BORAX TEST ON WET NOODLES SOLD IN GORONTALO CITY

Nadya Pilonu[1)], Adnan Malaha[2)], and Erfan AR Lainjong[3)]
[1,2,3)]Bina Mandiri University of Gorontalo
Email :nadyapilomonu@gmail.com, adnan.malaha92@gmail.com, erfanlainjong@gmail.com

ABSTRACT

Noodles are a popular food product that replaces rice and is loved by almost all groups, from children to adults. Noodles can be dangerous for health because noodles can contain harmful chemicals such as borax. It is hoped that the food consumed is food that is guaranteed for quality and safety, including being safe from the use of hazardous materials that can be at risk of disease for humans themselves. BTP is often added to improve the character of food so that it has increased quality. This study aims to determine whether or not borax is present in noodles. This study uses a descriptive qualitative method, data collection techniques based on documentation and laboratory examination. The data obtained from the research results are presented in table form and narrated. The results of this study showed that out of the 9 samples examined, no samples of wet noodles containing borax were found. This was proven by testing the curcumin paper which showed no color change on the curcumin paper.

Keywords: Wet Noodles, Borax, Curcumin

INTRODUCTION

Food is a basic human need that must be met in sustaining life, as well as playing a role in human health. The safety and availability of food is the most important thing for humans. It is hoped that the food that will be consumed is food that is guaranteed for quality and safety, including being safe from the use of hazardous materials that can interfere with or have a risk of disease for humans themselves [14].

The use of Food Additives (BTP) is currently often used in food processing. BTP is often added to improve the character of food so that it has increased quality [14].

BTP is sometimes only used to get a lot of profit or the food that is sold doesn't spoil quickly, some producers add harmful chemicals to food. In fact, these chemicals if added will endanger the health of consumers who consume them [30].

BTP can be divided into permitted BTP and prohibited/dangerous BTP to use [33]. For food additives that are permitted, their use must be provided within limits where consumers do not become poisoned by consuming additional substances known as use thresholds. Meanwhile, for BTP categories that are prohibited, the use of even the smallest dose is still not allowed.

Noodles are one of the popular food products in various countries including Indonesia, at this time noodles have become a rice substitute food product that is much loved by almost all groups, from children to adults [8].

Wet noodles have been found by many small community businesses that sell various kinds of innovative wet noodle-based products. Wet noodles are very popular

Submit: Jan 14th, 2024 Accepted: Augst 14th, 2024 Published: Sep 27th, 2024

because their preparations have undergone many developments, where every small community business has a different taste for the wet noodles that are sold. Noodles can be harmful to health because noodles can contain harmful chemicals such as borax [3].

Borax (Na2B4O710H2O) and boric acid (H3BO3) are white crystalline powders, odorless and soluble in water. Borax is used as a detergent to reduce hardness, and is a weak antiseptic. Borax is highly toxic and is prohibited from being added to food, for example in noodles, crackers, snacks, meatballs, rice cake, macaroni with the aim of improving color, texture and flavor [33].

Borax is a type of food additive that is prohibited from being used in food products. The bad effects of consuming borax are causing irritation of the gastrointestinal tract which is characterized by headaches, dizziness, vomiting, nausea, and diarrhea. Further symptoms are characterized by weakness in the body, kidney damage, even shock and death [30].

Analysis of the borax content of wet noodles sold in the central market of Gorontalo from the three samples tested found that one sample of wet noodles contained borax [1].

In 2019 the Gorontalo Province Food and Drug Monitoring Agency found wet noodles that did not meet food quality because they contained borax. According to the results of interviews with the head of the BPOM information and communication section in Gorontalo, it was found that wet noodles contained positive borax in the market [4].

Based on the background above, the authors are interested in conducting research on "The Borax Test on Wet Noodles Sold in Gorontalo City".

1. Overview of Food Materials

Food is everything that comes from biological sources of agricultural, plantation, forestry, fishery, animal husbandry, water and water products, both processed and unprocessed which are intended as food or drink for human consumption, including food additives, food raw materials, and other ingredients used in the process of preparing, processing, or making food or drinks [4].

The safety and availability of food is important for humans, the food to be consumed is expected to be food with guaranteed quality and safety, including being safe from the use of hazardous substances [14].

