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Potency of Ear Mushroom and Shrimp Head as Natural Flavoring on Variations of Drying Temperature

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KEYWORDS:
Ear mushroom, shrimp head, Natural flavoring, drying temperature protein, organoleptic quality.

ABSTRACT

Natural flavoring is a flavoring made from edible mushrooms as a flavor enhancer food of powder or liquid form. Ear mushrooms and shrimp heads contain high protein and glutamic acid and can be used as natural flavoring and give additional savory taste of food . The objective of this research was to analyze the total protein content and organoleptic quality of natural flavoring components of ear mushrooms and shrimp heads at various drying temperatures. This research method used a completely randomized design (CRD) and two treatment components. The first component was the ratio of ear mushroom and shrimp heads: (25g:75g), (50g:50g), and (75g:25g). The second component was different drying temperatures of 40°C and 50°C. The research results showed that the highest content of total protein and the best organoleptic quality of natural flavoring in the K1T2 treatment (25g ear mushrooms + 75g shrimp heads with 50°C drying temperature) was 35.67% ie dark brown color, savory taste, delicious aroma, very softtexture, and liked.

1. INTRODUCTION

Natural flavoring is a natural flavoring made from edible mushrooms to enhance the taste of food in powder or liquid form. In general, the flavoring that is often used made from synthetic ingredients, called MSG (Monosodium Glutamate) added to the food of some Indonesian people and often has an adverse impact on health. According to Ningsih (2018), excessive and continuous use of MSG can cause stomach and sleep disorders, nausea, allergic reactions, trigger hypertension, asthma, cancer, diabetes, paralysis, decreased intelligence, and impaired spermatogenesis due to the formation of free radicals. Natural flavoring is a flavoring that can be created from basic ingredients including protein. These ingredients may consist of animal or vegetable protein. The use of natural ingredients can result in flavorings that are equally delicious as synthetic ones. The addition of spices can affect the taste, color and aroma of food. The spices can alter the taste and color of food. garlic, shallots, and white pepper offer a delightful aroma that can enhance the natural flavor (Widyastuti, 2015). According to Zhang (2013), protein from edible mushroom can enhance the taste food of ingredient can be used as a substitute for MSG is ear mushroom. Ear mushroom is dark brown, ear-like shape, form of irregular wavy sheets with an elastic and springy texture. The savory taste obtained from mushrooms has led to people's passion for consuming them in everyday life, one of which is ear mushrooms. The results of research by Bandara (2019) stated that the content of dried ear mushrooms included 79.9–93.2% carbohydrates, 6.5–13% crude protein, 9.9–17.9% sugar content, 0.48–4.5% crude fat, and 3.5–

12.5% fiber. Sekara (2015) states that ear mushroom contains benefits as an anti-tumor agent, low cholesterol, anticoagulant, antioxidant, immunomodulator and anti-microbial. Another primary ingredient that can be utilized as combination for producing natural flavoring is shrimp heads, which contain nutritious protein.. According to Rathore (2018) states that shrimp heads have a protein content of 43.12%. According to Bawinto (2015) shrimp heads and shells can be processed into stock that can give savory flavor for food processing. Next to that, being used as a flavor enhancer, shrimp heads and shells have benefits against free radicals ten times superior than natural product of fruit and vegetables due to its 'contain the antioxidant astaxanthin. The important factor of making natural flavorings is the process of reducing the water content therefore it can inhibit the growth of pathogen microbes. Lisa's (2015) research showed that drying temperature will affect the water content of ear mushrooms. The appropriate oven temperature will not damage the protein content and other important nutrients of food ingredients, because the protein will be denaturation at too high temperature

The objective of this research was to analyze the total protein content and organoleptic quality of natural flavoring components of ear mushrooms and shrimp heads at various drying temperatures.

2. MATERIALS AND METHODS

2.1. Materials

The tools used in this research were blender, knife, digital scale, small bowl, medium sized steamer, frying pan, spatula, electric oven, small blender, gas stove, Kjeldahl flask, analytical balance, funnel, watch glass, and evaporating cup, 100 ml Erlenmeyer, 250 ml beaker glass, 100 ml measuring flask, 100 ml measuring cup, and dropper pipette volume 10 ml

The materials and spices used in this research were ear mushroom, shrimp heads, shallots, garlic, white pepper, tapioca flour, granulated sugar, distilled water, sulfuric acid, sodium hydroxide, selenium, selenium catalyst, cupric sulfate, ethanol, methyl red indicator, sodium sulfate, pp indicator, hydrochloric acid, concentrated nitric acid, and sodium tetra borate

