

FORMALIN CONTAMINATION IN CHILDREN'S STREET FOODS AT SCHOOLS IN SURAKARTA, CENTRAL JAVA, INDONESIA

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ABSTRACT

Formalin is one of the chemical agents that is sometimes abused as food preservative. Formalin has negative effect to human health, especially to children. This present study investigated the contamination of several children's street foods at schools with this substance.

This study was held in 12 schools in Surakarta, Central Java Indonesia. The schools chosen included 4 elementary schools, 4 high schools, 3 senior high school and a vocational school. The children's street school food samples were fried foods, pasta, dim sum, chip, cake, and drinks. Food samples were collected and their formalin content was analysed using a formal-semi quantitative test (AHMT). OF the 57 children's meal tested, 28 (49%) of them were positively contaminated with formalin.

These results are very important for food safety programs especially children street foods. Accordingly, the organizational structures are required to minimize the risk of food contamination using a Total Quality Management (TQM) approach.

Key word : formalin, street food

INTRODUCTION

Formaldehyde is a nearly colorless gas with a pungent, irritating odor even at very low concentrations [below 1 ppm] (<http://www.atsdr.cdc.gov>) Formaldehyde can be used for many purposes and is popular chemical because of its low cost. Formaldehyde is found in cigarette smoke and also can be formed in the environment during the burning of fuels or household waste

(<http://www.idph.state.il.us/envhealth/factsheets/formaldehyde.htm>).

Formalin is not a food preservative, therefore, it is not allowed to be used in food products. The effects of formalin at low levels on health causes burning and watering eyes. As formaldehyde level increases, it can cause the nose and throat burning, coughing, and difficulty in breathing. Some people may be more sensitive to formaldehyde and are affected by low level of formaldehyde. Strong mixtures of formaldehyde gas and liquid can cause irritation or rash if it contact to the skin. When it is swallowed, formaldehyde can cause severe pain, vomiting, and diarrhea. Animal studies have shown that it increased nasal cancers in rats and mice inhaling high levels of formaldehyde for a long time (<http://www.idph.state.il.us/envhealth/factsheets/formaldehyde.htm>).

Formalin is an antimicrobial chemical that is used either to kill undesirable microorganisms or prevent or retard their growth. (<http://www.sciencedirect.com>) It is widely used in disinfectants production and preservatives in mortuaries and medical laboratories (<http://www.assenng.org>). This compound is not in GRAS-listed and not approved to be food preservative. However, some small food industries such as noodle, tofu/tahu, dim sum and others are still using formalin to preserve their products.

Formalin may caus by long-term effects on human healthand its use through different foods consumption, has been questioned (<http://www.osha.gov>). Eventhough formalin is economical and readily available, this compound is very harmful to human.

The aim of this preliminary study is to detect the possibility of formalin contamination in the street foods especially those sold to children at schools.

MATERIALS AND METHOD

The materials were variaus kinds of street foods obtained from 12 schools in Surakarta, 4 elementary schools, 4 junior high schools, 3 senior high schools, and 1 vocational school. The food samples were collected and were analyzed by Semi Quantitative Test with AHMT (4-amino-5-hydrazyno-1,2,4-triazole-3-thio) activator.

RESULTS AND DISCUSSION

The selected 57 samples of children street foods were obtained from 12 different Schools in Surakarta. Data on formalin contamination in the street foods is shown in Table 1. Formalin concentration of the contaminated foods is presented in Table 2. Foods not contaminated with formalin were found in 2 schools (table 3).

Tabel 1. Formalin Contamination in Street Food obtained from 12 schools in Surakarta

No	Location	Sample	Formalin contamination	
			+	
1	SD Banyuanyar I Surakarta (elementary school)	Fried meatball Noodle-meatball soup Cassava ball/cimol Fried-tofu-meatball/Batagor	Fried meatball Noodle-meatball soup Cassava ball/cimol	Fried-tofu-meatball/Batagor
2	SMP Negeri 17 Surakarta (junior high school)	Cassava chip Doughnut Fried-tofu-meatball/Batagor Macaroni	Cassava chip Fried-tofu-meatball/Batagor	Doughnut Macaroni
3	SMP Muhammadiyah 7 Surakarta [senior high school)	Fried noodle Mango Cocktail Yellow Chip Ordinary Chip Macaroni		Fried noodle Mango Cocktail Yellow Chip Ordinary Chip Macaroni
4	SD Sawahan II Sangkrah Surakarta (elementary school)	Tofu meatball Jitingnoodle Macaroni Hot Chip	Tofu meatball Macaroni Hot Chip	Jiting noodle
5	SMA Negeri 6 Surakarta (senior high school)	Sausage Nugget meatball soup Tofu Tempura	meatball soup	Sausage Nugget Tofu Tempura

