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Review Article

Identification Of Borax Using Qualitative Methods In Bakso Snacks In Kota Manna District

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ABSTRACT

Meatballs are a food that is very popular with the public, from children to adults. In the processing of meatballs, food additives (BTP) are often added which can make the meatballs more chewy and extend the shelf life. One type of BTP added is borax. Borax is stated as a hazardous material and is prohibited for use in making food. The purpose of this study was to determine the presence or absence of Borax in Meatballs sold in Kota Manna District, South Bengkulu Regency. The research method used was an experimental qualitative test including organoleptic sample tests, tumper paper tests, and AgNO3 solution tests. The population in this study was meatballs sold in Kota Manna District, totaling 10 samples. The results obtained from the organoleptic test were negative because the shelf life was only 1 day, the shelf life on the 2nd and 3rd days the meatball samples began to rot and become slimy and even moldy. The tumper paper test obtained negative results and the AgNO3 solution test also obtained negative results. The conclusion of the study was that 10 meatball samples sold in Kota Manna District, South Bengkulu Regency were negative for containing borax.

Keywords:
Meatballs, Borax, Qualitative Test, Characteristics

INTRODUCTION

Meatballs are one of the snacks that are widely loved by the public, especially children. Meatballs are processed food products with meat as the basic ingredient with high protein content. In general, meatballs are made using beef or chicken with high nutritional value needed by the body (Paerunan, Sakung & Hamidah, 2018). The high protein and water content in meatballs can accelerate the growth of fungi and bacteria, thereby shortening the shelf life of meatballs due to the decay process.

It is not uncommon for meatball producers to add food additives or food additives (BTP) with the aim of making meatballs more chewy and having a longer shelf life so that they can inhibit the growth of microorganisms. The addition of BTP will also make the appearance of color and taste better (Putri, Alang & Sari, 2022). In the regulation of the Food and Drug Supervisory Agency (BPOM) number 11 of 2019 concerning food additives (BTP) states that there are 27 types of permitted BTP classifications, including: Antifoam (calcium alginate), Anticaking (calcium carbonate), Antioxidants (sodium ascorbate), Carbonating agents (carbon dioxide), Emulsifier salts (tricalium citrate), Gas for packaging (nitrogen), Humectants (sodium lactate), Coatings (pullulan), Sweeteners (sorbitol), Carriers (propylene glycol), Gelling agents (alginic acid), Foamers (ethyl methyl cellulose), Acidity regulators (calcium carbonate), Preservatives (sorbic acid), Developers (sodium carbonate), Emulsifiers (dikalium phosphate), Thickeners (calcium acetate), Hardeners (tricalcium citrate), Flavor enhancers (l-glutamic acid), Volume enhancers (methyl cellulose), Stabilizer (alginic acid), Color retainer (magnesium carbonate), Flour treatment (calcium oxide), Colorant (curcumin), Propellant (butane), Sequestrant (sodium gluconate) (BPOM RI, 2019).

In the Regulation of the Minister of Health No. 033 of 2012, borax is stated as a hazardous material and is prohibited for use in making food because food containing borax will be difficult to absorb by the blood and will be stored in the liver (Istiqomah, Sudarwanto & Sudarnika, 2017). The impact that occurs if consuming borax continuously is that it can interfere with intestinal peristalsis, nervous system disorders, depression, and mental disorders. Certain doses cause mental degradation, as well as damage to the digestive tract, kidneys, liver, and skin. Borax can also cause human chromosome abnormalities and cause genetic defects (Rahma and Hidjrawan, 2021). The characteristics of meatballs that positively contain borax include the texture of the meatballs being chewier than meatballs that do not contain borax, the color of the meatballs looking whiter and uneven than meatballs that do not contain borax, having an unnatural or more pungent aroma than meatballs that do not contain borax, meatballs containing borax when dropped on the floor will bounce and not stick like meatballs that do not contain borax (Puspaningrum, Yuliana & Inul Mu'arrofati, 2021).

South Bengkulu is one of the regencies in Bengkulu Province that has several market snacks such as meatballs, cilok, siomay, cimol and many more, especially in the Kota Manna District. Based on a preliminary survey conducted by the researcher, one meatball dish was found that was suspected of containing borax compounds, namely with the characteristics of grayish white meatballs, a pungent odor, and a chewy texture. The location was chosen because there had been no screening or inspection of meatball stalls and street vendors and there were many meatball sellers in the area. Based on the problems that occurred above, the author wanted to conduct research on the identification of borax in meatball snacks sold in the Kota Manna District, South Bengkulu Regency.

METHODS

Tools and materials

The tools used in this study were Analytical Scales (Preeisa XB 220A), Measuring Flask (pyrex)®, Filter Paper, Blender (MASPION 1215), Funnel (pyrex)®, Measuring Cup (pyrex)®, Hot Plate (IKA C-MAG HS 7), Erlenmayer (pyrex)®.

