

RESEARCH ARTICLE

Identification of Methanyl yellow and Rhodamin B content in ready-to-serve noodles stick

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DOI : [10.33086/etm.v5i1.6630](https://doi.org/10.33086/etm.v5i1.6630)**Abstract**

Methanyl Yellow is a yellow synthetic dye with the molecular formula $C_{18}H_{14}N_3N_2O_3S$ and a molecular weight of 3.4 gr/mol. Rhodamine B is a dangerous dye with the molecular formula $C_{28}H_{31}N_2O_3Cl$. Its effects cause respiratory problems, eye irritation, low blood pressure, bladder cancer, diarrhea, nausea, vomiting, kidney, lymphatic and liver damage. Purpose of this study was to describe the presence and absence of methanyl yellow and rhodamin B content in ready-to-eat stick noodles registered as Household Industry Food at the Jember Regency Health Office. This type of research is descriptive quantitative by taking samples from 4 Household Industries ready-to-eat stick noodles in Jember Regency and using laboratory tests to determine the content of Methanyl Yellow and Rhodamin B. Population of this study were all ready-to-eat stick noodles. The population of this study were all ready-to-eat stick noodles of different flavors taken using total sampling technique for samples of stick noodles without seasoning, and for seasoning samples using purposive sampling technique according to the inclusion criteria, namely ready-to-eat stick noodles registered as household industry food, ready-to-eat stick noodles that use yellow and red seasonings. Results of the test for Methanyl Yellow in 4 samples of unseasoned pasta were negative. Results of the Methanyl Yellow test on 4 samples of ready-to-eat yellow stick noodle seasoning were negative. In addition, rhodamin B testing on 20 samples of ready-to-eat red stick noodle seasoning was also negative. The conclusion of this study is that there is no Methanyl Yellow and Rhodamin B content in ready-to-eat stick noodles registered as Household Industry Food in Jember Regency.

Keywords: Sticky Noodles, Methanyl yellow, Rhodamin B.**INTRODUCTION**

Food is an essential need of living beings that must be met. Factors that affect the quality of food components include color, nutritional content, texture, taste and microbiological properties (Masthura, 2019). Improving the quality of food components, especially the appearance of food ingredients, is done by many food or beverage manufacturers by adding food additives, both natural and synthetic (Masthura, 2019). According to Permenkes Republic of Indonesia No. 033/2012

concerning food additives, food additives are substances that are added to food in order to affect the nature or form of the food (Kemenkes, 2012). The use of food additives is regulated by Law No. 17 of 2023 on Health, which emphasizes that food and beverages must meet standards or requirements, quality and nutrition in accordance with the applicable regulations (Kemenkes, 2023).

Twenty-four food samples were tested by the Food and Drug Supervisory Agency of the Republic of Indonesia in 2022. The test results showed that there were 10 samples containing Borax, 5 samples containing Formalin, and 2 samples containing Rhodamine B. (BPOM, 2023). Methanyl Yellow is a yellow synthetic dye with the molecular formula $C_{18}H_{14}N_3N_2O_3S$ and a molecular weight of 375.4 g/mol. Health effects include cancer, eye, skin and respiratory irritation. It also causes low blood pressure, bladder cancer, abdominal pain, diarrhea, nausea and vomiting (Hendayana, 2006). Rhodamin B is a dangerous dye with the molecular formula $C_{28}H_{31}N_2O_3Cl$. Health effects include disorders of the eyes (redness and swelling), skin, respiratory system and digestive tract. In addition, it can cause damage to the kidney, lymph and liver organs (Yuliarti, 2007). Foods that are likely to use food additives are snack foods. In 2022, snack foods became one of the food types that became a concern in the supervision of the Food and Drug Monitoring Agency regarding the addition of food additives. This was due to an increase in demand in production (BPOM, 2022). Based on the results of a survey on the level of snack preference among students of the Faculty of Public Health, University of Jember, it was found that 81.6% of the 103 respondents liked noodle stick type snacks. Snacks known as "mie lidi" are dry noodles in the form of sticks made of wheat flour (BPOM, 2015; Khumaeni et al., 2021).

