FOODSCITECH
Food Science and Technology Journal

Organoleptic and Nutritions Observation of Monosodium Glutamate (MSG)-Free Instant Noodle Seasoning With Soto Padang

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ABSTRACT

This research is an exploratory study. In this study, instant noodle seasoning was made from natural spices, without the addition of synthetic flavorings and preservatives. If monosodium glutamate (MSG) is consumed beyond the limit and consumed continuously for a long period of time, it will cause various side effects. MSG consumed by someone who cannot tolerate more than 3g/day can have adverse health effects. The purpose of this research is to develop Padang Soto flavored instant noodles using natural spices and without using synthetic flavoring Monosodium Glutamate (MSG). In this study, 4 formulas were made, coded as formula 1, formula 2, formula 3 and formula 4. The results showed that the panelists' preference for the color of instant noodles in formula 4 was 4.05. The panelists' favorite score for the aroma of instant noodle seasoning is highest in formula 4, which is 3.95. As for the taste results obtained, it is known that the panelists' favorite score for the taste of instant noodle seasoning is highest in formula 4, namely 4.05. From the results of the research, a dry seasoning with the code formula 4 has been produced that is delicious based on organoleptic analysis which can be used as a seasoning for instant noodle food products with instant Padang soup flavor. for proximate analysis, the best is also in formula 4, obtained water content of 3.85%, ash content of 1.66%, fat content of 1.29%, and protein content of 7.39%.

Keywords: *Aroma; Organoleptic; Instant Noodle Seasoning; Nutrition; Soto Padang*

INTRODUCTION

The development of the food industry has indirectly influenced changes in people's lifestyles, which began to favor fast food. One of the most popular ready-to-eat foods is instant noodles. Some of the reasons people like instant noodles are because they can be processed easily, served practically, and can meet the tastes of some people.

Instant noodles are a form of wheat-based food that is most popular with children, because instant noodles have a savory taste, soft texture, and striking colors, so that almost all groups like it. However, instant noodles are often criticized as unhealthy food. This is due to the Monosodium Glutamate (MSG) content found in instant noodle seasonings. MSG is one of the synthetic flavorings used to produce a better taste into dishes (Suryanto, 2015). MSG can be described as the sodium salt of glutamic acid with the IUPAC name - Sodium 2-aminopentanedioate and ionized by water to create glutamic acid and free sodium ions. MSG has a molecular mass of 169.11 g/mol and chemical formula C5H8NNaO4 which binds to the alpha carbon atom on the amino group (-NH2) and carboxylate group (-COOH) (Kayode et al., 2023).

MSG (E621), the sodium salt of glutamic acid, has been added to widely consumed foods worldwide in recent years (Niaz et al., 2018). MSG is used to intensify the natural flavors of a wide variety of food products under the name of Chinese salt, and may be present in packaged foods even though it is not listed on the label (Alalwani, 2014). It imparts an

ISSN 2622-1985 (print) | ISSN 2622-4127 (online)
DOI: http://dx.doi.org/ 10.25139/fst.v6i2.7404

exclusive flavor to processed foods that is also known as 'savory' taste and in Japanese as umami (Xiong et al., 2009).

MSG when consumed beyond the limit and consumed continuously over a long period of time will cause various side effects. MSG consumed by someone who does not tolerate more than 3g/day can be detrimental to health. Some also state that the use of table salt and MSG more than 6 g a day for a long period of time can lead to high blood pressure (Dendra & Oktavia, 2017). Symptoms arising from MSG consumption are called complex syndrome, symptoms of this complex syndrome such as burning in the back of the neck, radiating to the hands and chest, numbness in the back of the neck, facial stiffness, chest pain, numbness in the back of the neck, facial stiffness, chest pain, nausea and drowsiness (Bawaskar et al., 2017).

To be able to reduce the health effects caused by consuming noodles containing monosodium glutamate, it is necessary to make new innovations to create instant noodle seasonings derived from natural spices, as well as natural flavorings from animal products such as chicken and beef. It is expected that the use of this instant noodle seasoning, in addition to providing a taste that can resemble instant noodle seasoning on the market, can also provide health effects for those who consume it. The purpose of this research is to make instant noodle seasoning without the use of synthetic flavoring Monosodium Glutamate (MSG) and create new innovations in instant noodle seasoning products.