The materials used in this study were meatballs, silver nitrate solution (AgNO3) (Merck, Germany), distilled water (SMARTLAB, Indonesia), turmeric powder, 80% ethanol (SMARTLAB, Indonesia), and borax (SMARTLAB, Indonesia).

Research Procedure

Sample Preparation

Meatball samples were weighed as much as 15 grams, then 100 ml of distilled water was added and blended until smooth. Filtered and the filtrate was taken to identify the borax compound (Amelia *et al.*, 2024).

Testing Using Tumeric Paper

Making Tumeric Paper

Weigh 1 gram of curcumin powder, put it in a 250 ml Erlenmeyer flask, add 100 ml of 80% ethanol and shake for 5 minutes and filter the filtrate collected in a Porcelain cup. Dip the filter paper into the porcelain cup, while turning it over using tweezers so that it is even. Dry by hanging the filter paper for 1 hour. After drying, the filter paper is cut to a size of 6x1cm. Then store it in a place protected from exposure to sunlight (Hartati, 2017).

Preparation of Positive Control for Tumeric Test

Making Positive Control for Tumeric Test Take the curcumin paper that has been made, then make borax liquid by weighing 100 mg of borax powder and dissolving it in 50 ml of distilled water, stir until smooth. Drop the solution on the curcumin paper as much as 1-3 drops, then dry it (if it is positive for borax, the color will change from yellow to reddish brown) (Hartati, 2017).

Testing With Tumeric Paper

Drop 1-2 drops of sample filtrate on the tumeric paper. Observe the color change on the tumeric paper, positive borax if there is a color change from yellow to orange and reddish brown (Hartati, 2017).

AgNO3 Solution Test

The sample filtrate is put into a test tube as much as 10 ml. Add 1 ml of silver nitrate solution AgNO3. If a white precipitate forms, then the meatballs are positive for containing borax (Lestari *et al.*, 2021).

RESULTS AND DISCUSSION

Meatball meatball sampling in Kota Manna District, South Bengkulu Regency amounted to 10 samples. Organoleptic observations were carried out on meatball samples that were tested and were still in good condition, as can be seen in table 1, namely with a slightly chewy texture, natural odor and natural color.

Table 1. Organoleptic test observations on the 1st day of storage

Code	Texture	Odor	Color	Description
B1	A bit chewy	Natural	Fresh Grey	Negative
B2	A bit chewy	Natural	Pale white	Negative
B3	A bit chewy	Natural	Dark Grey	Negative
B4	A bit chewy	Natural	Fresh Grey	Negative
B5	A bit chewy	Natural	Fresh Grey	Negative
B6	A bit chewy	Natural	Dark Grey	Negative
B7	A bit chewy	Natural	Dark Grey	Negative
B8	A bit chewy	Natural	Pale white	Negative
B9	A bit chewy	Natural	Dark Grey	Negative
B10	A bit chewy	Natural	Dark Grey	Negative

In table 2 in the organoleptic test with a shelf life of 2 days, the 10 meatball samples began to change, from a chewy texture to slimy, from a natural color of gray to yellow and even brown, and from a natural odor typical of meatballs to starting to rot.

Table 2. Results of organoleptic test observations on the 2nd day of storage

Code	Texture	Odor	Color	Description
B1	Soft start	Start to rot	Slightly yellow	Negative
B2	Slimy	Start to rot	Pale white	Negative
B3	Soft start	Start to rot	Slightly yellow	Negative
B4	Slimy	Start to rot	Slightly yellow	Negative
B5	Slimy	Start to rot	Slightly yellow	Negative
B6	Slimy	Start to rot	Slightly yellow	Negative
B7	Soft start	Start to rot	Slightly yellow	Negative
B8	Soft start	Start to rot	Pale white	Negative
B9	Soft start	Start to rot	Slightly yellow	Negative
B10	Soft start	Start to rot	Slightly yellow	Negative

In table 3 in the organoleptic test with a shelf life of 3 days, the texture of the 10 meatball samples began to become slimy and even moldy, the color of the meatballs turned yellow to brownish and had a very bad smell. This shows that from the organoleptic test with a shelf life starting from day 1-3, all 10 meatball samples were negative for containing borax, because their shelf life only lasted for 1 day, while meatballs containing borax would last for more than 3 days.