Based on the results of a preliminary investigation on December 20, 2023 at the Jember District Health Office, there are four household industries that sell ready-to-eat stick noodles and are registered with the Household Industry Food. The household industries have been observed, which shows that two industries produce raw stick noodles and sell ready-to-eat stick noodle products, while the other two only sell ready-to-eat stick noodle products. The process of manufacturing ready-to-eat stick noodles is known to involve the addition of conspicuous yellow and red seasoning food additives. Products registered as Household Industry Food should be stricter in terms of monitoring the addition of food additives, but this has not been done optimally. In addition, based on Khumaeni's research in 2020 states that there is Rhodamin B in stick noodles, which is 0.1840 ppm (Khumaeni et al., 2021). This purpose of this study was to describe the content of Methanyl yellow and Rhodamin B in ready to eat stick noodles as household industrial food at the Jember District Health Office.

MATERIALS AND METHODS

Kind of study

This study is a quantitative descriptive to describe the content of methanyl yellow and rhodamin B in ready-to-eat stick noodles. The sampling sites were in 4 ready-to-eat stick noodle home industries that are still producing and registered with the Jember District Health Office. The 4 home industries are located in Ajung, Mangli and Wuluhan sub-districts. The total population was 44, consisting of 4 samples of stick noodles without seasoning and 40 samples of red and yellow stick noodles with seasoning. Sampling technique used total sampling for samples of stick noodles without seasoning and purposive sampling for samples of stick noodles with seasoning according to the inclusion criteria. Inclusion criteria used are ready-to-eat stick noodles registered as household industrial food at Jember District Office, ready-to-eat stick noodles using yellow and red seasoning. Number of samples used in this study was 28 samples consisting of 4 samples of unseasoned pasta and 24 samples of seasoned red and yellow ready-to-eat pasta. Examination of methanyl yellow and rhodamin B content using Photometer ZE:200 which goes through 2 stages, namely the qualitative test stage using the rapid test kit. If the results are positive, continue with the ZE:200 Photometer (SNI, 01-2895-1992).

Procedure of study

Step 1 Procedure (Rapid Test Kit):

1. Prepare 25 grams of sample and add distilled water. Then use a blender or mortar to grind the sample.
2. Put 1 ml of the ground sample into a test tube and add 3-5 drops of methanyl yellow Reagent or Reagent I and II to rhodamin B. The methanyl yellow and rhodamin B tests are performed separately.
3. tir until homogeneous and wait 3-5 minutes.
4. The specimen is positive for methanyl yellow if there is a reddish color change. If there is no color change, the sample is negative for methanyl yellow.
5. The specimen is positive for rhodamin B if there is a color change to purple. If there is no color change, the specimen is negative for rhodamin B.

Stage 2 Testing Procedure (ZE:200 Photometer): If the result of stage 1 (qualitative) examination is positive, you can proceed to the next stage of examination by using the ZE:200 Photometer to measure the content.

1. Measurement of methanyl yellow samples:
 - (a) Place the sample in the cell up to 2 ml and add Aquadest up to 8 ml or up to the limit line.
 - (b) Add 3 drops of Methanyl Yellow-1 reagent, close the vial immediately and homogenize.
 - (c) Switch on the ZE:200 Photometer tool and select the methanyl yellow test. Enter the blank value and press "Read".
 - (d) Measure the sample on the ZE:200 Photometer.
2. Measurement of rhodamin B Samples:
 - (a) Transfer 2 ml of the sample into a 10 ml test tube.
 - (b) Add 3 drops of Reverse Osmosis-1 reagent and shake.
 - (c) Next add 55 ml of Reverse Osmosis-2 reagent, then seal and homogenize until the color is lifted all the way to the Reverse Osmosis-2 reagent liquid.
 - (d) Turn on the ZE: 200 Photometer tool and select the rhodamin B test. Enter the blank and press "Read".
 - (e) Aspirate the liquid at the bottom of the test tube, leaving only the liquid at the top, and immediately measure the sample using the ZE: 200 Photometer tool.

RESULTS AND DISCUSSION

Methanyl Yellow Content Based on Unseasoned Stick noodles

The Methanyl Yellow test was carried out on 4 samples from 4 home industries. Based on Table 1, four samples did not contain methanyl yellow. This is evidenced by the absence of color change in the test sample to yellowish to reddish. All discolorations in all four samples were average white. The samples tested were samples of food products registered as Household Industry Food, so the results were negative. According to the Food and Drug Supervisory Agency Regulation No. 22/2018, Household Industry Food is a food production license granted to household industry operators by the Regent or Mayor through the Health Department. Household Industry Food Certificates are given to consumers as a form of guarantee of health, safety, and hygiene in food production (Windayati

et al., 2024). The Household Industry Food Certificate assures the public that the food they purchase and consume meets the proper quality standards and is guaranteed because it has passed the food sample test (Imtiyaz, 2016). The sample is said to be positive for methanyl yellow if the color change in the sample becomes reddish (Putri and Yudhastuti, 2023).