2. Overview of Wet Noodles

a. Definition of Wet Noodles

Noodles are one type of food that is very well known by Asian people, especially East Asia and Southeast Asia. Based on its history, Mi was created in China and is currently growing. In general, noodles are classified into two types, namely wet noodles and dry noodles. Wet noodles are noodles that have not been processed (cooked) with a high water content, while dry noodles have a lower water content. The process of making noodles includes the stages of mixing ingredients, kneading until smooth, forming strands, and cutting to size [9].

Figure1. Wet noodles
(Source: Effendi et al, 2016)

b. Wet Noodle Type

Noodles can be classified into several groups. Generally, the distribution of noodle types is based on color, noodle diameter, method of manufacture, type of product being marketed, raw materials, and water

content. In Asia, it is divided into two types based on their color, namely white noodles and yellow noodles due to the addition of alkali [6].

Based on how it is made, noodles are divided into raw wet noodles and cooked wet noodles. Based on the type of product available in the market, there are two types of noodles, namely wet noodles (chicken noodles and yellow noodles) and dry noodles (egg noodles and instant noodles). Meanwhile, noodles based on their raw materials can be divided into two types, namely noodles made from flour, especially wheat flour and transparent noodles made from starch, for example sound and vermicelli [6].

c. Factors Affecting the Quality of Wet Noodles

In making noodles the raw materials used are flour, water and salt, these three ingredients greatly affect the final product of noodles. Wheat flour is the main ingredient that most determines the success of making noodles, wheat flour in making noodles must have the main protein content, namely gluten. Wheat flour contains 7% - 22% protein and is composed of at least 5 types of proteins, namely albumin which dissolves in water, globulin and protose which dissolves in salt, gliadin which dissolves in alcohol and glutenin which dissolves in acids or alkalis (glutelin). Glutenin and gliadin when mixed with water will form gluten which will expand and bind tightly. Generally the amount of water added is around 28-38% of the mixture of ingredients used. If it exceeds 38% then the dough becomes sticky and if it is less than 28% then the dough becomes brittle making it difficult to form dough sheets. Gluten will affect the elastic properties of the dough which can cause the noodles to not break easily during printing and to be springy [25].

d. How to make wet noodles

Wet noodles are generally made from wheat flour (wheat flour), water, and salt with/without the addition of alkaline salt. Wheat is the main ingredient in making raw wet noodles. The function of wheat is as a structure-forming material, a source of carbohydrates, a source of protein, and the forming of gluten's chewy properties. Salt functions to provide flavor, strengthen texture, and bind water. The process of making wet noodles involves mixing all the ingredients (flour, water and salt) into a dough and then forming it into thin sheets with a rollpress machine, resting them, then cutting them into noodle threads. Furthermore, tapioca was sprinkled as a fertilizer [22].

The process of mixing all the ingredients together is meant to make a homogeneous dough. In addition, this process also triggers the hydration of water with flour that is evenly distributed and attracts gluten fibers so that it becomes an elastic and smooth dough. In the mixing process, the formation of gluten has started to occur even though it is not optimal [22].

3. Overview of Food Additives

Food additives (BTP) are mixed ingredients, pure ingredients which are not part of the food raw materials, but are added intentionally to food in order to affect the shape or properties of the food itself, such as; preservatives, coloring agents, flavoring agents, anti-clumping agents, bleaching agents and food thickeners [11].

The permitted Food Additives are [18]:

a. Antioxidant(Antiocxidant)

Antioxidants are compounds that

can inhibit oxidation in foodstuffs. Use of materials such as animal fats, vegetable oils, food products with high fat content, meat products, fish products, etc.

b. Anti-caking Agent

Anti-caking agent is a food additive which prevents the occurrence of caking in food in the form of powder and flour.

c. Acidity Regulator (AcidityRegulator)

Regulation of acidity (acidulants), namely acidic chemical compounds which are included in food additives which are intentionally added to food for various purposes. The acidic nature of these compounds can prevent microbial growth and act as a food preservative.

d. Artificial Sweetener (Artificial Sweetener)

Food additive that can give a sweet taste to food that has no or almost no nutritional value.

