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Survey on the Use of Borax, Magenta and Metanyl Yellow in Food Samples Procured from State Elementary Schools of Surabaya City.

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ABSTRACT

The children' snacks in state elementary school tend to be sold at a low price, sometimes the food vendors do not seem to take into account the quality, hygiene and sanitation of the snacks. Electronic media often report about the food or the snacks that contain hazardous substances such as preservatives and dyes that are banned by the government. The survey was conducted in August and September 2014 in 62 state elementary schools scattered in the city of Surabaya with sample of 476 pieces, and the results show a borax content (0.29%) in children' snacks and no snacks content of Magenta and Metanyl Yellow that are sold in the state elementary schools in the city of Surabaya.

Keywords: Children' snacks, Borax, Magenta, Metanyl Yellow

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INTRODUCTION

Children' snacks obtained in state elementary schools of Surabaya sold at low prices and food vendors often do not take into account the quality, hygiene and sanitation snacks. The findings of Food and drug monitoring agency Indonesia in the last five years (2006-2010) showed as much as 48 percent of children' school-snacks do not meet food safety requirements because they contain harmful chemicals.

Most of the children who live in the city of Surabaya school in State elementary school, it is supported by data obtained from education authorities in 2013 that the number of state elementary schools in the city of Surabaya, which is spread in 31 districts. Snacks that are available at state elementary school tend to be sold at a low price, sometimes the food vendors do not seem to take into account the quality, hygiene and sanitation snacks.

Sampling conducted by food and drug monitoring agency Indonesia in 2011 found at least four types of hazardous materials that are prohibited to use for food, such as Formalin, Borax, Rhodamine B, and Metanil Yellow contained in many foods sold in school environment. Sampling food of children' snacks school conducted in 6 provincial capitals (Jakarta, Serang, Bandung, Semarang, Yogyakarta and Surabaya), was found positive for 72.08 percent of harmful substances (State Intelligence Agency, 2012). Wigati (2013) still found 1 of 11 samples of sausages is sold in state elementary school of Mojo village in Surabaya containing Borax. Research on the presence of Borax in meatballs and wet noodles are also conducted in other areas that provide positive results as done by Tumbel M (2010), Triastuti (2013), Sultan (2013), Sastaviyana (2013).

In a research conducted in India, a vast majority of colored food commodities (83.6%) were found to employ permitted colors and confirmed a marked decline in the trend of use of nonpermitted colors (NPCs). Of the 4 zones of India, East zone showed the maximum adulteration (80.3%) both by exceeding the prescribed limits of permitted colors (72.3%) and the use of NPCs (28.7%). Tartrazine was the most popular color among the permitted list, which ranged from 12.5 to 1091 mg/kg. Rhodamine B was the most prevalent dye in the NPCs group. (Dixit, 2013). The government has tried to seek a solution of the problem with them by holding Media Conference organized by Food and drug monitoring agency Indonesia and Health Department on July 27, 2013, attended by 400 school principals and teachers to attend a seminar on School Children Snacks Profile (PJAS): safe, quality, and nutritious, but it also organizes education authorities healthy competition between school's canteen.

MATERIALS AND METHODS

The study population: children' snacks from state elementary school scattered in the city of Surabaya. Samples were sampled snacks child of a home industry such as: cireng, meatballs / bulb, sausages etc to identify the presence of Borax; food or drinks that are red and yellow which analyzed the presence of Borax, Magenta and Metanil Yellow.

Places selected in doing sampling are state elementary schools which located in 31 districts which are spread evenly in the area of Surabaya Center, East, West, North and South by random sampling.

This research was conducted at the Laboratory of Toxicology Department of Health Analyst, Health Polytechnic Surabaya, in January 2014 through November 2014.

Method of analysis

Borax

To detect Boric acid (if borax has been used, the same reaction will be obtained), about a tablespoonful of the chopped meat is thoroughly macerated with a little hotwater, pressed through a bag, and 2 or 3 tablespoonfuls of the liquid placed in a sauce dish with 15 or 20 drops of strong hydrochloric acid for each tablespoonful. The liquid is then filtered through filter paper, and a piece of turmeric paper dipped into it and dried near a lamp or stove. If boric acid or borax were used for preserving the sample, the turmeric paper should be changed to a bright cherry-red color. If too much hydrochloric acid has been employed a dirty brownish-red color is obtained, which interferes with the color due to the presence of boric acid. When a drop

of house hold ammonia added to the colored turmeric paper, it is turned a dark green, almost black color, if boric acid is present. If the reddish color, however, was caused by the use of too much hydrochloric acid this green color does not form (SNI 01 - 2894 – 1992).

Magenta and Metanil Yellow

Samples and standards were applied as spots in triplicate using either capillary or micro-pipette on a prepared TLC plates (10×10). Distance from the left and right edge of the plate was 10 mm and from the lower edge was 8 mm. The distance between the spots was kept at 8 mm. 9 spots were applied on a single plate. Development of the plate was performed in saturated TLC jar with different solvent systems and the development time was 1½ hour. For visual evaluation the chromatograms were evaluated under normal light and the distances moved by solvent and the spots were measured by template scale (SNI 01 – 2895 – 1992).