Table 1. Methanyl yellow test results

Home Industry	Sample Code	Methanyl yellow Content	Description
A	1	Negative (-)	Produce and sell stick noodles
B	2	Negative (-)	Buy raw stick noodles from IRT C and sell stick noodles
C	3	Negative (-)	Produce and sell stick noodles
D	4	Negative (-)	Buy raw stick noodles from IRT C and sell stick noodles

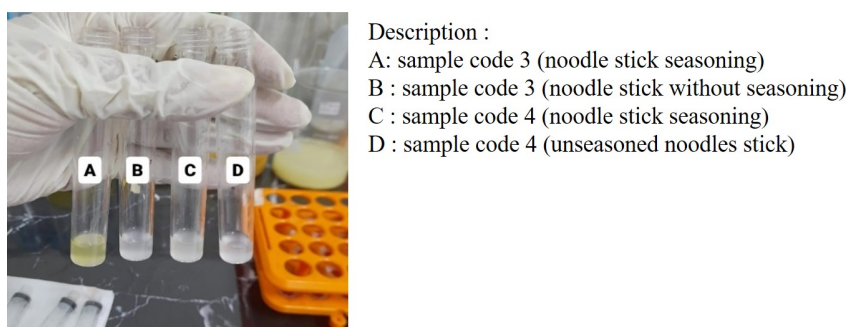


Figure 1. Methanyl yellow test results on unseasoned and seasoned noodles stick

Based on Figure 1, it can be seen that the samples with codes B and D have changed color to cloudy white. Sample B is a sample with code 3 from household industry C, while D is a sample with code 4 from household industry D. This indicates that there is no color change in the sample which was originally yellowish to yellow and noticeably red after testing. Therefore, the sample does not contain methanyl yellow. Samples 1 and 2 also changed color to cloudy white. The 4 samples of unseasoned pasta were tested only until the first stage, namely a qualitative test using the Inagenpro brand rapid test kit. The test could not be continued using the ZE:200 Photometer because the result was negative in stage one. The color change in te test samplless is caused by the addition of reagents to methanyl yellow during the testing process.

Samples of unseasoned stick noodles with codes 1, 2, 3, and 4 have almost the same characteristics, namely a slightly yellowish color, no odor, and the color is not too bright or noticeable compared to stick noodles seasoned with yellow. Methanyl yellow dye is a type of hazardous material that has been regulated in the Joint Regulation of the Minister of Home Affairs of the Republic of Indonesia and the Head of the Food and Drug Administration of the Republic of Indonesia No. 43 of 2013 and No. 2 of 2013 on the Supervision of Hazardous Materials Misused in Food. The advantages obtained in the use of methanyl yellow dye are brighter or striking colors, more stable, stronger and more varied (Putri and Yudhastuti, 2023).

The results of this study are consistent with Rahmadini and Apriani’s research in 2017 that found no rhodamin B and methanyl yellow dye content in 20 samples of snacks from two elementary schools in Rawa Crocodile. One of the samples tested is a stick or what is commonly referred to as stick noodles (Rahmadini and Apriani, 2017). According to the research conducted by Cahyogi and Lagino in 2016, the knowledge level of most traders or sellers is sufficient with an average value of 64.4% where they already know that the use of methanyl yellow dye is harmful to health (Lagiono, 2016).

The circulation of food and beverages that still use methanyl yellow coloring in the market is decreasing. This may be due to the wider knowledge of the community and various studies on the dangers of consuming food or beverages containing methanyl yellow dyes which can have a negative impact on the human body (Putri and Yudhastuti, 2023). Consumption of methanyl yellow dye can have a negative effect on the human body. This can occur because methanyl yellow is an irritant which when consumed is fatal to the digestive tract. Other effects that occur include experiencing fever, diarrhea, abdominal pain, nausea and vomiting, low blood pressure, and the body feeling weak and weak (Rosmauli and Superteam, 2014).