2.2. Research Procedure

The research process: 1.Preparation of ear mushrooms, shrimp heads, shallots, garlic, white pepper, brown sugar, tapioca flour and water; 2. Making natural flavorings : 1.Cut into small pieces and grind ear mushrooms as much as 75g (K1), 150g (K2), and 225g (K3) and shrimp heads as much as 225g (K1), 150g (K2), and 75g (K3) using a blender .2 Roast the shrimp head flour with bay leaf to reduce the strong smell. 3.Blend all the spices (for every 100 g of mixed ear mushrooms and shrimp heads) 15g garlic, 5g shallots, 2g white pepper, 4g salt and 5g palm sugar shrimp heads, ear mushrooms, garlic, shallots, white pepper, salt and palm sugar, tapioca flour); 4. Put the mixture of natural flavoring spices and ingredients in baking dish and steam for 15 minutes; 5.Dry the dough in an oven of 40°C and 50°C temperatures and drying time for 12 hours; 6.Smooth the dough from the oven and filter the natural flavoring into fine powder; (Widyastuti, 2015) 7. Natural flavoring was ready to be tested for protein content (the Kjeldahl method : the stage of destruction, destillation and titration (Munthe I, 2016) and organoleptic quality that were color, flavor, aroma texture, and acceptability)

2.3. Research Design

This research method used a completely randomized design (CRD) and two treatment components. The first component was the ratio of ear mushroom and shrimp heads: (25g:75g),

(50g:50g), and (75g:25g). The second component was different drying temperatures: 40°C and 50°C with 3 replications of each treatment. The parameters were total protein content (the Kjeldahl method) and organoleptics quality (color, flavor, aroma and community accepantance)

3. RESULTS AND DISCUSSION

3.1. Results

Total protein level and Organoleptic Quality Of Natural Flavoring Component Of Ear Mushroom and Shrimp Heads in the following table:

Table 3.1. Total Protein level and Organoleptic Quality of Natural Flavoring Component of Ear Mushrooms and Shrimp Heads at different of Drying Temperatures

Treatments	Protein (%)	Test Aspect				
		Color	Flavor	Aroma	Texture	Community acceptance
K1T1	25.01	dakbrown	lesssavory	less delicious	very soft	quite like
K2T1	22.51	darkbrown	savory	bit delicious	very soft	like
K3T1	16.35*	darkbrown	savory	delicious	very soft	like
K1T2	29.71**	darkbrown	savory	delicious	very soft	like
K2T2	24.34	darkbrown	savory	delicious	very soft	like
K3T2	20.67	darkbrown	savory	delicious	very soft	like

Explanation :
* : the lowest protein level
** : the highest proteini level
K1T1 : 25g of ear mushroom + 75g of shrimp head, with 40°C drying temperature
K2T1 : 50g of ear mushroom + 50g of shrimp head with 40°C drying temperature
K3T1 : 75g of ear mushroom + 25g of shrimp head with 40°C drying temperature
K1T2 : 25g of ear mushroom + 75g of shrimp head with 50°C drying temperature
K2T2 : 50g of ear mushroom + 50g of shrimp head with 50°C drying temperature
K3T2 : 75g of ear mushroom + 25g of shrimp head with 50°C drying temperature

Table 3.1 showed the highest natural flavoring protein content of 29.71% in the K1T2 treatment(25 g of ear mushroom + 75 g of shrimp head at 50 °C drying temperature) and the lowest naturalflavoring protein content in the K3T1 treatment (75 g of ear mushroom + 25 g of shrimp head at40 °C drying temperature) was 16.35%. The color of all treatments of natural flavoring componentof ear mushrooms and shrimp heads was dark brown. There was also no difference texture of the natural flavoring across all treatments, it was very soft. The flavor of natural flavoring in the K1T1treatment (25g of ear mushrooms + 75g of shrimp heads at 40°C drying temperature) was less savory, however the flavors of other samples were savory. The aroma of natural flavoring in treatments K1T1 (25g of ear mushrooms + 75g of shrimp heads at 40°C drying temperature) andK2T2 (50g of ear mushrooms + 50g of shrimp heads at 40°C drying temperature) was less delicious, while the aroma of other treatments were delicious. The accepted community of natural flavoring in the K1T1 (25g of ear mushrooms + 75g of shrimp heads at 40°C drying temperature) was quite like, however the panelists preferred the other treatments.

3.2.Discussion

The composition of higher shrimp head and the higher temperature resulted the higher proteincontent. This was supported by research (Akbar, Riyadi, & Jaya, 2017) stated that different concetration of shrimp heads broth given showed significant differences of protein content in kemplang crackers. The addition concentration of shrimp head stock can increase the protein content with value between 9.89% - 16.30%. Beside that, the protein content of 100 g of shrimp heads was higher than ear mushrooms. According to Rathore (2018), shrimp heads have protein level of 43.12%, while according to Bandara (2019) ear mushrooms have protein content of 6.5-13%. Drying temperature also affects total protein conten from the Kjeldahl method. This research showed that 50°C heating temperature and additional drying time of 15 minutes can increase crude protein content. This was due to the decrease of water content on dried material. This opinion is also strengthened research (Riansyah, Supriadi, & Nopianti, 2013) showed that total protein content of salted astringent fish showing total protein content at 50°C temperature (T1)was 21.73%, then 60°C temperature (T2) was 21.97% and also at 70°C temperature (T3) was 24.12%. The longer time and the higher temperature used for drying process, the higher protein content will be.