4. Overview of Preservatives

Preservatives are compounds that can inhibit and stop the process of fermentation, pickling, or other forms of spoilage, or ingredients that can protect foodstuffs from spoilage. The use of preservatives in food ingredients can be freed from microbial life, both those that are pathogenic which can cause poisoning or other health problems as well as non-pathogenic microbes that can cause damage to food ingredients, for example spoilage. But if you use preservatives in irregular and unsupervised doses, it will cause harm to usage [20].

At this time, there are still many uses of preservatives that are prohibited for use in food and harmful to health, such as Formalin and Borax [6]. The purpose of preservatives are:

a. Inhibits the growth of spoilage microbes in food, both pathogenic and non-pathogenic.
b. Extends the shelf life of food.
c. Does not reduce the nutritional quality, color, taste and fruit of the preserved foodstuffs.
d. Not to hide the poor quality of the food.
e. Not used to hide the use of one ingredient that does not meet the requirements.
f. Not used to hide food spoilage.

At this time there are many ways to preserve food, starting from canning food, which is preserved in bottle form, cooling, heating, drying and salting. In preserving, chemicals are usually used and nowadays their use is increasing because it is one of the advantages for processed food producers [34].

5. Overview of Borax

a. Definition of Borax

Borax is a chemical compound derived from the heavy metal boron (B), borax is an antiseptic and germ killer. This material is widely used as an anti-fungal agent, wood preservative, and antiseptic in cosmetics [32].

Figure2. Borax
(Source: Nurhasanah, 2017)

Borax is a white, odorless crystal compound that is stable at room temperature. Borax is a chemical compound with the name sodium tetraborate (NaB4O7 10 H2O). If it dissolves in water it will become hydroxide and boric acid (H3BO3). Borax or borax acid is usually used as a detergent and antiseptic. Consuming foods that contain borax does not cause direct harm, but borax will accumulate

little by little because it is absorbed cumulatively in the consumer's body. The prohibition on the use of borax is also strengthened by the RI Minister of Health No. 235/Menkes/VI/1984 concerning food additives, that Sodium Tetraborate, which is better known as Borax, is classified as an additive that is prohibited from being used in food.

b. Borax in Wet Noodles

Naturally borax and boric acid form in water and soil. Therefore, boric acid is naturally formed in food. Based on the water content, wet noodles quickly deteriorate or rot, because of that many products use preservatives, one of which is borax, this compound is very harmful to health [34].

c. Use of Borax

Borax is used in the metal industry, wood coatings, porcelain lubricants, cleaners, preservatives and pesticides. The use of borax as a food preservative because borax acid can inhibit the growth of microorganisms, so that food will be fresh and durable [2].

Borax can be found in solid or liquid form (sodium hydroxide or boric acid). Borax or boric acid have antiseptic properties and can be used by the pharmaceutical industry as drug formulations, for example in ointments, powders, compress solutions, oral medications and eye washes [2].

The reason for using borax as a food preservative is because boric acid can inhibit the growth of microorganisms, so food will stay fresh and last longer. In addition, boric acid added to starch foods can control the gelatinization of starch, so that it can increase the sharpness of the color, texture, and taste of food [35].

d. Impact of Borax on Health

Consuming foods that contain borax is not directly bad, but borax will accumulate little by little because it is absorbed cumulatively in the consumer's body [32].

The bad impact on health from borax is that it causes irritation of the gastrointestinal tract which is characterized by headaches, dizziness, vomiting, nausea, diarrhea, and can cause skin diseases, namely redness of the skin, followed by peeling of the epidermis. Further symptoms are characterized by weakness, kidney damage, fainting, even shock and death [29].

e. Borax Toxicity Effects

Toxicity Effects Boron compounds or boric acid are weak bactericidal. Due to its weak toxicity, it can be used as a food preservative. However, if repeated and excessive use will result in toxic (poisoning). Symptoms that arise include nausea, vomiting, diarrhea, decreased body temperature, weakness, headaches, and can cause shock. In the use of 10-20 grams can cause death in adults, while in children around 5 grams. If the use is relatively large it can damage the brain, liver and kidneys. So judging from its toxicological effects, boric acid is prohibited for use in food [6].

The negative effects of using borax in its misuse in life can have a very bad impact on human health. The danger that occurs when exposed to borax in the short term can cause irritation of the respiratory tract, conjunctivitis, erythema and macular rash, irritate the digestive tract and cause nausea, vomiting, diarrhea and stomach cramps. In large doses it can cause tachycardia, cyanosis, delirium, convulsions and coma [12].