Methanyl yellow content by seasoning

Table 2. Methanyl yellow test results by seasoning

Home Industry	Sample Code	Methanyl yellow Content
A	1	Negative (-)
B	2	Negative (-)
C	3	Negative (-)
D	4	Negative (-)

Methanyl yellow testing was performed on 4 samples of ready-to-eat yellow stick noodle seasoning. Sampling was done by purposive sampling method which was adjusted according to the inclusion criteria. The inclusion criteria are ready-to-eat stick noodles that use yellow seasoning and are registered as Household Industry Food. Samples with code 1 came from household industry A, samples with code 2 came from household industry B, samples with code 3 came from household industry C, and samples with code 4 came from household industry D. Based on Table 2, it can be seen that the 4 samples did not contain methanyl yellow coloring substances in the ready-to-eat stick noodle seasoning. This is evidenced by the absence of color changes in the sample, which was originally yellowish to bright yellow to red after testing. Therefore, the sample does not contain methanyl yellow.

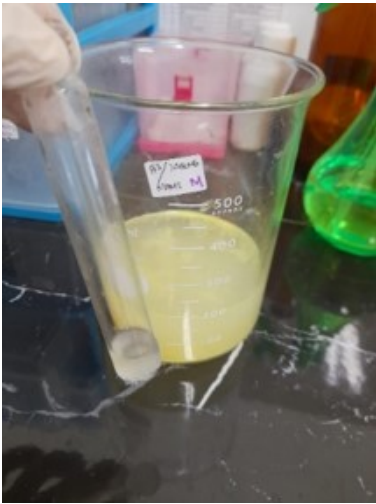


Figure 2. Methanyl yellow test results on Sample 2 (Household Industry B)

Based on Figure 2, the sample with code 2 from Household Industry B changes color to cloudy white. Based on Figure 1, it shows that Sample A changes color to cloudy yellow. Sample A is a

sample with code 3 from Household Industry C. Therefore, the sample does not contain methanyl yellow.

Figure 1 also shows that Sample C is a sample with code 4 that changes color to cloudy white. Sample with code 4 comes from Household Industry D. Sample with code 1 also experienced the same color change, which is cloudy white. Samples with code 1 come from Household Industry A. Therefore, the sample does not contain methanyl yellow. Samples are considered positive for methanyl yellow if the color change in the sample becomes reddish (Putri and Yudhastuti, 2023). Testing of 4 samples of yellow ready-to-eat stick noodle seasoning was performed only to the first level, using a rapid test kit. The test cannot be continued using the ZE:200 photometer because the results are negative at level one.

Seasoning used in ready-to-eat stick noodles is Antaka brand instant seasoning. Antaka is a seasoning with flavors such as sweet corn, balado, sweet spicy, barbecue, grilled corn, salted cheese, sweet cheese, grilled chicken, and roast beef. Yellow-colored ready-to-eat stick noodle seasoning samples from the 4 Pangan Industri Rumah Tangga use antaka with a sweet corn flavor variant on average. Food coloring composition in the sweet corn flavored antaka is the natural colorant curcumin CI 75300. Curcumin is an orange-yellow natural food coloring found in the turmeric plant (*Curcuma domestica* valet) at 1.8-5.4%. Turmeric imparts a yellow or orange color effect to foods. Pigments in turmeric can be used to improve the quality and shelf life of food and can be beneficial to the body for nutrient absorption (Mardiah et al., 2018). Methanyl yellow content was not detected in the yellow ready-to-eat stick noodle seasoning sample because the colorant used with the type of natural colorant curcumin CI 75300 is not a food colorant, which is prohibited for use in food (17mardiah2018upaya).

Methanyl yellow content was not found in ready-to-eat stick noodles with yellow spices, which indicates that the knowledge level of producers and traders is good. The knowledge they have also affects their attitude and behavior not to use methanyl yellow dye (Bafdal et al., 2022). This research is consistent with the research conducted by Simanjutak in 2020 that 7 samples of traditional yellow snacks suspected of containing methanyl yellow dye sold in Mandonga market, Kendari City, did not find positive results for methanyl yellow dye content (Simanjuntak, 2020). Although the test results showed negative for methanyl yellow dye, it does not exclude the possibility that ready-to-eat lidi noodles using yellow spices use other food additives such as flavor enhancers, preservatives, and others. Therefore, further testing of these parameters is needed.