RESULTS AND DISCUSSIONS

The number of public school in the city of Surabaya is 476 and the number of state elementary schools were selected to be a sampling of snacks are in 31 districts some 62 schools, number of samples obtained from selected state elementary school were 675 pieces consisting of the following

Table 1: Number of samples based on the type of the parameter

No	Type of parameter	Frequency	Percent
1	Preservatives Borax	336	49,7
2	Synthetic red dyes	215	32
3	Synthetic yellow dyes	124	18,3
	Total	675	100,0%

Table 2: Types of samples at Borax examination in snacks of state elementary school

No	Type of snack	Frequency	Percent
1	Crackers	44	13,1%
2	Cireng	30	8,9%
3	Sausage	29	8,6%
4	Tempura	18	5,4%
5	Nugget	31	9,2%
6	Meatball	69	20,5%
7	Dumplings	26	7,7%
8	Batagor	9	2,7%
9	Tofu	27	8,0%
10	Egg Tofu	3	0,9%
11	Bread	9	2,7%
12	Noodle	12	3,6%
13	Foot Dragon	5	1,5%
14	Corned Beef	7	2,1%
15	Scalop	4	1,2%
16	Dragon Egg	3	0,9%
17	Pempek	2	0,6%
18	Cimol	2	0,6%
19	Etc	6	1,8%
	Total	336	100%

The highest frequency for samples of Borax in snacks are meatballs, followed by crackers.

Table 3: Type sample for synthetic red dye in snacks of state elementary school

No	Type of snack	Frequency	Percent
1	Sausage	22	17,7%
2	Crackers	20	16,1%
3	Fried Rice	4	3,2%
4	Sauce	78	62,9%
5	Gelatin/Jelly	12	9,7%
6	Beverages	27	21,8%
7	Red Seasoning	4	3,2%
8	Corned Beef	4	3,2%
9	Nugget	16	12,9%
10	Bread	4	3,2%
11	Tempura	2	1,6%
12	Cireng	5	4,0%
13	Noodle	3	2,4%
14	Candy	7	5,6%
15	Dry Snack	2	1,6%
16	Jam	2	1,6%
17	Etc	3	2,4%
	Total	215	100%

The highest frequency for samples of synthetic red dye in snacks is sauce, followed by a red drink.

Table 4: Type of samples for examination synthetic yellow dye in snacks of state elementary school

No	Type of Snacks	Frequency	Percent
1	Dumplings	4	3,2%
2	Sauce	24	19,4%
3	Nugget	26	21,0%
4	Beverages	10	8,1%
5	Yellow Seasoning	3	2,4%
6	Crackers	15	12,1%
7	Dry Snack	3	2,4%
8	Sausage	3	2,4%
9	Candy	6	4,8%
10	Gelatin/Jelly	8	6,5%
11	Noodle	5	4,0%
12	Tempura	2	1,6%
13	Foot Dragon	2	1,6%
14	Cireng	5	4,0%
15	Corned Beef	2	1,6%
16	Etc	6	4,8%
	Total	124	100%

The highest frequency for samples of synthetic yellow dyes in the snacks are nuggets, followed by orange sauce.

Table 5: Results of Borax, Magenta and Metanil Yellow in snacks of state elementary school

No	Parameter	Result	
		Positive	Negative
1	Borax	1 (0,29%)	335 (99,71%)
2	Magenta	0%	215(100%)
3	Metanil Yellow	0%	124 (100%)

From Table 5 showed, there is still a schoolboy snack producers containing Borax, which is found in crackers pulleys, not obtained samples containing Magenta and Metanil yellow.

The results of the study in the city of Karachi, Pakistan get results about 11% of branded food and 44% non-branded, respectively, were found to contain colors not allowed for human consumption. Similarly, 4% and 30% of branded drinks unbranded found not fit for consumption because it contains colors banned by the government (Saleem, 2013).

The results of this survey in 2014, there is still a snack in state elementary school which contains Borax, although a small percentage (0.29%), when compared with previous researchers Wigati (2013), Tumbel (2010), Triastuti (2013), Sultan (2013) and Sastaviyana (2013), the percentage of positive results contain Borax much smaller. The results of this survey in 2014 showed that no child snacks in state elementary school containing Magenta and Metanil Yellow. This shows the quality of a child snacks in state elementary school is better. Colors are added in foods useful to improve the purchasing power of consumers. A variety of food products available in the market contain food additives that are not permitted by the government that are harmful to health, such as retardation of growth, increased mortality, decreased food intake and levels of fertility, organ damage, like liver, kidneys, heart, eyes, lungs lungs etc. All synthetic colors have mutagenic properties and most of them have been identified as a potential carcinogen (Shinde, 2013)

Metanil Yellow effects if consumed continuously will cause a decrease in the activity of the enzyme cholinesterase (AChE) in the brain that affect the neurotransmitter system and the adult central nervous system (CNS) of Wistar rats because of its neurotoxicity (Nagaraja, 1993). Metanil Yellow also have an effect on the liver and intestinal tissues (Shanta, 1999). Chronic toxic effects were also seen in the testes of albino rats when given Metanil Yellow experimental animals at a dose of 3.0 g / kg body weight with a diet of pellets daily for a period of 30 and 45 days. Degeneration shown in the seminiferous tubules and in spermatocytes also featured in Sertoli cells (Sarkar, 2013)

CONCLUSIONS

From the research, it can be concluded that the child snacks at State elementary school in Surabaya containing preservatives Borax (0.29%) and no snacks that contain Magenta and Metanil Yellow. Considering that there are children' snacks in state elementary schools that contain food additives banned by the government, monitoring the quality of snacks by relevant agencies should be further enhanced.

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