METHODS

Material

The ingredients used in this research are sugar, salt, chicken meat, shallots, garlic, and some spices such as ginger, turmeric, cardamom, technical hexane solution, technical NaOH, H2SO4 Merck, HCl Merck, etc.

Tool

The tools used in this research are pot, rice cooker, spoon, cup, cutting board, knife, cauldron, blender, stove, analytical balance, aluminum foil container, HDPE plastic container, oven, soxhlet, kjeldahl pumpkin, distillation equipment, and furnace.

Research Design

Research design

This research was carried out using a Completely Randomized Design (CRD), with three repetitions of testing.

Preparation of natural flavoring from chicken broth

Making natural flavoring from chicken broth begins with weighing salt, sugar, garlic, shallots, onions, turmeric, leeks, celery leaves, coriander, carrots according to the predetermined formulation. Then washed with clean water and pureed using a blender, then dried using a food dehydrator. Continue to be pulverized using a blender, and filtered using a 60 mesh sieve. After obtaining chicken broth powder, it is then stored in an airtight glass container.

Preparation of instant noodle seasoning formulation

Making seasoning formulations begins with weighing each spice, chicken broth powder and then mixing all these ingredients, so that several seasoning formulations are formed. In

FOODSCITECH, 6 No. 2 December 2023
ISSN 2622-1985 (print) | ISSN 2622-4127 (online)
DOI: http://dx.doi.org/ 10.25139/fst.v6i2.7404

the process of making instant noodle seasoning formulations using a mixing process between chicken broth and several spices, and producing several kinds of seasoning formulations. Table 1. below is the instant noodle seasoning formulation of Padang soup flavor. In the development of this instant noodle seasoning formulation, variations of instant noodle seasoning were made with a total of 5.60 grams. This total weight is made as the right amount of instant noodle seasoning to be served with one medium portion of instant noodles that is usually served.

Table 1. Instant Seasoning Formulation

Materials	Formula 1	Formula 2	Formula 3	Formula 4
Sugar (g)	1.00	0.70	0.70	0.90
Sald (g)	1.00	1.30	0.70	0.90
Shallots (g)	1.00	0.70	1.10	0.80
Garlic (g)	1.10	1.00	1.15	0.90
Galangal (g)	0.03	0.01	0.03	0.15
Turmeric (g)	0.10	0.10	0.11	0.01
Salam (g)	0.02	0.03	0.03	0.01
Orange Leaf (g)	0.10	0.05	0.05	0.05
Coriander (g)	0.05	0.05	0.10	0.03
Cardamom (g)	0.03	0.05	0.06	0.02
Lemongrass (g)	0.10	0.05	0.07	0.05
Cumin (g)	0.05	0.00	0.00	0.03
Mushroom broth (g)	0.50	0.70	0.50	0.50
Chicken broth (g)	0.50	0.85	1.00	1.25
Ginger (g)	0.02	0.01	0.00	0.00
Total	5.60	5.60	5.60	5.60

Test Parameters

Organoleptic Test Parameters

This research has used a modified method by Fadilah (2022). Organoleptic test parameters used include color, aroma, and taste. The test method used is the hedonic method (favorability test) with a scale of 1-5, namely (1) very dislike (2) dislike (3) somewhat like (4) like, and (5) very like. Panelists are asked to give an assessment according to their level of preference.

Organoleptic test is a way of testing the characteristics of instant noodle seasoning using human senses, including the senses of sight, smell and taste. This test is conducted to determine the level of panelist preference for the resulting product. The type of sensory test used in this study is the hedonic test to measure or determine the level of difference between the samples presented. The hedonic scale used has a range from very dislike (numerical scale = 1) to very like (numerical scale = 5) using 25 moderately trained panelists. The somewhat trained panelists included were panelists from university students who had previously been introduced to the sensory of noodle seasoning. These 25 people played a role in organoleptic color, aroma and taste. Then the organoleptic results are transferred into the form of data which will be explained in the results and discussion.

Proximate Analysis

This research consists of several stages, starting with drying the ingredients of several spices, chicken broth and mushroom broth, followed by reducing the size of the ingredients to powder, and finally made into several formulations. Padang soup seasoning was analyzed for moisture content, ash content, fat content and protein content (AOAC, 2005).

