IDENTIFICATION OF HAZARDOUS CHEMICAL AND MICROBES CONTAMINATION IN FOODS OF STREET VENDORS

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Abstract

This study aimed at identifying chemical and microorganism contamination in foods of street vendors around Institut Agama Islam (IAIN) Syekh Nurjati Cirebon. The samples are meatball, cilok, grilled fish cake, nuggets, rolade, sauce, crackers, and iced water drinks. The sample tests are formalin test, borax test, Rodhamine B test, Methanyl Yellow test, and Coliform & Escherichia coli MPN test. The results showed that some food samples like meatball, cilok, grilled fish cake, nuggets, and rolade were positive of formalin & borax contaminated. The iced water drinks are contaminated by Coliform & E. coli. The other samples like sauce and crackers were negative of Rhodamine B & Methanyl Yellow contaminated. In conclusion, according to this study, the foods of street vendors at IAIN Cirebon are not yet safe to be consumed.

Keywords: Hazardous chemical, microbes, food street safety.
The fulfillment of quality and safe/healthy food contained in Law No.18 of 2012 is the fundamental right of a citizen in Indonesia. Healthy food is an important issue today because of various foods sold at open street. The results of the study in 2011 by the Food and Drug Supervisory Agency (BPOM) revealed an extraordinary incidence of 163 cases of food poisoning. One reason is the addition of preservatives, dyes, and also the potential for harmful microbial contamination (Rizki, 2016).

The coloring and preservatives allowed by BPOM RI are particular food coloring. However, the price of food coloring and chemicals is considered quite expensive for small producers. Hazardous textile coloring material that is often used is Rhodamine B & Methanyl Yellow, while dangerous preservatives that are commonly used are formalin & borax. This use causes food poisoning followed by acute pain, vomiting, nervous system depression, and blood circulation failure (Isran et al., 2016).

Formalin and borax abuse have been researched and indicated positively in some foods such as fish, shrimp, noodles, bread, rice cake, meatballs, cilok, tofu and others (Hastuti, 2016; Kusumawati, 2004; Pane et al., 2013; Putra, 2009; Rinto & Utama, 2009; Sultan, et al., 2013; Suryadi & Kurniadi, 2014; Triastuti, et al., 2013; Tumbel, 2012). In this study, the samples were grilled fish cake, rolade, nuggets, meatballs (formalin), cilok, and wet yellow noodles (borax).

Research on the identification of chemicals and harmful microbial contamination in foods of street vendors can be an indicator. Rhodamine B and Methanyl Yellow dyes are indicated in canteen snacks, ground red chilies, sauces, chili sauce, skewer meatball sauce and lipstick (Irawan & Ani 2016; Taufik et al. 2016; Sajimamo et al., 2016; La Ifu, 2016; Hernawan, 2017; Situmorang et al., 2015; Azhari, 2017; Rusmalina & Anindhit, 2015). In this study, the samples studied were from sauces (Rhodamine B) and crackers (Methanyl Yellow).

One indicator of safe/healthy food is free from biological hazards (BPOM RI, 2012). Natural hazards such as bacteria can produce toxins that can cause disease (FAO, 2006). Malicious microbiological contaminants can originate from Coliform and E. coli, 2002). If these bacteria levels increase above average, they will cause digestive diseases such as acute diarrhea and fever. If it is not immediately treated, it will cause death (Kumala & Indriani, 2008; Zein et al., 2004). This research was conducted by Yusuf (2004) in the Darmaga TPB dormitory, food samples containing E. coli and was declared not eligible. Lettuce was examined in Bogor market containing Salmonella, which included pathogenic bacteria (Agustin, 2004). Also, market snacks and stalls in Jakarta contain pathogenic bacteria (Aminah et al., 2005). The samples tested for Coliform and E. coli by MPN. In this study, MPN was a mixture of water and ice. The use of this MPN method can reveal the existence of E. coli and Coliform contamination (Nurjannah & Novita, 2018).

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The effect of borax on body organs varies depending on the concentration of borax ingested into the body. In adults, a borax dose of 10-20 gr/kg body weight and children 5 g / kg body weight can cause poisoning & death. Under these doses can cause symptoms such as upper abdominal pain, headaches, skin diseases and shortness of breath and failure of blood circulation (Khamid, 2006).

Identification of Rhodamine B & Methanyl Yellow

Identification of Rhodamine B dye tested on the red sauce while Methanyl Yellow tested on yellow crackers. Identification of Rhodamine B in sauces has been examined by Kartini & Mukti (2017), Azmi et al., (2017), Longdong (2017), Muflihunna & Sajadah (2014), and Samosir et al., (2018). Meanwhile, the identification of Methanyl Yellow in crackers has been examined by Rahayu & Mahmuda (2016), Murtiyanti (2013) and Rahayu & Mahmuda (2016). Presentation of data on identification of the use of these dyes is in Table 2.

The results of the identification of Rhodamine B in Table 2 state that all the sauce from the traders A, B, C, D, E did not contain rhodamine B. This dye is made from dietyllamino-phenol and phatalic anhydride which is very toxic to humans. These dyes are declared prohibited for food ingredients according to the Regulation of the Minister of Health of the Republic of Indonesia No.722 / Menkes / Per / IX / 1988 concerning dyes which are declared dangerous and prohibited in Indonesia.
Identification of Hazardous Chemical and Microbes Contamination in Foods of Street Vendors around IAIN Syekh Nurjati Cirebon has not been conducted. With the potential for food safety hazards, it is feared that there is a possibility that it will disrupt the health of people who consume snacks around IAIN Syekh Nurjati Cirebon. Health is a factor that greatly influences learning achievement (Riyani, 2015). Therefore, this study aims at identifying harmful microbial chemicals and contaminants in foods of street vendors. It is hoped that this research will become a reference source for the campus community, to sort out snacks that are guaranteed to be safe.