Rhodamine B content by seasoning

Table 3. Methanyl yellow test results by seasoning

Home Industry	Sample Code	Rhodamine B Content	Flavor Description
A	1	Negative (-)	Spicy Balado
	2	Negative (-)	Balado
	3	Negative (-)	Onion Chicken
	4	Negative (-)	Sweet Spicy Corn
	5	Negative (-)	Super Spicy
	6	Negative (-)	Spicy Onion Chicken
	7	Negative (-)	Grilled Corn
	8	Negative (-)	Spicy Grilled Corn
	9	Negative (-)	Spicy Chicken
	10	Negative (-)	Spicy Beef
B	11	Negative (-)	Spicy 5 Giga
	12	Negative (-)	Extra Spicy
	13	Negative (-)	Spicy Sweet
	14	Negative (-)	Spicy Cheese
	15	Negative (-)	Balado

Table 3. Methanyl yellow test results by seasoning

Home Industry	Sample Code	Rhodamine B Content	Flavor Description
	16	Negative (-)	Spicy Orange Leaf
	17	Negative (-)	Grilled
C	18	Negative (-)	Extra Spicy
D	19	Negative (-)	Spicy
	20	Negative (-)	Balado

The four household industries have registered household industry food with Jember District Health Office. Table 3 shows that the 20 samples did not contain Rhodamine B dye. This is evidenced by the absence of color change to purple in the sample.

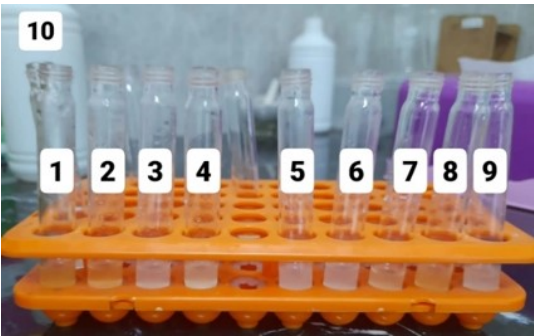


Figure 3. Rhodamine B Test Results on Samples from Household Industry A

Based on Figure 3, there are test samples from Household Industry A. These samples are 10 samples of ready-to-eat red stick noodle seasoning. Samples with codes 1, 2 and 8 changed color to cloudy yellow. Samples with codes 3, 4, 5, 6, 7, 9, and 10 experienced a color change to cloudy white.



Figure 4. Rhodamine B Test Results on Sample 11 (Household Industry B)

Based on Figure 4, there is one sample with code 11 that experienced a color change to yellowish white. In addition, samples with codes 12, 13, 14, 15, 16, and 17 also experienced the same color change, yellowish white. All the samples from Home Industry B have the same sample color change.

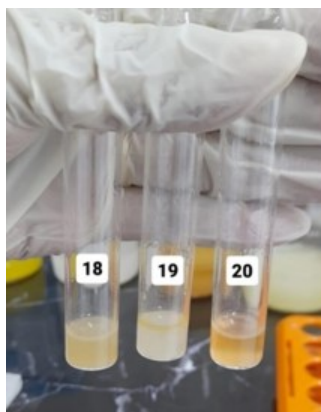


Figure 5. Rhodamine B Test Results on Samples from Home Industries C and D

Based on Figure 5, it can be seen that the sample with code 18 has changed color to cloudy white. The sample comes from Household Industry C. Sample with code 19 changed color to yellow to orange. Sample with code 20 has changed color to cloudy yellow. Both samples are from Household Industry D. The sample is considered positive for rhodamin B if the color change in the sample becomes purple (Shafira et al., 2022). Testing of 20 samples of ready-to-eat red stick noodle seasoning was performed only up to the first stage, using the inagenpro brand rapid test kit. The test cannot be continued using the ZE: 200 photometer because the results are negative at level one.

The red ready-to-eat pasta seasoning samples in Household Industries A and B use the same Mazzoni brand instant seasoning. Mazzoni is a seasoning with flavours such as onion chicken, grilled chicken, balado, balado ijo, extra spicy balado, barbecue, chilli, roasted corn, sweet corn, cheese, pizza, roast beef, spicy sweet shrimp. According to the mazzoni packaging, the ingredients are sugar, dextrin, salt, mononatrium glutamate flavour enhancer, chilli powder, garlic powder and food colouring. The food colouring used in Mazzoni is not specified, but the red colouring may be due to the chilli powder and food colouring used. No Rhodamine B content was found in the sample of red ready to eat pasta seasoning because the Mazzoni brand of seasoning already has a marketing authorisation from the Food and Drug Administration with a Household Industry Food number 255628029618. It also has Halal certification with the number 01061002810502.