ISSN 2622-1985 (print) | ISSN 2622-4127 (online)
DOI: http://dx.doi.org/ 10.25139/fst.v6i2.7404

Determination of water content

Water content testing refers to the method gravimetrically. Into an empty Petri dish that has been constantly weighed as much as 1g of sample using an analytical balance, then dried in an oven at 105^{o}C for 3-4 hours, after which it is stored in a desiccator filled with silica gel adsorbent and weighed again until a constant weight is obtained.

Water content is calculated by the formula:

$$\%\text{Water content dry based (db)} = \frac{\text{W} - (\text{W1} - \text{W2})}{\text{W1} - \text{W2}} \text{ x } 100\%$$

Note:

W = sample weight before drying (gr)

W1 = weight of dried sample and cup (gr)

W2 = weight of empty cup (gr)

Determination of ash content

Ash content testing refers to the gravimetric method. Into an empty porcelain cup that was already constant, a sample of 3 g was weighed using an analytical balance (Metltler Toledo) then nestled on a hotplate (Thermolyne-Cimarec 2) and then fumigated in a furnace (Thermolyne 1500) at a temperature of 550-600^{o}C. After becoming ash, it was stored in a desiccator containing silica gel adsorbent then weighed until a constant weight was obtained.

Ash content is calculated by the formula:

$$\%\text{ash} = \frac{\text{ash (g)}}{\text{sample (g)}} \text{ x } 100\%$$

Determination of protein content

Protein levels can be determined by the Kjeldahl method. This method consists of three stages, namely deconstruction, distillation and titration. At first the sample was weighed as much as 1 gram using an analytical balance and put into the Kjeldahl flask. then added 5 grams of kjeldahl salt (a mixture of CuSO4 and K2SO4 1: 3), and added 10 mL of concentrated sulfuric acid solution, then deconstructed for 3-4 hours. The deconstructed solution was dissolved in a volume of 50 mL, then pipetted as much as 5 mL using a volumetric pipette and put into a distillation flask. The solution was distilled with 10 mL of 30% NaOH solution and the distillate was collected in a 100 mL Erlenmeyer flask which contained 10 mL of 3% boric acid solution and 2-3 drops of tashiro indicator in a cold atmosphere until the volume reached 75 mL. then titrated using a burette with 0.1 N HCl solution which has been standardized with borax solution until a color change from green to purple occurs. The volume of HCl solution used to titrate the sample solution was recorded and the protein content was calculated.

Protein content is calculated by the formula:

$$\%\text{N} = \frac{\text{ml HCl (sample} - \text{blanko)}}{\text{sample (g)}} \text{ x N HCl x } 14.008 \text{ x } 100\%$$

% crude protein: %N x protein conversion factor

FOODSCITECH, 6 No. 2 December 2023
ISSN 2622-1985 (print) | ISSN 2622-4127 (online)
DOI: http://dx.doi.org/ 10.25139/fst.v6i2.7404

Fat Content Analysis Soxhlet Method

The fat flask to be used is dried in an oven at 105°C for 1 hour The fat flask is cooled in a desiccator for 15 minutes and weighed (W2) Samples as much as ± 5 grams are mashed and then weighed (W1) and wrapped using filter paper formed into a sleeve (thimble) Assemble the extraction tool from the heating mantle, fat flask, Extraction was carried out for ± 6 hours until the solvent dropped back through the siphon into the clear-colored fat flask The extraction results from the fat flask were separated between the hexane and the extracted fat using a rotary evaporator (rpm 50, The fat that has been separated with hexanes is then heated in an oven at 105 ° C for 1 hour The fat flask is cooled in a desiccator for 15 minutes and weighed (W3) Warm up again in the oven for 1 hour, if the difference in weighing the last extraction results with the previous weighing has not reached 0.0002 grams. %fat content is calculated by the formula:

$$\%\text{Fat} = \frac{\text{w3} - \text{w2}}{\text{w1}} \text{ x } 100\%$$

Data Analysis

Data were analyzed using microsoft excel, and SPSS.

RESULT AND DISCUSSIONS

Proximate Analysis

The proximate analysis carried out is the measurement of water content, ash content, fat content, and protein content in the sample. The results of the analysis can be seen in Table 2.