**METHOD**

Samples were taken from street vendors around IAIN Syekh Nurjati Cirebon in November 2018 and analyzed at the Regional Health Laboratory (Labkesda) in Cirebon City. This research is a qualitative and quantitative descriptive study. The parameters analyzed were formalin, borax, Rhodamine B, Methanyl Yellow, and Coliform & E. coli. Qualitative test for formalin using chromotofic acid, borax refers to SNI 01-2358-1991, Identification of synthetic coloring agents (Rhodamine B & Methanyl Yellow) using Paper Chromatography method according to SNI, 01-2895-1992. The microbiological examination uses the Most Probable Number Test method which consists of a presumptive test using the lactose broth medium, confirmative test using the brilliant green lactose broth medium. The sample consisted of meatballs, cilok, yellow noodles, sauce, brains, nuggets, crackers, and ice cubes. All samples were selected from several street vendors. Data that has been analyzed is presented in the form of tables and narratives to discuss the results obtained.

**FINDINGS AND DISCUSSION**

**Identification of Formalin and Borax**

Formalin identification was tested in grilled fish cake snack, rolade, nuggets, meatballs, while identification of borax was tested in meatballs, cilok, and yellow noodles from meatballs. Formalin & borax used in these samples have been tested positively in various test sites (Fauziah, 2014; Harsojo & Kadir, 2013; Kartini & Mukti, 2017; Nopiyanti, Krisnawati, & Heriani, 2018; Santi, 2018; Tubagus, 2013; Ulfa, 2015 ; Wariyah & Dewi, 2013; Warmi, 2013; Yulizar, Wintarsih, & Amin, 2014).

The results of the identification of formalin and borax in Table 1 showed that all samples from trader A were declared unsafe for consumption because they contained formaldehyde. Formaldehyde can increase blood acidity, shortness of breath, hypothermia, coma, and death (Winarno, 1997).

Identification in the merchant cilok D sample contained positive borax, while the merchant C, and E samples did not contain borax. Addition of borax acid in the process of making meatballs/cilok can improve the structure and texture of meatballs/cilok to be more springy and...
The results of the Methanyl Yellow identification in table 2 show that the crackers of the F & G are negative of Methanyl Yellow. The use of Methanyl Yellow dye is often found in food products such as crackers, noodles, tofu, fried foods, cakes, and yellow snacks. Methanyl Yellow is often used by food traders because of its lower price and more attractive colors than food coloring. Methanyl Yellow is prohibited for food products because of the heavy metal content that can endanger health (Palar, 2008). This compound is an aromatic azo chemical compound that can cause tumors in various tissues of the liver, bladder, digestive tract, and skin tissue.

Identification of Coliform and E. coli

The samples tested came from a mixture of water & ice cubes at traders H, I, J, K, L, M, and N. Research on coliform bacteria contamination and E. coli on water & ice was tested by Nurjannah & Devi (2018), Hadi, et al., (2014), and Rifa et al., (2016). Data presentation on total contamination of Coliform bacteria and E. coli is found in table 3.

| Drinks Sample/Street Vendors       | MPN Coliform/ Gram | MPN E.Coli/ Gram |
|------------------------------------|-------------------|------------------|
| Mixture of Water & Ice Cube /H     | 33                | 33               |
| Mixture of Water & Ice Cube /I     | 460               | 150              |
| Mixture of Water & Ice Cube /J     | 240               | 93               |
| Mixture of Water & Ice Cube /K     | 460               | 460              |
| Mixture of Water & Ice Cube /L     | >2400             | >2400            |
| Mixture of Water & Ice Cube /M     | >2400             | >2400            |
| Mixture of Water & Ice Cube /N     | >2400             | >2400            |

Jasaboga sanitation hygiene number 1096 / MENKES / PER / VI / 2011 which was 0 / gram. This indicates that iced drinks in street vendors around IAIN Syekh Nurjati Cirebon are not safe for consumers. Contamination of E. coli bacteria is an indicator bacterium that is used to detect contamination by feces in water and detect the presence of intestinal pathogens. E. coli is a normal flora found in the digestive tract of animals and humans, but some E. coli serotypes can cause diarrhea in humans. The mixture of water & ice cubes around this campus are not safe to be consumed and a high chance to cause disease. This can cause people who drink it to suffer from diarrheal diseases. Diarrhea can cause heart rhythm disorders, and cerebral hemorrhage due to loss of electrolyte fluid (Herbowo & Firmansyah, 2016).

CONCLUSION

The results of identification of hazardous chemicals and microbial contamination in street vendors around IAIN Syekh Nurjati Cirebon were formalin and borax positive in some samples, Rhodamine B & Methanyl Yellow are negative in all...
samples and *E. coli* & *Coliform* contamination in water mixtures and ice. Therefore, foods street vendors around IAIN Syekh Nurjati Cirebon are not yet safe to be consumed. Suggestions from the results of this study are expected to provide periodic guidance and counseling on food safety for street vendors around IAIN Syekh Nurjati Cirebon.

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