Original Research Article

CHARACTERISTICS OF PETIS VANNAMEI SHRIMP (*Litopenaeus vannamei*)WASTE WITH THE ADDITION OF KLUWAK FRUIT (*Pangium edule*)

ASBTRACT

The shrimp processing industry produces a lot of waste that can become a pollutant for the environment if not managed properly. Shrimp waste such as heads, tails and skins, if processed properly, can become a fishery diversification product that is able to provide added value to the community. Shrimp waste is known to contain protein of 31.58%. The high protein content can be a consideration in processing shrimp waste into by-products as a substitute for food products. This study aims to analyze the effect of the addition of kluwak fruit on water content, protein content and hedonic value of vannamei shrimp waste petis. The research method used was an experimental method with petis treatment added by kluwak with 4 different concentrations, namely (A) 0 g concentration (control), (B) 10 g concentration, (C) 20 g concentration, and (D) 30 g concentration. The results showed that the addition of kluwak fruit provided a real difference in the value of water content and protein content in vannamei shrimp waste petis. The addition of kluwak fruit to vannamei shrimp waste petis produced the best hedonic scale organoleptic value in treatment (D) with a concentration of 30 g.

Keywords: vannamei shrimp waste; kluwak; water content, protein content, organoleptic

1. Introduction

Vannamei shrimp is a source of protein with a content of 31.58% so that it can encourage increased consumption to meet nutritional and health needs [1]. This high protein content stimulates the processing of shrimp waste that has not been widely used into highly nutritious processed food products. This can be a reason for making diversified products from processed shrimp waste as a substitute product that can be processed into food. Processing shrimp waste as a processed fishery product has great potential and is expected to increase and utilize shrimp waste such as shrimp heads, tails and shells into food products.

Waste products from industrial processing are usually immediately disposed of and can cause environmental pollution if further processing is not carried out. Further processing can be done by utilizing it as a material for making petis [2]. Shrimp waste is treated with boiling water so that an extract is obtained in liquid form resembling broth [3].

Petis is a processed product made from fish, shrimp, or meat with the addition of other spices. Petis is categorized as a sauce or pasta because it has a thick, elastic texture and is usually black or brown in color, depending on the main ingredient. Petis

is an important element in traditional food in various regions in Indonesia because it gives a distinctive taste to each dish. Petis is generally made with shrimp meat or leftover shrimp such as head, skin, and tail. This ingredient is boiled to produce a thick sauce that contains various amino acids, vitamins, minerals, and flavoring elements that give petis a distinctive taste [4]. The taste varies depending on the type of flavoring ingredient used, resulting in a similar taste, even though the base ingredients are different [5].

One of the flavoring ingredients used is the addition of kluwak fruit in petis to enhance the taste and provide color, so as to produce the best petis that consumers like. Kluwak fruit is a potential food ingredient that is currently not optimally utilized for food products, and has advantages in terms of nutritional elements [6]. Based on this description, this study aims to process and utilize shrimp waste into processed fishery products in the form of petis with the addition of kluwak fruit as a flavoring ingredient in petis so that it is expected to strengthen the taste and color in the product and can provide added value and quality of petis made from vannamei shrimp waste.

2. Materials and Methods

2.1. Origin of samples and Research Site

Samples of vannamei shrimp waste (*Litopenaeus vannamei*) were obtained from household waste, while kluwak fruit (*Pangium edule*) was obtained from the Parigi market, Lappariaja District, Bone Regency. Sample testing was carried out at the Laboratory of the Fishery Product Quality Application Center (BPMPP) located on Jl. Prof. Ir. Sutami No. 2 Makassar, and the hedonic scale organoleptic test was carried out on the campus of the Institute of Maritime Technology and Business.

2.2. Tools and Materials

The tools used in this study include; testing laboratory tools, *styrofoam*, digital scales, blenders, strainers, knives, basins, cutting boards and other kitchen tools. The ingredients used are boiled water, shrimp waste, kluwak fruit, sugar and salt.

