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Survey on The Use of Formalin, Rhodamine B and Auramine 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 74 state elementary schools scattered in the city of Surabaya with sample of 631 pieces, and the results show a Formalin content (0%) in children' snacks and the snacks content of Rhodamine B (2,32%) and Auramine (0%) that are sold in the state elementary schools in the city of Surabaya.

Keywords:

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INTRODUCTION

The children in elementary school are the future generation as human resources have the potential to continue the development of the nation. During this period, they require nutrition that are used to growth and development. Suci's study (2009) stated that in general, Elementary school children often shop in the school cafeteria, but tend to choose food sold outside the school fence [1]. Snacks that are sold outside the school fence tend to have relatively low prices and nutritional quality, a low level of cleanliness, as well as the common food additives that are banned from using foodstuffs [2]. It does not rule out the possibility that the snacks sold in State Elementary School other village or sub-district in Surabaya also contain chemicals that are banned by the government.

The survey OF Food and Drug Supervisory Agency on Snacks of School Children were taken from 866 Elementary School / Islamic elementary schools spread across 30 cities in Indonesia. During the year 2011, it has been taken as many as 4,808 samples of food school children and 1,705 (35.46%) of samples which do not save and have enough quality of food. Profile of test results of food samples snacks school, children were 151 snacks contain Formalin, 138 snacks containing Borax, 3 snacks containing Metanil Yellow, 1 snacks contain Auramine, 187 snacks containing Rhodamine B [3].

The survey 's Food and Drug Supervisory Agency in August 2012 found four foods that contain preservatives Formalin and Rhodamine B and Auramine when performing food inspection in Gayamsari Market, Semarang. the 22 of samples were tested by officers directly at the site, there are four foods that are proven to contain substances harmful to human health. At a routine check before Eid Al-Fitr, the officers found the preservative Formalin of food in wet noodles and anchovy squashed, while the 'Moho' cake and noodle crackers substances found Rhodamine B and Auramine dyes [4].

In 2013, Food and Drug Supervisory Agency was routinely carried out sampling and laboratory testing 24 906 of foods. The test results showed that 3,442 (13.82%) of samples did not meet the requirements of safety and quality of food. From the test results are still found food products that contain hazardous substances are abused as Food Additives, as many as 221 samples containing Borax; 304 samples contained Rhodamine B; 115 samples containing Formalin; 9 samples containing Methanyl Yellow and 6 samples containing Auramine [5].

In 2014, the snack of school children were qualified as much as 7945 (76.18%) samples from 10 429 samples tested. There was a decrease of snack eligible in 2014 more than in 2013. That was happened because microbiological contamination in the snack of school children. Based on the results of testing in 2014, the type of food which accounts for the largest number of samples does not qualify were ice, colored drinks and syrups, jelly or gelatin and meatballs [6].

Dixit's research (2013) conducted in India, synthetic food dyes are banned by the government were found (16.4%), the East India zone indicates the use of the dye is allowed to pass through the maximum (80.3%) and the use of food dye banned by the government amounted to 28.7%, one use of banned food dye was Rodamin B [7].

With regard to that matter, the authors were prompted to conduct research on the existence of Formalin, Rhodamine B and Auramine in snack of Elementary school in the Surabaya city.

MATERIALS AND METHODS

The design of survey was descriptive study and the population of 476 State Elementary School scattered in Surabaya city. The schools selected as a sampling of snacks were in 6 sub-district numbered 74, so the sampling was done in 15.5% of the population due to lack of funding. The samples were sampled snacks child of a home industry such as cireng, meatballs / bulb, sausages etc to identify the presence of Formalin; food or drinks that are red and yellow which analyzed the presence of Rhodamine B and Auramine. Places selected in doing sampling are state elementary schools 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 - November 2014.

The Formalin test (Cat no 1080280)

Colorimetric with color card and sliding comparator 0.1 - 0.25 - 0.4 - 0.6 - 0.8 - 1.0 - 1.5 mg / l HCHO MColorstest™

The Rhodamine B and Auramine test

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)[8].