6.	SMP Negeri 26 Surakarta (junior high school)	Fried noodle Colored ice Macaroni Cassava chips Cake Instant Fried noodle	Fried noodle Macaroni Cassava chips	Colored ice Cake Instant Fried noodle
7	SMP Kristen 4 (junior high school)	Candy Toast Cakue/fried dough	Candy	Toast/roti bakar Cakue/fried dough
8	SD Banyuanyar II (elementary school)	Fried wonton/Pangsit Hot Stick Candy Instant fried noodle		Fried wonton/Pangsit Hot Stick Candy Instant fried noodle
9	SMK Sahid Surakarta (vocational school)	Meatball Soup/Bakso Tofu Dim sum/Siomay Nugget Fresh Meet	Tofu Dim sum/Siomay	Meatball soup Nugget Fresh Meet
10	SD IT Nur Hidayah Surakarta (elementary school)	Noodle Rice crispy/Intip Tofu Chicken meat Taro crisps/Kripik Sausage	Noodle Rice crispy/Intip Tofu Chicken meat Sausages	Tam crisps/Kripik tales
11	SMA Negeri 8 Surakarta (senior high school)	Tofu Tofu beefball Fish chip/Tengiri chip Rice crackers/ Gendar Rambak Chip Bakwan/fried vegetable batter	Tofu Tofu meatball Fish chip/Tengiri chip Rice crackers/ Gendar Rambak Chip	Fried vegetable batter/Bakwan
12	SMA Negeri 7 Surakarta [senior high school)	Tofu dim sum/Siomay tahu Chip Fried wonton/ pangsit goreng Macaroni	Tofudimsum/ Siomay tahu Chip Macaroni	Fried wonton/ pangsit goreng

Tabel 2. Formalin concentration in children's Street Food

No	Location	Formalin Contamination(+)	Concentration
1	SD Banyuanyar I Surakarta (elementary school)	Fried meatball Noodle-meatball soup Fried cassava ball/Cimol	5 ppm 10 ppm 5 ppm
2	SMP Negeri 17 Surakarta (junior high school)	Cassava chip Fried tofumeatball/Batagor	5 ppm 5 ppm
3	SD Sawahan II Sangraha Surakarta (elementary school)	Tofu meatball Macaroni Hot Chip	5 ppm 1 ppm 1 ppm
4	SMA Negeri 6 Surakarta (senior high school)	Meatball	5 ppm
5	SMP Negeri 26 Surakarta (junior high school)	Fried Noodle Macaroni Cassava chips	5 ppm 1 ppm 1 ppm
6	SMP Kristen 4 (junior high school)	Candy	1 ppm
7	SMK Sahid Surakarta (vocational school)	Tofu Dim sum/siomay	5 ppm 1 ppm
8	SD IT Nur Hidayah Surakarta {elementary school}	Noodle Rice crispy/Intip Tofu Chicken meat Tales crisps Covered sausage	5 ppm 1 ppm 5 ppm 10 ppm 1 ppm 1 ppm
9	SMA Negeri 8 Surakarta (senior high school)	Tofu Tofu meatball Fish chip/Tengiri chip Rice crackers/Gendar Rambak Chip	5 ppm 5 ppm 5 ppm 1 ppm 1 ppm
10	SMA Negeri 7 Surakarta (senior high school)	Tofu dim sum/Siomay tofu Chip Macaroni	5 ppm 1 ppm 1 ppm

Table 3. Street foods without formalin contamination

No	Location	Formalin Contamination (-)
1.	SMP Muhammadiyah 7 Surakarta (junior high school]	Fried noodle Mango cocktail Yellow Chip Ordinary Chip Macaroni
2	SD Banyuanyar II (elementary school)	Fried dim sumPangsit Hot Stick Candy Instant fried noodle

The results showed 28 out of 57 (49%) children's street foods were contaminated by formalin. Eanwhile, twenty nine food samples were free from formalin contamination. The level of contamination is about 1 to 10 ppm.

This finding indicated that formaldehyde contamination was found scattered in almost every school in Surakarta. This proves that food safety in schools in the city of Surakarta is not guaranteed

According to the act of the Republic of Indonesia, number 7 year 1996 on food, the government bans the use formaldehyde as food additive. To protect consumers, in 2002, National Agency for Drug and Food Control amended the used of food additives especially for preservatives. According to this amendment, a food producer who wants to use a food preservative as well as other additives must prove its safety.

The effects of formalin on the human body that is consumed through different foods, especially by children, have not been determined. Many health-conscious consumers are interested in foods that do not contain any preservatives, especially those which are not normally in foods. This has resulted in searching food preservatives that are naturally present either in plant or animals origin.

The formalin testing was carried out with a using semi quantitative method using AHMT as an activator solution. There is another test of formaldehyde contamination that is easier and can be done by the public using potassium permanganate.

Based on this finding, **it is necessary** to have specific attention from local and central government on providing safer foods for children. We expect further support from **government to disseminate** food safety issues in the community, especially with regard to children's street food since this is very important for a healthy future generation.

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