2.3. Research Procedure

The preparation stage includes the preparation of tools and materials in research and sampling. The process of making petis with the addition of kluwak fruit includes: washing, boiling and filtering, adding kluwak fruit, sugar and salt, and heating/thickening. Shrimp waste in the form of skin and head is washed with clean running water. The boiling of shrimp waste is carried out for ± 15 minutes at a temperature of 100°C. Next, the waste is smoothed with the boiled water with a blender and then filtered so that shrimp waste broth is obtained. After that, the addition of kluwak fruit (kluwak fruit is separated from the skin and mashed first), sugar and salt, then cooked until it thickens and becomes petis. The petis made is vanname shrimp waste petis with the addition of (A) 0 g, (B) 10 g, (C) 20 g, and (D) 30 g. Petis samples that have been treated are then tested for water content, protein

content, and organoleptic on a hedonic scale in the laboratory.

2.4. Research Design

This study is included in an experimental study that aims to assess the effects of various treatments and investigate possible causality by providing one or more treatment conditions. The study used vannamei shrimp waste petis with treatment through the addition of kluwak fruit (A) 0 g, (B) 10 g, (C) 20 g, and (D) 30 g. Each treatment was repeated 3 times so that 12 experiments were obtained.

2.5. Data Collection Techniques

The data collection technique is to determine the water content and protein content of vannamei shrimp waste petis referring to the work procedure [7], [8], and [9]. Meanwhile, the hedonic scale organoleptic test uses the results of 25 panelists. The hedonic scale is 1-5, namely 1 = very unsportsmanliked, 2 = disliked, 3 = neutral, 4 = liked and 5 = strongly liked. The data from the test results were analyzed in Anova to see the effect on the observed variables.

3. Results and Discussion

3.1 Water content

Based on the results of testing the moisture content of processed petis using several treatments, the results were obtained that the higher the concentration of kluwak added to the petis accompanied by an increase in moisture content (Figure 1).

The results of the variety analysis showed that the addition of kluwak fruit had no real effect ($P > 0.05$) on the water content of vannamei shrimp waste petis. According to the National Standardization Agency [9], the moisture content value of petis is maximum 50%, while the water content of treatment A, B and C meets the requirements [9]. The highest water content was obtained in treatment D with the addition of 30% kluwak fruit at 54.39%. This shows that the higher the concentration of adding kluwak fruit, the higher the water content in the petis. The water content in a food product is affected by the composition of the ingredients used in the product. The high water content in treatment D is suspected to be influenced by the high water content of the kluwak fruit. Warnasih and Hasanah [10] revealed that the moisture content of fresh (wet) kluwak contained a water content of 43.84%.

The water content in food products or food ingredients refers to the amount of water contained in them, and this is an important factor because the water content in food affects the shelf life of food products [11]. The water content in processed fish is one of the factors that determines the shelf life of a product. Adawyah and Puspitassari [12], stated that the amount of water contained in the body of fish ranges from 50-80%. The required water content limit ranges from 30-40% so that the development of decaying bodies can be stopped. However, enzymatic and chemical processes as well as bacterial growth require a certain amount of water, so the moisture content must be maintained as needed. High water content can accelerate deterioration while

low water content is able to maintain the quality of food [13].