Table 2. Proximate Analysis Results

Analysis (%)	Treatments			
	Formula 1	Formula 2	Formula 3	Formula 4
Water content	3.93 ± 0.04	3.85 ± 0.21	3.99 ± 0.08	3.85 ± 0.49
Ash content	1.35 ± 0.01	1.38 ± 0.02	1.55 ± 0.01	1.66 ± 0.02
Fat content	1.25 ± 0.25	1.28 ± 0.12	1.26 ± 0.10	1.29 ± 0.03
Protein content	5.63 ± 0.53[a]	5.77 ± 0.31[a]	7.05 ± 0.21[b]	7.39±0.52[c]

Note: The numbers in the same column followed by the same lowercase letter are not significantly different in the DNMRT test at the 5% real level.

The results of this research showed that the different formulations of soup seasoning were not significantly different from the moisture content of the resulting seasoning. the moisture content produced ranged from 3.85 - 3.99%. This is in accordance with SNI (1996) standards related to the maximum water content of powdered broth seasoning is 4%. Products in powder form need to pay attention to moisture content because it affects the growth of microorganisms, so if the moisture content is lower it can minimize the risk of damage to the product and make the shelf life longer (Herawati, 2008).

Ash content in food products can indicate the quality of a food, whether the food has good quality or not. Another purpose of ash content analysis is to distinguish between synthetic food and real food and as a parameter in a food. Ash content analysis is related to the inorganic mineral content of a food product. The higher the ash content of a food, the higher the inorganic mineral content in the food (Seftiono et al., 2019). In this study, the flavoring in formula 4 had an ash content of 1.66%. According to the Indonesian National Standard (SNI-01-3709-1995), the maximum quality standard of ash content in flavoring is 7% (w/b), so this

ISSN 2622-1985 (print) | ISSN 2622-4127 (online)
DOI: http://dx.doi.org/ 10.25139/fst.v6i2.7404

flavoring still meets the SNI standard quality. The ash content of a material is influenced by the type of material, method of saponification, temperature and time used during the saponification process. The higher the temperature and the longer the time used in the process, the more water is evaporated (Fauzy, et al., 2016).

In this study, the formula 4 has a fat content value of 1.29%. These results are in accordance with the standard SNI-01-4218-1996, where the standard fat content is at least 0.3%. Fat content can be influenced by the water content of the material, where the higher the water content, the higher the fat content that will be measured in proximate testing and analysis (Fauzy, et al., 2016). Fat content in the sample can also be influenced by the processing process, where the processing process with the principle of heating or drying is able to make some of the fat contained in food ingredients will melt out, causing fat content to decrease (Romadhon & Surti, 2016).

The protein content in each formula has a significant effect. It can be seen that the protein content obtained is increasing. Formula 4 has the highest protein content, which reaches 7.39%. This could be due to the increasing percentage of chicken broth added. According to SNI quality standards (1996) that the protein contained in powdered broth is at least 7%. The distinctive functional properties of a protein can come from different sources and affect the characteristics of a food product (Normilawati et al., 2019), here are several factors other than raw materials that also affect the protein content of flavorings, such as the hydrolysis stage and the drying stage. The hydrolysis stage can cause proteins to be hydrolyzed by enzymes into amino acids, so that if more peptide bonds are hydrolyzed by enzymes, the peptide bonds that are counted as proteins will also decrease(Anggraini & Yunianta, 2015). The drying stage in the processing process can also affect the value of the protein content of the flavoring. If the temperature used in the drying stage is higher, it can cause protein denaturation so that protein levels can decrease (Fauzy, et al., 2016).

Organoleptics Analysis

From the research activities that have been carried out, namely the manufacture of instant noodle seasoning formulations without the use of synthetic flavoring monosodium glutamate (MSG), the results of data in the form of organoleptic data in the form of color, aroma and taste. The product results can be seen in Figure 1.Color, aroma and taste affect consumer interest in consuming the product. The organoleptic score used is 1-5. The explanation of the 1-5 scale is (1) very dislike (2) dislike (3) somewhat like (4) like, and (5) very like.

Figure 1. The product results

Color

The color organoleptic test is intended to determine the color of the panelists' preference for instant noodle seasoning after hot water brewing. The average value of preference for the

FOODSCITECH, 6 No. 2 December 2023
ISSN 2622-1985 (print) | ISSN 2622-4127 (online)
DOI: http://dx.doi.org/ 10.25139/fst.v6i2.7404

color of instant noodle seasoning after brewing is as follows. Color is an important parameter in organoleptic testing, because generally consumers will be interested in the color state of the food before considering nutritional value and taste.

