The data collection technique in this research is a laboratory test. Laboratory tests in this study were used to determine whether snacks in Muhammadiyah Elementary Schools 1, 2 and 3 contained borax and formalin or not.

**RESULTS AND DISCUSSION**

One way of showing positive or negative formalin is by changing the color reading (Sudarmaji et al., 2018). Testing the content of borax and formalin in 15 samples of snacks using the Borax Test Kit and Formalin Kit Test, by looking at the color change of the test paper from yellow to brownish red, the sample is positive for borax and by looking at the change in the color of the liquid to a purplish color, the sample is positive contain formalin. The results of the borax and formalin content test can be seen in the table below:

<table>
<thead>
<tr>
<th>No.</th>
<th>Sampling Location</th>
<th>Food Sample</th>
<th>Test results</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Borax</td>
<td>Formalin</td>
</tr>
<tr>
<td>1</td>
<td>Seller 1</td>
<td>1. Fried Meatballs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Sauce</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Fried White Noodles</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>Seller 2</td>
<td>4. Fried Tofu</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Fried Meatballs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6. Sausage</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7. Fried Noodles</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8. Sauce</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>Seller 3</td>
<td>9. Nuggets</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10. Grilled Meatballs</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11. Sauce</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Seller 4</td>
<td>12. Fried Yellow Noodles</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>Seller 5</td>
<td>13. Fried Sweet Potatoes</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>Seller 6</td>
<td>14. Egg Roll</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15. Sauce</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Description: + : Positive contains borax or formalin  
           - : Negative contains borax or formalin
Based on the results of research on 15 samples of snacks taken at SD Muhammadiyah 1, 2 and 3 which were tested using the Borax Kit Test, all samples did not contain borax. This is evidenced by the sample of snacks tested that did not change the color of the test paper from yellow to brownish red. But if a sample contains borax, it will be marked by a color change on the test paper from yellow to brownish red. This statement is in accordance with (Hidayat, & Muharrami, 2014) which states that the color change of curcumin from yellow to brownish red.

Based on the results of the study of 15 samples tested using the Borax Kit Test, that there was no change in color to brownish red. This is because the sample of snacks tested did not change color on the test paper. According to (Mayasari & Mardiroharjo, 2012; Larasati et al., 2019), borax is a compound in the form of crystals, white color, odorless, soluble in water and stable at normal temperature and pressure. Borax is usually used as a preservative, as an antiseptic and cockroach repellent. However, it turns out that borax is still traded in the community and at a very affordable price. As a food additive to increase the taste and durability of food. (Dyah, 2019).

The formalin content test in snack samples detected using the Formalin Kit Test on 15 samples of snacks taken at Muhammadiyah Elementary Schools 1, 2 and 3. Samples that were positive for formalin were marked by a change in the color of the liquid to purplish pink after being dropped with reagent A and reagent B. This indicates that the presence of formalin contained in the sample. Based on the results of the research on the formalin test, none of the samples was proven to contain formalin. This can be seen from the absence of color changes that occur in the
samples of snacks tested. This is also the same as described in (Maidah, 2015) research entitled "Qualitative and quantitative analysis of sodium benzoate, borax and formalin in the elementary school environment of the Tamalanrea sub-district, Makassar city" which shows that from 10 samples tested consisting of donuts and bakwan snacks at school Tamalanrea IV basics, donuts and dumplings at the Inpres Unhas Elementary School, cimol and dumplings at Bung Elementary School, soy sauce brands A, B and C, none of the samples tested positive for borax and formalin, but 3 samples tested positive for sodium benzoate, namely samples of soy sauce brands A, B and C.

Formalin is a substance that is harmful to the human body. Formalin vapor can cause eye and nose irritation, as well as respiratory tract disorders. This is because formalin compounds quickly react with amino acids which cause the body's proteins to not function. The impact of this exposure is that formaldehyde accumulates in the mucous lining of the respiratory tract and digestive tract. Formalin that enters the human body below the threshold will be broken down within 1.5 minutes into CO₂. The safe threshold is 1 milligram per liter. (Nopiyanti et al., 2018). Formalin acts as an antibacterial which can slow down the activity of bacteria in foods that contain excess protein. Protein reacts with formalin in food so food lasts longer (Anjani et al., 2019).

Borax and formalin are toxic to all cells. Its effect on the body depends on its concentration. The kidney is the organ most at risk because the highest levels of borax and formalin are obtained when excreted. Doses of 10-20 g/kg body weight adults and 5g/kg body weight children will cause poisoning to death. Frequent consumption of foods containing borax and formalin will cause brain, liver, and kidney disorders. In large quantities borax causes fever, anuria, coma, central nervous system damage, cyanosis, kidney damage, anemia, vomiting, diarrhea, fainting, and even death (Chikmah & Maulida, 2019).

Foods that contain borax and formalin in the lowest levels will have a dangerous impact on health. If borax and formalin enter the body regularly and continuously, it will cause a buildup in the body. In general, the impact of the use of borax and formalin on humans can reduce the degree of health and the ability of the human body to survive (Hastuti & Rusita, 2020). The role of the school or government to pay attention to food safety in schools needs to be increased because of the variety of foods or snacks outside the school. The most important thing to do is to increase knowledge and provide training to...
all school members about healthy food (Santi & Al Bahij, 2018).

CONCLUSION

Based on the results of the research that has been carried out, it can be concluded that from the 15 samples of snacks that have been tested, there are no samples that are positive for borax and formalin in Muhammadiyah Elementary Schools 1, 2 and 3. This is proven by research results that there is no color change that occurs in the sample of snacks tested. Of all the snacks that have been tested are safe for consumption because these snacks do not contain formalin and borax.

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