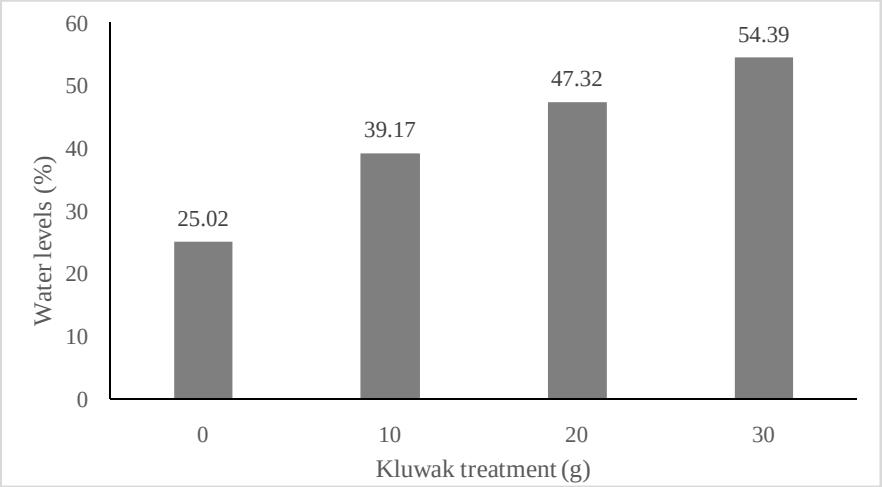

Figure 1.Average value of water content test results of petis product samples from vannamei shrimp waste based on treatment

3.2 Protein levels

Based on the results of testing the protein levels of petis processed using several treatments, the results were obtained that the higher the concentration of kluwak added to petis accompanied by a decrease in protein content (Figure 2). After variety analysis, it was shown that the addition of kluwak fruit had no real effect on the protein content of vannamei shrimp waste petis with a sig value ($P > 0.05$). The protein content produced in petis products using vannamei shrimp waste raw materials with the addition of treatment cluwak C and D has been in accordance with the quality requirements of petis that have been determined according to [14] where the maximum protein content value is 15%.

The protein content in the addition of 30 g of kluwak fruit has the lowest protein content while the highest protein content is found in the addition of 0 g of kluwak fruit. The concentration of adding kluwak fruit is suspected to affect protein levels, where the increasing concentration of kluwak fruit, the petis protein level tends to decrease. Syarief and Halid [15] argue that the decrease in protein content occurs due to an increase in water content, which has the potential to reduce protein content, and vice versa.

Protein is a food substance that has an important role in the body. The main function of protein is as a fuel, building and regulating substance in the body [11]. Protein analysis in foodstuffs generally focuses on determining the total protein content or known as crude protein. Crude protein is the amount of nitrogen (N) contained in a foodstuff, which is then multiplied by a factor of 6.25. This approach is based on estimates that the average nitrogen content in foodstuffs is about 16 grams per 100 grams of protein [16].

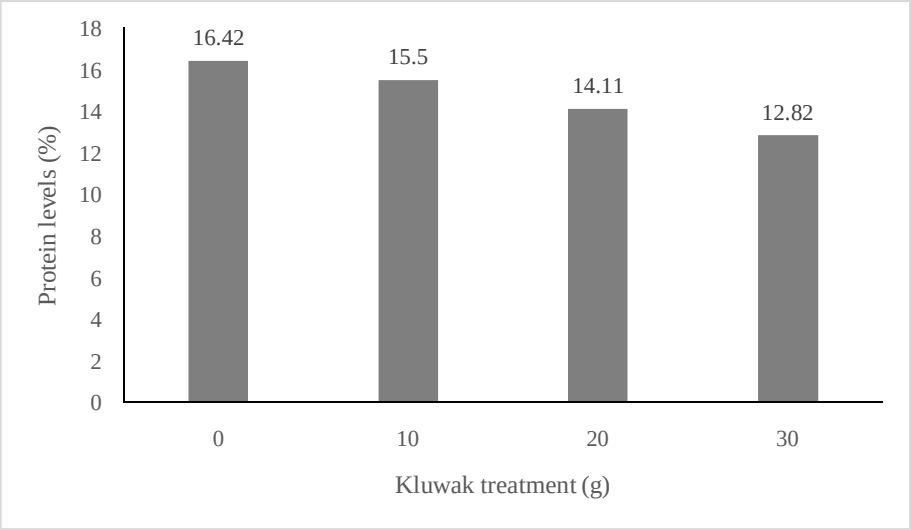

Figure2. Average value of protein content test results of petis product samples from vannamei shrimp waste based on treatment

Suryanti *et al*. [17] revealed that the high protein content in snack food raw materials can affect the binding of water molecules by starch molecules because proteins have molecular groups that are hydrophilic and ionic, so they can be soluble in water. This condition causes starch molecules to find it difficult to expand and the cell pore structure becomes low and dense, resulting in the texture of snack products that tend to be hard.