In long-term exposure to borax when in contact with the skin cause local skin damage and dermatitis. Orally it can cause systemic effects, such as persistent nausea and vomiting, if absorbed it causes systemic disturbances, circulatory depression, shock, and coma [12].

Because it has such an effect on human health, the Government issued a regulation prohibiting the use of borax as a food additive in Minister of Health Regulation No. 033 of 2012 concerning Food Additives, saying that borax is a hazardous and toxic substance (B3) so it cannot be used as an additive. in food [12].

6. Qualitative Identification of Borax

Qualitative analysis is a chemical analysis method used to identify a chemical element or compound present in a sample based on chemical and physical properties [16].

Test the color of the tumeric paper in the borax test by first making the tumeric paper by cutting fresh turmeric into pieces, cleaning and grinding it and filtering it so that a yellow turmeric liquid is produced. The filter paper is cut and put into the turmeric liquid then dried. The result of this process is called tumeric paper. The sample that has been parsed is then taken a few drops and then dripped on tumeric paper and then dried [15].

Curcumin can function as an indicator because it will change color from yellow to brick red and is able to break down borax bonds into boric acid and bind it into a rosa color complex or called rosacyanin chelate or Boron Cyanocurcumin complex compound, a red substance. Because curcumin is the main active ingredient in curcumin turmeric which has a very strong anti-inflammatory and very high antioxidant content. Besides having high antioxidants, the curcumin content in turmeric is also an improvement in the borax detection tool [23].

RESEARCH METHODS

This research is included in this approach using a descriptive qualitative approach. Qualitative research to see whether or not borax is present in wet noodles sold in Gorontalo City. The type of research used in this research is descriptive research, namely by testing and observing samples with the aim of seeing whether or not borax is present in wet noodles in Gorontalo City.

The types of data used in this research are primary and secondary data. In this study, the type of data used is primary data, which is derived from the results of the borax test on wet noodle samples sold in Gorontalo City. The borax test can be done with the color test of curcumin paper. Secondary data was obtained from literature, previous research, annual data from BPOM Gorontalo, journals and books published and used as a theoretical basis.

As important as the position of data in research, ensuring the correctness of data is also a job that a researcher cannot ignore. Good and correct data will determine the results of a good and correct research, on the other hand erroneous data (doubtful) will show the degree of trust in a research result, the validity of the data used is used, namely laboratory tests using qualitative methods by looking for changes in color on curcumin paper on the sample used.

The adequacy of references in this study the authors did by collecting as many data sources as possible through the data sources in this study, the results of laboratory tests and documentation were obtained.

Through this technique, researchers report the results of their research in detail, carefully so that they are able to describe properly and

correctly the context of the research carried out.

RESEARCH RESULT

TableBorax Qualitative Test Results

Sample Code	Reaction	Results
Central Market 1	No brick red color formed	Negative
Central Market 2	No brick red color formed	Negative
Central Market 3	No brick red color formed	Negative
Andalas Market 1	No brick red color formed	Negative
Andalas Market 2	No brick red color formed	Negative
Mood Market	No brick red color formed	Negative
Dungingi Market	No brick red color formed	Negative
Padar Liluwo	No brick red color formed	Negative
Biawu Market	No brick red color formed	Negative

Data Source processed (2022)

DISCUSSION

Based on laboratory test results from nine samples of wet noodles sold in the city of Gorontalo, they did not contain borax negatively. This was proven by testing the curcumin paper on the noodle sample, where the curcumin paper was dipped in a wet noodle sample that had been mashed and seen that it did not show a change in color from yellow to brick red. This is in accordance with the opinion of Safitri et al that curcumin is a means of detecting the presence of borax in food.

If the sample contains borax, it will form a complex color rosa or what is often called rosacyanin chelate, a substance that is red in color. Curcumin paper in acidic conditions will turn yellow and in alkaline conditions will change color to brick red. The color change of curcumin from yellow to brick red, which is a rosacyanin complex, can indicate the presence of borax.

CONCLUSION

Based on the results of the borax test on 9 samples sold in Gorontalo City, it can be concluded that all samples were negative or did not contain borax, this was evidenced by the absence of a color change on the curcumin paper.

