



Chemical and Sensory Characteristics of Dried Noodles with Addition of Telang Flower Extract (*Clitoria ternatea* L)

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Abstract: Indonesian people are very fond of noodles because they are cheap and practical. One way to improve the quality of the noodles is by adding several active ingredients. Judging from the phytochemical review, telang flowers have several active ingredients that have pharmacological potential. This study aimed to test the chemical characteristics and preference level of the panelists from dried noodles of the telang flower. This study used a randomized design with the treatment given in this study as additional telang flower extracts comprising 4 levels: 0%, 25%, 50%, 60%, and 75%. The limits analyzed were the panelist acceptance rate, protein content, total phenol, and water content. From the research results on testing the protein content got an average value of 14%, the total phenol got an average value of 0.55mgGAE / g, and the water content got an average value of 13.96%. because in the organoleptic test, the average panelist gave a value from neutral to very fond of dry noodles with telang flower extract.

1. Introduction

The increase in the population of Indonesia that occurs from year to year encourages the Government to advance food self-sufficiency. This is very necessary to meet people's food needs sustainably with excellent quality, enough quantity, and variety, safe for consumption, and affordable anytime and anywhere. Noodles are a food product that is consumed by Indonesians. They record the consumption of noodles in Indonesia as the second largest in the world after the People's Republic of China (PRC) [4]. Noodles have become popular among the public because of their low price and simple processing and presentation. One way to improve the quality of the noodles is by adding several active ingredients that have pharmacological potential.



Judging from the phytochemical review, telang flowers have several active ingredients that have pharmacological potential. The blue color found in telang flowers indicates anthocyanin content in it. Anthocyanin is a secondary metabolite and is a flavonoid. Anthocyanins themselves are chemical components that have antioxidant action that can act as antioxidants in the body [3]. Telang flower (*Clitoria ternatea*), often called butterfly pea, is a distinctive flower with a single BLUE petal [9]. Judging from the phytochemical review, telang flowers have several active ingredients that have pharmacological potential. The pharmacological potential of the telang flower, among others, is as an antioxidant, antibacterial, anti-inflammatory and analgesic, antiparasitic and anticomid, antidiabetic, anticancer, antihistamine, immunomodulator, and a potential role in the central nervous system, the Central Nervous System (CNS) [12].

Dry noodles are dry food products made from wheat flour with or without other food ingredients and permitted food additives and are in the form of noodles. Dry noodles are noodles that have been dried until the moisture content reaches 8 - 10%, are resistant to being stored for a long time, have a shelf life of ± 3 months, this is because of their low water content making it difficult to grow mold and mold [4]. Making noodles with telang flower extract is one of the diversification of food as local food, fortified with natural ingredients that have health functions because of the antioxidant content in them. The purpose of this study was to decide the protein content test and the organoleptic properties of dried telang flower noodles.

2. Materials And Methods

The method used in this study was a randomized design (CRD) with 3 replications. The treatment given in this study was telang flower extracts comprising 4 levels, : 0%, 25%, 50%, 60%, and 75%. The data got from the research results then carried out the analysis process using the variance fingerprint method. If there is a significant characteristic in treatment, they carry further analysis using Duncan's multiple range test (DMRT).

2.1. Time and Place

We conducted this research at the Food Analysis Laboratory and Food Processing Laboratory, Department of Agricultural Technology, Jember State Polytechnic from May to July 2020.

2.2. Materials and Tools

The raw materials used in this research are wheat flour, telang flower extract, eggs, salt, water. The tools used: trays, electric ovens, analytical scales, plastic containers, stoves, pans, sieves, knives, mills, and noodle molds.

2.3. Dried Noodle Processing

The procedure for making noodles is modified [8], 100 gr of wheat flour, then 2 eggs, 1 g of salt are added, and the addition of telang flower extract according to the treatment. Mix all the dough until homogeneous. The dough is divided into several parts and is made into a sheet using a rolling pin (dough thinner) with a thickness of ± 1.5 mm, then the noodles are ground using a noodle mill. Then the noodles are steamed for 1 minute. Picked up and dried at 60°C for ± 8 hours.

2.4. Observation Variable

2.4.1. Water content

We weighed the sample as much as 2 grams in a known weight plate, then dried in an oven at 105 °C for 3 hours. We cool it in a desiccator until it reaches room temperature, then weighed. Then reheated in the oven for 30 minutes, cool in a desiccator, and weight. I repeat this treatment several times until it reaches a constant weight.

The formula calculates the water content:

$$\text{Water content (\%)} = \frac{B-C}{B-A}$$



Note: A: The weight of the empty cup is expressed in grams
B: first plate + sample weight expressed in grams
C: we express the weight of the plate + dry sample in grams.