The color of all treatments was the same (dark brown). The dark brown color produced by all treatments was caused by ear mushroom composition. The drying process of natural flavoring usedoven was also one of the factors that influences color. According to (Bhattacharya, Bhakta, & Ghosh, 2011) the dark brown color produced can also be caused by a chemical reaction that causes a browning reaction. This was also stated by (Irawati, Warnoto, & Kususiyah, 2015) that the browning reaction of natural flavorings is non-enzymatic reaction in reducing sugars from carbohydrates with primary amino groups results in large evaporation of water. The formation of brown color is triggered by an oxidation reaction catalyzed by the enzyme phenol oxidase or polyphenol oxidase. These two enzymes can catalyze the oxidation reaction in phenol compounds causes the color change to brown.

The flavor of natural flavoring was also influenced the spices used during the making process.The spices addition of natural flavoring is intended to increase and improve taste (Wahidah, 2010).The savory taste can be caused the protein content hydrolyzed into amino acids (glutamic acid) which gives specific taste. The metal ion of food content can affect the food taste. Metal ions will be released from their complex bonds due to hydrolysis or degradation and will reduce the bitter taste of food (Winarno, 2004).

The aroma of natural flavoring was delicious except for the K1T1 treatment (25g of ear mushrooms + 75g of shrimp heads at 40°C drying temperature) the aroma was less delicious. The ratio addition of shrimp head extract created aroma liked panelists (Adawyah, Asyah, Puspitasari, & Candra, 2017). The aroma of the K1T1 was considered less delicious due to the higher shrimp head component than that of 75g ear mushroom, therefore the shrimp head aroma was considered more pungent and stronger. Next to that, the different aroma of the panelists influenced the assessment of the aroma of the natural flavoring.The strong aroma prevention of shrimp heads was anticipated by roasting them using bay leaf to reduce the unpleasant aroma. According to (Harismah & Chusniatun, 2016) the adding bay leaf of food will make the aroma delicious because of the distinctive smell of bay leaf. Bay leaf can also absorb excess CO2 and serve as an alternative medicine. According to (Atika & Handayani, 2019) the roasting (heat) treatment at the stage of making flavor powder causes the volatile compounds and other chemical contents of the shrimp shell to change chemical content such as evaporating, giving specific aroma of the shrimp.

The texture of natural flavoring components of ear mushroom and shrimp head were very softall treatments. The texture of natural flavoring was also influenced the water content of the ingredients used. Ear mushrooms and shrimp heads had low water content to making it easier to dry. According to (Winarno, 2002), the dough made during the oven process will affect the resulting texture of material. The too thick mixture of material will cause the heat to propagate less evenly and make the solid less homogeneous. The thinner the dough, the more even the heat will

propagate, and the resulting dough will have softer texture. According to (Dewita & Syahrul, 2014), processing food ingredients that contain carbohydrates, proteins and fats will affect the appearance (aroma, taste, mouthfeel, aftertaste and texture, consistency, softness, elasticity and crunchiness).

According to the panelists, the natural flavoring was most preferred at the K1T2 (25 g of ear mushrooms + 75g of shrimp heads at 50°C drying temperature). The natural flavoring was less liked at the K1T1 (25g ear mushrooms + 75g shrimp heads with 40°C drying temperature). According to panelists, the natural flavoring flavor were savory, delicious, very soft, as well ummami respectively. According to (Suhaenah & Nuryanti, 2017), the high level of liking and acceptance shows that the product is accepted panelists and can be used as natural flavoring product made from natural ingredients and reduces chemical-based food ingredients. The differences of age and tastes can be the factor results of organoleptic quality. The 20 panelists range age of 14 years t- 48 years. According to (Djohar, Timbowo, & Mentang, 2018) the age panelist influences the results of organoleptic quality because the person of 40 years old become slightly less sensitive, beside that each person's taste was different.

4. CONCLUSIONS

In the K1T2 (25 g of ear mushrooms + 75 g of shrimp heads at 50 °C drying temperature), the highest protein content of the natural flavoring was total of 29.67%. The best organoleptic qualityof natural flavoring in K1T2 (25g ear mushrooms + 75g shrimp heads at 50°C drying temperature)was dark brown, savory taste, delicious aroma, very soft texture and liked.

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