REFERENCES

[1] Adinugroho, N. (2013). Pengaruh pemberian boraks dosis bertingkat terhadap perubahan gambaran makroskopis dan mikroskopis hepar selama 28 hari. Karya Tulis Ilmiah. Fakultas Kedokteran. Universitas Diponegoro.

[2] Aminah dan Hermawan., (2009). Bahan-bahan berbahaya dalam kehidupan. Bandung. Salamadami.

[3] Anas.I. (2014). Analisis kandungan boraks pada Mi Basah yang dijual di pasar sentral kota gorontalo. Karya Tulis Ilmiah. Program Studi D-III Farmasi. Fakultas Ilmu Kesehatan dan Keolahragaann. Universitas Negeri Gorontalo.

[4] Badan Pengawas Obat dan Makanan (BPOM). (2012). Batas maksimum penggunaan bahan tambahan pangan pengawet. BPOM, Jakarta.

[5] Balai Pengawas Obat dan Makana (BPOM).(2019). Laporan tahunan 2019.BPOM, Gorontalo.
[6] Cahyadi, W, (2008), Analisis dan aspek kesehatan bahan tambahan pangan. Jakarta : Bumi Aksara.
[7] Cahyadi, W. (2012).Analisis dan aspek kesehatan bahan tambahan pangan. Edisi 2 Cetakan III. Jakarta: Bumi Aksara.
[8] Dewi, I. A. Mulyadi, A. F dan Ikawati, N. Q. F. (2015). Penggandaan skala mi kering dari ubi jalar (Ipomea batatas L). *Jurnal Teknologi Pertanian*. Vol.16 No. 1.
[9] Effendi. Z. Surawan, F.E.D dan Sulastri. Y. (2016).Sifat fisik Mi basah berdasarkan tepung komposit kentang dan tapioka. *Jurnal Agroindustri*. Vol.6 No.2
[10] Efrilia, M. Prayoga, T. dan Mekasari, N. (2016). Identifikasi boraks dalam bakso di kelurahan bahagia Bekasi Utara Jawa Barat dengan metode analisa kualitatif.*Jurnal Ilmiah Ibnu Sina*. Vol. 1 No.1
[11] Fadilah, A. N., Djatmika, R., dan Muadifah, A. (2019). Analis boraks dalam sempol di Tulungagung dengan preparasi sentrifugasi secara spektrofotometri visible. *Jurnal Ilmiah Kesehatan Putra Bangsa*, 1(1), 18-24.
[12] Fuad (2014*)*. Identifikasi kandungan boraks pada tahu pasar tradisional di daerah Ciputat. Naskah Skripsi. Fakultas Kedokteran dan Ilmu Kesehatan Universitas Islam Negeri Syarif Hidayatullah, Jakarta.
[13] Habsah (2012). Gambaran pengetahuan pedagang mi basah terhadap perilaku penambahan boraks dan formalin pada mi basah di kantin-kantin Universitas X Depok tahun 2012.Skirpsi. Universitas Indonesia
[14] Handayani, S. dan Hartono.(2016). Hubungan pengetahuan guru dan pengelola kantin tentang gizi btp (bahan tambahan pangan) terhadap penggunaan btp beresiko pada makanan anak SD di Surakarta. *Jurnal Terpadu Ilmu Kesehatan*, 5(2), 188-192.
[15] Harimuri, S. dan Setiyawan, S. (2019). Analisis kualitatif dan kuantitatif kandungan boraks pada bakso tusuk di wilayah Kabupaten Gunung Kidul Provinsi Daerah Istimewah Yogyakarta. Fakultas Kedokteran dan Ilmu Kesehatan. Universitas Muhammadiyah Yogyakarta.Vol.6 No. 2.
[16] Hidayat, Z. (2018). Identifikasi kandungan senyawa boraks dengan analisa kualitaif pada makanan cilok di wilayah Kecamatan Mertoyudan Kabupaten Megelang. Karya Tulis Ilmiah. Jurusan Farmasi. Universitas Muhammadiyah Magelang
[17] Irviani, L.I. dan Nisa, F.C. (2014).Pengaruh penambahan pektin dan tepung bungkil kacang tanah terhadap kualitas fisik, kimia dan organoleptik Mi kering terdistribusi mocaf.*Jurnal Pangan dan Agroindustri*. Vol. 3 No. 1
[18] Kementerian Kesehatan. (2012). Peraturan Menteri Kesehatan Republik Indonesia Nomor 033 Tahun 2012 Tentang Bahan Tambahan Pangan.
[19] Koswara, S. (2009).Teknologi pengolahan Mi. Seri Teknologi Pangan Populer.
[20] Lakapu, Y.S.(2013). Identifikasi formalin dalam jeroan ayam yang beredar di pasar kasih naikoten Kupang bulan Juni tahun 2013.Karya Tulis Ilmiah, Jurusan Analis Kesehatan Poltekkes Kemenkes, Kupang.
[21] Nasir, M. (2018). Identifikasi Sakarin pada kue Buroncong yang dijual di Kecamatan Panakkukang Kota Makassar. *Jurnal media Analis Kesehatan,* 9(2), 136-140.
[22] Nurhasanah. (2017). Identifikasi Penggunaan boraks pada Mi basah yang dijual oleh pedagang pangsit di kota Kendari. Karya Tulis Ilmiah. Jurusan