2.4.2. Protein Content

Weighed almost 1 gram of the sample and put it in the Kjeldahl flask. Added 15 ml of concentrated H_2SO_4 and 2 grams of selenium, then digested for 3 to 5 hours. Once complete, the solution becomes clear and cools. We diluted the results of the destruction with 100 ml distilled water and then calmly added with 50 ml of 30% NaOH. Then distillation was carried out. We collect distillation into a 250 ml Erlenmeyer flask containing 50 ml of 0.1 N KCl solution. The distillation handling is complete if the distillate collected is generally 75 ml. The remaining 0.1 N HCl solution which did not react with distillate was added 2 drops of Methyl orange and then titrated with 0.1 N NaOH standard solution. I marked the endpoint of the titration by the presence of the first pink color and remained for 30 seconds. We performed a blank titration with the same treatment without using a sample.

2.4.3. Determination of Total Phenol Content using the Folin–Ciocalteu Method [13]

Weighed 100 mg of the extract and then dissolved up to 10 ml with distilled water to get a concentration of 10 mg/ml. From, a concentration of 10 mg/ml pipette 1 ml and diluted with distilled water to 10 ml and got an extract concentration of 1 mg/ml. Pipette 0.2 ml of extract, add 15.8 ml of distilled water and 1 ml of Reagen Folin-Ciocalteu, then shake. Let stand for 8 minutes, then add 3 ml of 10% Na_2CO_3 to the mixture. Let the solution sit for 2 hours at room temperature. We measured the absorption using a UV-Vis spectrophotometer at the largest absorption wavelength of 765 nm. Performed 3 (three) repetitions so that the phenol levels got were obtained as mg of gallic acid equivalent / g of the fresh sample.

2.4.4. Organoleptic Test

Organoleptic test using the hedonic method or level of preference. We carried organoleptic test out to decide the level of preference for the panelists to the dried noodle product of Telang flower extract. Where this organoleptic test uses a panelist comprising 25 people by asking to offer a personal assessment of the sample presented. The limits analyzed are taste, color, aroma, and texture, by providing an assessment with the following scale

1. *Very disliked*
2. *Dislike*
3. *Neutral*
4. *Like*
5. *Like*

3. Results and Discussion

3.1. Water Content

The average water content of dry noodles with the addition of telang flower extract ranged from 12.7% to 15.8%. Water content is a quality need for dry noodles listed in SNI for dry noodles 01-2774-1992 that dry noodles must have the largest water content of 10%. Thus, the dry noodles with the addition of telang flower extract produced still do not meet the SNI requirements.

**Table 1.** The average water content of dry noodles with the addition of telang flower extract

| The Addition of Telang Flower Extract (%) | Average the Water Content (%) |
|---|-------------------------------|
| 0 | 12,76 ^d |
| 50 | 13,33 ^c |
| 60 | 14,26 ^b |
| 75 | 15,8 ^a |

The results of the analysis of variance showed that there was a very significant effect between the addition of telang flower extract (BNT 5%) on the water content of the dried noodles. We show the average water content in various treatment combinations in Table 1. The lowest water content value of dry noodles was treatment with the addition of 0% telang extract (control) and the highest was the addition of 75% telang flower extract. The water content in dry noodles increased with the increasing concentration of the added extract of the telang flower. This is because the more water used in the manufacture of dried noodles in the telang flower extract is added, the first water content is in the noodles, thus affecting the water content of the final product. According to [15] the more raw materials added will affect the water content of the product. Also, suspected that the water content of dry noodles is getting higher because the drying treat is based on the occurrence of water evaporation (water suction by air) because of differences in the water content between air and dried products [11].

3.2. Protein Content

The average protein content of dried noodle extract of telang flower in various treatment combinations produced ranged from 13.641 to 15.018%. We can see the average protein content of dry noodle products in Table 2. The results of the analysis of variance showed that the variation in the level of addition of telang flower extract had a significant effect on the protein content of dry noodles.

Table 2 shows that the higher the rate of addition of telang flower extract, the protein content of dry noodles increases. This is because the protein content of dry noodles is influenced by the protein content of the telang flower extract, which is high, around 19% [3]. The protein content of dry noodles according to SNI 01-2774-1992 is at least 11% for quality I calculated based on the dry weight of the ingredients. The addition of telang flower extract to the noodle mixture aims to give innovation in noodle making not only to support food diversification but also to increase the protein content of the noodles.

Table 2. The average protein content of dry noodles with the addition of telang flower extract

| The Addition of Telang Flower Extract (%) | Average the Protein Content (%) |
|---|---------------------------------|
| 0 | 13,64 ^d |
| 50 | 13,68 ^c |
| 60 | 14,01 ^b |
| 75 | 15,01 ^a |

3.3. Total Phenol

The total value of phenol in the dried noodles of telang flower extract increased with the addition of the extract given. We can see the mean total phenol value in Table 1. The results of the analysis of variance showed that the variation in the rate of addition of telang flower extract not had a significantly different effect on the total phenol of dry noodles, where the higher the rate of adding telang flower extract, the total phenol content of dry noodles tended to increase. According to [2], the total phenolic content in the telang flower extract was 19.43 ± 1.621 GEA (mg / g sample). According to other sources, the total content of phenolic compounds in telang flowers ranges from 53 to 460 mg of gallic acid equivalent per gram of dry extract [1; 5; 14]. The phenolic compounds comprise flavonoids, phenolic, acids, and tannins. The non-phenol bioactive components that have been identified in telang flowers are a group of phytosterol compounds, terpenes, sugar alcohols, alkyl aldehydes and peptides [10].