RESULTS AND DISCUSSION

The snacks examination with the rapid test (screening test) and if there is a positive result , will be followed by a confirmatory test. Confirmation test for examination of the dye will be done by the method of Thin Layer Chromatography. The results that can be reported are as follows :

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

No	Parameters	Number of samples	Percent
1	Formalin	292	46,3%
3	Synthetic Red dyes	215	34%
4	Synthetic Yellow dyes	124	19,7%
	Total	631	100,0%

Table 2: The sample snacks of elementary school children for Formalin test

No	Snacks	Formalin content	
		Frequency	Percent
1	Cireng	30	10,3%
2	Sousage	29	9,9%
3	Tempura	18	6,2%
4	Nugget	31	10,6%
5	Meatball	69	23,6%
6	Dumplings	26	8,9%
7	Batagor	9	3,1%
8	Tofu	27	9,2%
9	Egg tofu	3	1,0%
10	Bread	9	3,1%
11	Noodle	12	4,1%
12	Foot Dragon	5	1,7%
13	Corned Beef	7	2,4%
14	Scalop	4	1,4%
15	Egg Dragon	3	1,0%
16	Empek-empek	2	0,7%
17	Cimol	2	0,7%
18	etc	6	2,1%
	Total	292	100%

The highest frequency for sample of formalin test was the meatballs almost it was present in all schools.

Table 3: Type sample for synthetic red and yellow dyes in snacks of the state elementary school

No	Snacks	Red Samples		Yellow samples	
		Frequency	Percent	Frequency	Percent
1	Sousages	22	17,7%	3	2,4%
2	Crackers	20	16,1%	15	12,1%
3	Fried rice	4	3,2%	0	0
4	Sauce	78	62,9%	24	19,4%
5	Jelly	12	9,7%	8	6,5%
6	Beverage	27	21,8%	10	8,1%
7	Seasoning	4	3,2%	3	2,4%
8	Corned beef	4	3,2%	2	1,6%
9	Nugget	16	12,9%	26	21,0%
10	Bread	4	3,2%	0	0
11	Tempura	2	1,6%	2	1,6%
12	Cireng	5	4,0%	5	4,0%
13	Noodle	3	2,4%	5	4,0%
14	Candy	7	5,6%	6	4,8%
15	Dry Snack	2	1,6%	3	2,4%
16	Jam	2	1,6%	0	0
17	Dumplings	0	0	4	3,2%
18	Foot Dragon	0	0	2	1,6%
19	Etc	3	2,4%	6	4,8%
	Total	215	100%	124	100%

The highest frequency for sample of synthetic red dyes was sauce , followed with red beverage. The highest frequency for sample of synthetic yellow dyes was nuggets , followed with orange sauce .

Table 4: The results of examination snacks for Formalin, Rhodamine B and Auramine tests

No	Results of tests	Percent of positive samples	Percent of negative samples
1	Formalin	0%	100%
2	Rhodamine B dyes	2,32%	97,68%
3	Auramine dyes	0	100%

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 [9].

There is a general adverse effect of artificial food colouring and benzoate preservatives on the behaviour of 3 year old children which is detectable by parents but not by a simple clinic assessment [10]. Bell (2013) found that children encounter at least twice the number of exposures to food dyes as adults, and also that fruit and vegetable consumption was inversely correlated to the number of dye exposures per day in the children [11].

Steven (2013) wrote artificial food colors (AFCs) and common foods may cause behavioral changes in children with and without attention-deficit/hyperactivity disorder (ADHD). Studies have shown that a subgroup of children (with or without ADHD) react adversely to challenges with AFCs. Three types of potential mechanisms are explored: toxicological, antinutritional, and hypersensitivity. Suggestions for future studies in animals and/or children include dose studies as well as studies to determine the effects of AFCs on the immune system, the intestinal mucosa, and nutrient absorption. Given the potential negative behavioral effects of AFCs, it is important to determine why some children may be more sensitive to AFCs than others and to identify the tolerable upper limits of exposure for children in general and for children at high risk [12].

The Mamun’s research (2014) was the histopathological examination Mus musculus showed large cell deformity including shrieked and ruptured glomeruli, leucocytic infiltrations, degenerated tissue and congestion of renal glomerulus along with hemorrhage in renal tissue and congestion of central vein,

enlargement in the sinusoids, deleterious degenerations, mild hemorrhages and coagulation were also observed in hepatic tissue compared with the compact organization of their control [13].

Formalin-induced cytotoxicity (measured as reduction of the nuclear division index) possibly prevented division of damaged cells. Micronuclei were only significantly induced in human blood when proliferating cells were exposed to formalin during the last cell cycle before preparation. Several human biomonitoring studies reported increased frequencies of sister chromatid exchanges and Micronuclei in lymphocytes of subjects exposed to formalin [14] [15]. Repeated exposure to formalin-containing foodstuff results in mice to overexpressing HSP70 (Heat Shock Protein, 70 kDa) and induction of apoptosis (Maramis, 2014). In general, the presence of synthetic dye and formaldehyde into body, will damage the health.

CONCLUSIONS

From the research, it can be concluded that the child snacks at State elementary school in Surabaya containing preservatives Formalin (0%) and the snacks that contain Rhodamine B (2,32%) and Auramine (0%). 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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