Table 3. Results of organoleptic test observations on the 3rd day of storage

Code	Texture	Odor	Color	Description
B1	Soft and slimy	Foul	Yellow	Negative
B2	Slimy and moldy	Foul	Yellow	Negative
B3	Soft start	Foul	Pale yellow	Negative
B4	Slimy and moldy	Foul	Pale yellow	Negative
B5	Slimy and moldy	Foul	Pale yellow	Negative
B6	Slimy	Foul	Brown	Negative
B7	Soft start	Foul	Pale yellow	Negative
B8	Soft and slimy	Foul	Pale yellow	Negative
B9	Soft start	Foul	Pale yellow	Negative
B10	Soft and slimy	Foul	Brown	Negative

Qualitative analysis of meatball samples was carried out in two ways, namely the tumeric paper test and the test using AgNO3 reagent. Testing using tumeric paper was carried out by dripping 1-2 drops of sample filtrate on the numeric paper. This experiment was repeated three times. If the turmeric paper changes color from yellow to orange and reddish brown, it means that the sample is positive for borax (Hartati, 2017). The color change is caused by the combination of curcumin with boric acid and the formation of the red-brown component rosocyanine or the formation of the boron cyanone complex compound which is a red pigment (Muthi'ah and Qurrota, 2021).

Table 4. Results of borax test using tumrik paper

Code	Reduplication 1	Reduplication 2	Reduplication 3
B1	Doesn't change	Doesn't change	Doesn't change
B2	Doesn't change	Doesn't change	Doesn't change
B3	Doesn't change	Doesn't change	Doesn't change
B4	Doesn't change	Doesn't change	Doesn't change
B5	Doesn't change	Doesn't change	Doesn't change
B6	Doesn't change	Doesn't change	Doesn't change
B7	Doesn't change	Doesn't change	Doesn't change
B8	Doesn't change	Doesn't change	Doesn't change
B9	Doesn't change	Doesn't change	Doesn't change
B10	Doesn't change	Doesn't change	Doesn't change
positive control	from yellow to reddish brown	From yellow to reddish brown	From yellow to reddish brown
negative control	Doesn't change	Doesn't change	Doesn't change

Figure 1. Test results for borax using tumeric paper

Table 4 shows negative results in all meatball samples, because there was no color change from the tumeric paper, namely from yellow to brick red or reddish brown. except for the positive control test, the tumeric paper changed color from yellow to reddish brown. This study is in line with the study conducted by Fitria and Sihotang (2024) namely by using tumeric paper, obtained the results that of the 15 meatball samples tested, none of them were detected to contain borax because there was no color change on the tumeric paper.

In testing using silver nitrate solution (AgNO3), the 10 meatball samples obtained negative results, because there was no formation of white sediment at the bottom of the test tube as seen in table 5.

Table 5. Results of borax test using tumrik paper

Code	Reduplication 1	Reduplication 2	Reduplication 3
B1	No sediment formed	No sediment formed	No sediment formed
B2	No sediment formed	No sediment formed	No sediment formed

Code	Reduplication 1	Reduplication 2	Reduplication 3
B3	No sediment formed	No sediment formed	No sediment formed
B4	No sediment formed	No sediment formed	No sediment formed
B5	No sediment formed	No sediment formed	No sediment formed
B6	No sediment formed	No sediment formed	No sediment formed
B7	No sediment formed	No sediment formed	No sediment formed
B8	No sediment formed	No sediment formed	No sediment formed
B9	No sediment formed	No sediment formed	No sediment formed
B10	No sediment formed	No sediment formed	No sediment formed
positive control	Sediment formed	Sediment formed	Sediment formed
negative control	No sediment formed	No sediment formed	No sediment formed

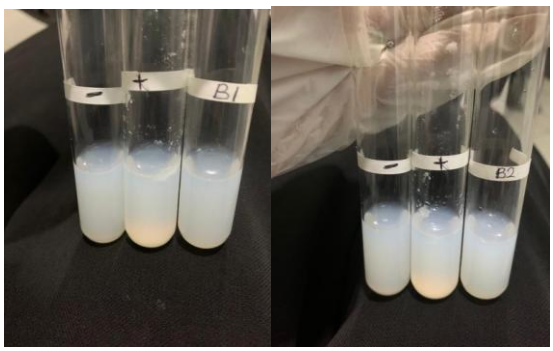

Figure 2. Test results with AgNO3

The chemical reaction that can occur if a white sediment forms at the bottom of the test tube can be called the AgNO3 compound. This study is in line with the research conducted by Sidrotullah et al. (2023) with the AgNO3 precipitation test obtained the results that from the 8 meatball samples produced negative results, because there was no formation of white sediment.

CONCLUSIONS

From the results of the research that has been done on the organoleptic test of the 10 meatball samples, it is negative because the shelf life is only 1 day, the rest of the meatball samples start to rot and become slimy and even moldy. The tumeric paper test obtained negative results because there was no color change from yellow to reddish brown, and the AgNO3 solution test obtained negative results because it did not form a white precipitate. The conclusion of this study is that the 10 meatball samples sold in Kota Manna District, South Bengkulu Regency are negative for borax.

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CONFLICT OF INTEREST

There are no conflicts of interest between the authors

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