Table 3. The average the total phenolic content of dry noodles with the addition of telang flower extract

| The Addition of Telang Flower Extract (%) | Average the total phenolic content |
|---|------------------------------------|
| 0 | 0,282 ^b |
| 50 | 0,681 ^a |
| 60 | 0,6970 ^a |
| 75 | 0,6977 ^a |

3.4. Organoleptic Test

Organoleptic test results, conducted by 25 untrained panelists, show the results of the organoleptic test which aims to determine the level of preference for dried noodles from telang flower extract with the addition of 50% formulation of telang flower extract. The parameters tested were aroma, taste, texture and color.

3.4.1. Aroma

The smell of food is one way to determine the consumer’s sense of smell for a food ingredient. We can see the results of aroma analysis in Figure 1.

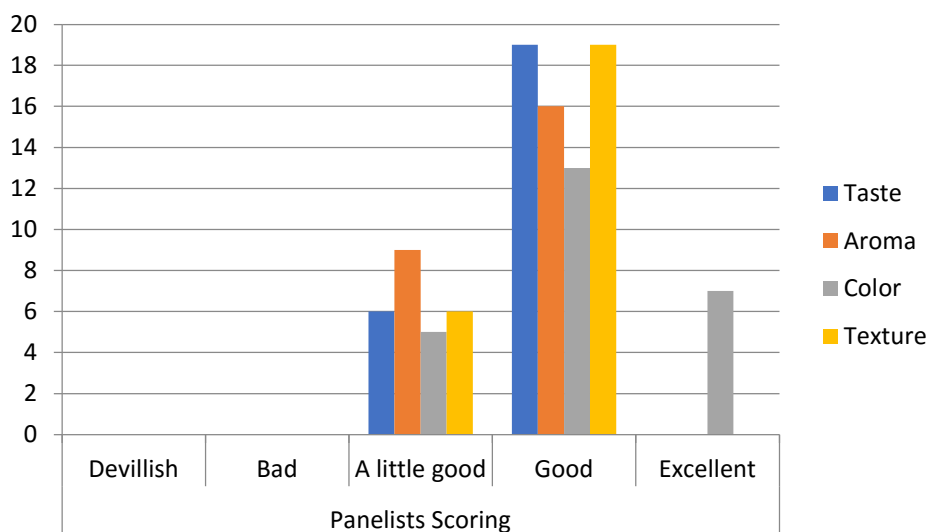


Figure 1. Panelists scoring in each of evaluated organoleptic characteristics

According to the organoleptic test results, the average preference level of 3,64 (A little good). The addition of telang flower extract in the manufacture of dry noodles gives off the aroma of the telang flower. According to [15], the smell of food determines the delicacy of the food and the taste of the food itself. Although food has a high nutritional value, when it smells bad, the level of preference for food can decrease. The presence of an unpleasant aroma will cause a dislike for food, even though it has not been consumed

3.4.2. Color

Color is very important in food and beverage products, to give color to food and drinks can impress consumers. The natural dye used in the manufacture of these dry noodles is from the telang flower extract because the blue color in the flower provides a special attraction for noodle lovers. We can see the results of the color analysis in Figure 1.

Based on the results of the organoleptic test on the color of dry noodles, it shows the level of preference with an average value range of 4.08 (Good). It means from the treatment given to dry noodles that have been tested, the panelists think they like this because of the color of the telang flower that



shows up on the dry noodles. According to [15], apart from being an aspect that determines quality, it can also an indicator of freshness or maturity. The uniform and even color can show the mixing method or processing method. A food ingredient that has nutritional value tastes good and has a very good texture is less desirable if it has an unsightly color.

3.4.3. Taste

Taste as one of the primary factors in determining whether or not a product is acceptable among consumers, this is important because the ingredients used are the major requirements in producing the desired taste. Based on the results of tests that have been carried out on the taste of dried noodles in the telang flower extract, the average is 4,08 (good). We can interpret it that the level of preference of the panelists is like to well like. Taste is a very important parameter in determining the level of consumer acceptance of a food product. Good taste can support the product so that consumers accept it [7].

3.4.4. Texture

The texture is one of the most important factors in every food processed served, food has its texture, for example, hardness, stickiness, crunchiness, elastilation, chewiness, softness, and so on. Mixing good ingredients will still get excellent results to produce the desired product, for a reason consumers can accept a product that can be consumed or not. We can see the results of texture analysis in Figure 1.

Based on the tests that have been carried out on the texture of the dried noodles of the telang flower extract, the average results is 3,76 (A little good) so most of the panelists like it. Each food has its own textural properties. Physical, size, and shape. The texture is the biggest determinant of taste quality [6]. The resulting texture from mixing the telang flower extract with the gelatinization can present good texture.

4. Conclusion

Anthocyanins produced from telang flowers (*Clitoria ternatea L.*) can color dry noodles and the resulting color looks blue and does not fade after being processed and ready for consumption. The added telang flower extract affects protein content, moisture content, and total phenol content, color preferences, aroma, taste, texture.

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