Table 3. Average value of preference for the color of instant noodle seasoning after brewing

Treatments	Color
Formula 1	3.20
Formula 2	3.90
Formula 3	3.75
Formula 4	4.05

Based on the results obtained, it is known that the tepanelis' liking value for the color of instant noodle seasoning brew is the highest in formula 3, which is 4.05 (like) with a yellowish white color. This value is higher than formula 1, formula 2, and formula 4. This is because formula 3 contains more turmeric than the other formulas, so the color is close to the color of the desired noodle flavor, which is the taste of soto padang. Soto padang is identical to the distinctive yellow color that comes from the addition of turmeric.

Taste

The organoleptic taste test was aimed to determine the panelists' preference for the instant noodle seasoning after hot water brewing. The average value of preference for the taste of instant noodle seasoning after brewing is as follows.

Table 4. Average favorability of instant noodle taste flavor after brewing

Treatments	Flavor
Formula 1	2.90
Formula 2	3.00
Formula 3	2.90
Formula 4	3.20

Based on the results obtained, it is known that the panelists' liking value for the taste of instant noodle seasoning brew is the highest in formula 4, which is 3.20 (rather like). This value is higher than formula 1, formula 2, and formula 3. This is because formula 4 contains a lot of chicken broth, and a little turmeric. Chicken broth has been widely proven to improve the taste of food. The turmeric content that is too high in instant noodle seasoning can make the seasoning taste bitter. This is due to the compounds present in turmeric.

Nursari et al. (2016) stated that each spice component contributes to flavour, color, aroma, and taste will synergize with new sensations that can improve the taste, acceptance, and identity of each processed product. Spices naturally contain a variety of active components that play a very large role in producing the flavor of a product. Spices contain antioxidants, anti-bacterial, anti-inflammatory, anti-yeast, antiseptic, anticancer and antibiotic substances that make spices more durable (Kurihara, 2015).

Aroma

The aroma organoleptic test is intended to determine the panelists' favorite aroma of instant noodle seasoning after hot water brewing. The average value of preference for the aroma of instant noodle seasoning after brewing is as follows. Aroma can affect a person's appetite for food. This is because, if someone smells a bad smell from the food, it can reduce appetite.

Table 5 Average favorability of the aroma of instant noodle seasoning after brewing

Treatments	Seasoning
Formula 1	3.20
Formula 2	3.90
Formula 3	3.90
Formula 4	3.95

Based on the results obtained, it is known that the panelists' liking value for the aroma of instant noodle seasoning brew is the highest in formula 4, which is 3.95 (rather like). This value is higher than formula 1, formula 2, and formula 3. This is because formula 4 contains less turmeric, too much turmeric makes the aroma of instant noodle seasoning becomes very turmeric-scented. Whereas what is expected is instant noodle seasoning that smells like Padang soup, not turmeric.

Based on the organoleptic test of the color, aroma and taste of the instant noodle seasoning. It can be concluded that the best formula in making instant noodle seasoning is formula 4 because in the scope of instant seasoning, the most important thing is taste, then aroma, and color. Since the taste and aroma have the highest value in formula 4, the best formula is formula 4. Although the best color is in formula 3, the color of formula 4 is just below the color value of formula 3.

CONCLUSION

From the results of the research on the seasoning of instant noodles with the taste of soto padang with the use of natural spices and without using synthetic flavoring Monosodium Glutamate (MSG), the best formula can be obtained that emphasizes the taste, aroma, color and nutritions of instant noodles. Noodle seasoning itself without using synthetic MSG. The results show that formula 4 has the best value, both in terms of proximate analysis and organoleptic. in formula 4, the water content is 3.85%, ash content is 1.66%, fat content is 1.29%, and protein content is 7.39%. This shows that formula 4 is the best result, both in terms of organoleptic and nutritional content.

ACKNOWLEDGMENTS

Thanks are given to the Faculty of Agricultural Technology for providing research funds with contract number: 01/PL/PN-UNAND/FATETA-2022 budget year 2022 and the author would like to thank all those who have helped the implementation of this research.

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