The red ready-to-eat stick noodle seasoning sample in Household Industry C uses a combination of instant seasonings, which vary by brand but are often Mazzoni and Antaka. Mazzoni is a seasoning with a variety of flavours such as onion chicken, grilled chicken, balado, balado ijo, extra spicy balado, barbecue, chilli, roasted corn, sweet corn, cheese, pizza, roast beef, spicy sweet shrimp. According to the mazzoni packaging, the ingredients are sugar, dextrin, salt, mononatrium glutamate flavour enhancer, chilli powder, garlic powder and food colouring. The food colouring used in mazzoni is not specifically mentioned, but the red colouring may come from the chilli powder and food colouring used.

The next most commonly used instant seasoning is the Antaka brand. Antaka is a seasoning with flavours such as sweet corn, balado, sweet spicy, barbecue, grilled corn, salted cheese, sweet cheese, grilled chicken and roast beef. According to Antaka's packaging, the ingredients are sugar, maltodextrin, salt, chilli powder, onion powder, mononatrium glutamate flavour enhancer, silica anticoagulant, synthetic colours Yellow FCF CI 15985 and Red Allura 16035. No rhodamine B was detected in the red ready-to-eat pasta seasoning sample because the synthetic colourants used, Yellow FCF CI 15985 and Red Allura 16035, are not food colourants that are prohibited for use in food. These synthetic dyes are permitted for use in food (Mardiah et al., 2018). In addition, the red

colour of the seasoning may come from the chilli powder in Antaka brand seasoning. In addition, the red-coloured ready-to-eat stick noodle seasoning sample from household industry D also used Antaka brand instant seasoning, as did household industry C.

The results of this study are in line with the research conducted by Rokhmah and Rusmalina (2023) which states that there is no content of Rhodamin B dye in 9 samples of Balado seasoning obtained from the market in Ulujami and Comal districts. This study is in line with a study Affandi and Aziza (2015) research, which stated that 14 samples of food snacks and eye-catching red drinks sold at Kartini IV State Elementary School in Cirebon City did not contain Rhodamin B, a dangerous dye. Some of the samples tested included balado seasoning in fried otak-otak, chilli seasoning in crackers, balado seasoning in macaroni and balado seasoning in cimol. This can be attributed to the attitude and level of knowledge of traders about harmful colourings. The attitude and knowledge level of hawkers showed that 77.8% of hawkers of brightly coloured snacks at Kartini IV State Elementary School, Cirebon City were classified as good, but 22.2% of hawkers were still in the less category. Therefore, the vendors did not use the dangerous colour Rhodamin B. According to a study Abbas et al. (2019), out of 11 samples of snacks from Inpres Batua 1 Elementary School in Makassar City, 4 samples did not contain Rhodamin B coloring agent and the sweetener (saccharin) was found within the normal limits. One of the samples tested for Rhodamin B is Balado seasoning.

However, vigilance is still needed when choosing brightly coloured and eye-catching foods. This is to avoid adverse effects caused by the consumption of Rhodamin B dye. Snacks containing rhodamin B dye have the following characteristics: they are brighter in colour, have a glossy, conspicuous red colour, there are lumps of colour, the colour looks uneven and, when eaten, they taste slightly bitter (Rokhmah and Rusmalina, 2023).

CONCLUSIONS

Based on the results of laboratory tests for methanyl yellow and rhodamin B on ready-to-eat stick noodles registered as household industrial food at the Jember District Office, it can be concluded that (1) no methanyl yellow was found in 4 samples of stick noodles without seasoning, (2) no methanyl yellow was found in 4 samples of yellow stick noodle seasoning, and (3) no rhodamin B was found in 20 samples of red stick noodle seasoning. The researchers suggest that it is hoped that the Jember Regency Health Office can encourage the Jember Regency Government to issue regulations on food safety. The Jember Regency Government can issue regulations on food safety in Jember Regency through the Regent Regulation. For entrepreneurs of ready-to-eat Lidi Noodle Household Industries, they can improve product safety by continuing to include a minimum of 8 food labels on the packaging, namely product name, ingredient composition, name and address of the producer, halal for those required, production date and code, expiry information, distribution permit number, and origin of certain ingredients. The public can increase their vigilance in choosing the type of food to consume by first reading the composition of ingredients listed on the product packaging and avoiding the consumption of unlabelled food. In the future, researchers will be able to investigate the levels of methanyl yellow and rhodamin B and other dangerous food additives in ready-to-eat pasta samples that have not been registered as food for domestic use.

Author Contributions

Jainab Putri Solikah, Khoiron: Conceptualization, analysis, and draft writing. Globila Nurika: Conceptualization, data curation.

Conflict of Interest

There is no conflict of interest in this study.

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Data availability

Data related to the findings of this study are available at the corresponding author.

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