Analis Kesehatan Poltekkes Kemenkes Kendari.

[23] Nurma. (2018). Studi analisis boraks menggunakan kurkumin hasil ekstrak rimpang kunyit (curcuma domestica val.) Secara spektrofotometri ultraungu-tampak.Skripsi. Bandar Lampung : Fakultas Matematika dan Ilmu Pengetahuan Alam.

[24] Riandini dan Nursanti.(2008). Bahan kimia dalam makanan dan minuman. Bandung: Shakti Adiluhung.

[25] Rosmeri, V.I. dan Monica, B.N. (2013). Pemanfaatan tepung umbi gadung (dioscorea hispida dennst) dan tepung mocaf (modified cassanava flour) sebagai bahan subsitusi dalam pembuatan Mi basah, Mi kering dan Mi instan. Skripsi. Universitas Diponegoro. Semarang.

[26] Rustandi, D. (2011). Produksi Mi. Perpustakaa Nasional. Solo: Malang

[27] Safitri, J. M. Towon. G. A. R. Untu, S.D. Kanter, J. W. (2019). Identifikasi boraks pada mi basah yang beredar di supermarket dan pasar tradisional di Kota Bitung. *Jurnal Biofarmasetikal Tropis,* 2 (1), 36-42.

[28] Saputro, A. H. dan Fauziyyah, R. (2021).Analisis kualitatif boraks pada bakso dan mi basah di kecamatan Sukarame, Sukabumi dan Wayhalim. *Jurnal Ilmiah Farmasi Famasyifa,* Vol. 04 No. 1

[29] Suhendra, (2013). Analisis boraks dalam bakso daging sapi a dan b daerah Tenggiris Surabaya menggunakan spekrofotometri. *Jurnal Ilmiah Mahasiswa Universitas Surabaya*, Volume 2, No. 2.

[30] Suseno, D. (2019). Analisis kualitatif dan kuantitatif kandungan boraks pada bakso menggunakan kertas turmerik, FT-IR spektrofotometer dan spektrofotometer uv- vis. *Indonesia Journal of Halal*, 2(1), 1-9.

[31] Syah, (2005).Manfaat dan bahaya bahan tambahan.Himpunan Alumni Fakultas Admajaya. Jakarta.

[32] Tubagus, I. G. Citraningtyas, dan Fatimawali. (2013). Indentifikasi dan penetapan kadar boraks dalam bakso jajanan di kota Manado. *Jurnal Ilmiah Farmasi* 2 (4) : 2302- 2493.

[33] Wahyudi, J. (2017). Mengenali bahan tambahan pangan berbahaya.*Jurnal Litbang* Vol. XIII. No. 1 Hal 3-12

[34] Widayat, D. (2011). Uji kandungan boraks pada bakso.Skripsi. Fakultas Kesehatan Masyarakat Universitas Jember; Jember.

[35] Yiu., P.H., J.See., A. Rajan and C. F. J. Bong. (2008). Boric acid levels in fresh noodles and fish ball. Am. J. Agric. Biol. Sci., 3: 476-481.