3.3 Organoleptic

Based on the results of the test on the organoleptic test which includes the appearance, aroma, texture and taste of processed petis using several treatments, the results are obtained as seen in Figure 3.

3.3.1 Appearance

The average value of the organoleptic test for the appearance of vannamei shrimp waste petis showed that the acceptance rate of the panelists ranged from 3.04-3.64 with the criteria of brownish and blackish-brown color, homogeneous, elastic and brilliant. The highest appearance value in treatment (D) with the addition of 30 g of kluwak fruit was 3.64. The appearance of vannamei shrimp waste petis with an additional concentration of 30 g was most liked by the panelists. The more kluwak fruit is mixed in the petis, the stronger the dark brown color produced by the petis. Meanwhile, the lowest average value of appearance was found in the 10 g treatment with a value of 3.14 because it looked light brown and not brilliant.

Astawan [18]states that a good petis has bright (not dull) color characteristics, generally blackish-brown. Appearance includes the color aspect, playing an important role in the subjective assessment by the panelists. The color of the product, like the petis, greatly affects how the product is perceived visually. High-grade petis products usually have a shiny blackish-brown color and are free of contaminants.

The appearance characteristics of petis with the addition of kluwak fruit show that the more the concentration of kluwak is added, the more brilliant the color will be.

An addition of 0 g in concentration indicates pale petis, 10 g in concentration indicates brownish color. A concentration of 20 g produces a dark brown color, while petis with a concentration of 30 g is blackish brown and brilliant.

3.3.2 Aroma

Aroma in the context of a food product is a collection of gaseous compounds that produce a specific odor. Odor can be described as a mixture of four main aromas, namely fragrant, sour, rancid, and charred. In the food industry, aroma testing is very important because it can provide a quick assessment of how the product will be received by consumers.

The highest average value of aroma was found in the treatment with an additional concentration of 30 g with a value of 3.4. It is suspected that kluwak has an aromatic aroma that is typical of spices where kluwak, if used as a kitchen spice, can provide a more pleasant aroma. Meanwhile, the lowest average value of aroma in the treatment of adding a concentration of 0 g with a value of 2.9. The results of the hedonic scale organoleptic study showed that the increase in the concentration of kluwak was inversely proportional to the level of preference of the panelists for the scent of petis. This is in accordance with the statement [19] that the addition of kluwak paste in the manufacture of Almond Cripsy by 0.05%, 0.07% and 0.08% does not affect consumer acceptability in aroma parameters.

The aroma characteristics produced in petis with the addition of 0 g concentration produce petis products with a very thick shrimp odor. Meanwhile, the aroma produced on petis with the addition of 10 g, 20 g, and 30 g is relatively the same. The aroma of vannamei shrimp waste petis with an additional concentration of 30 g was preferred by the panelists and the additional concentration of 20 g and 30 g was included in the somewhat liked category, while the concentration of 0 g (control) was included in the neutral category.

3.3.3 Flavor

The taste characteristics produced in petis with the addition of 30 g of kluwak showed the highest average taste value of 3.12. The panelists preferred petis with the addition of kluwak with a concentration of 30 g because it tasted more savory, delicious, and more pleasant to the throat when tasting. Meanwhile, the lowest average taste was found in the treatment of adding a concentration of 10 g with a value of 2.76 because the taste was not good.

3.3.4 Texture

Texture is one of the important aspects in assessing food ingredients and their processed products. These characteristics play a central role in the consumer experience, and products with hard-to-use or hard-to-consume textures can have an impact on consumer satisfaction levels and panelists' ratings. Therefore, in the development of food products, it is important to pay attention to the texture to match consumer preferences and meet expectations for the desired taste and texture experience. The highest average texture value was found in the treatment of adding a concentration of 30 g (D) with a value of 3.6, The texture characteristics produced on petis with the addition of 30 g kluwak showed a thicker, homogeneous and soft texture. Meanwhile, the lowest average texture value was found in the concentration treatment of 10 g (B) with a value of 2.76 and was less in demand because the

texture was less thick and not homogeneous.

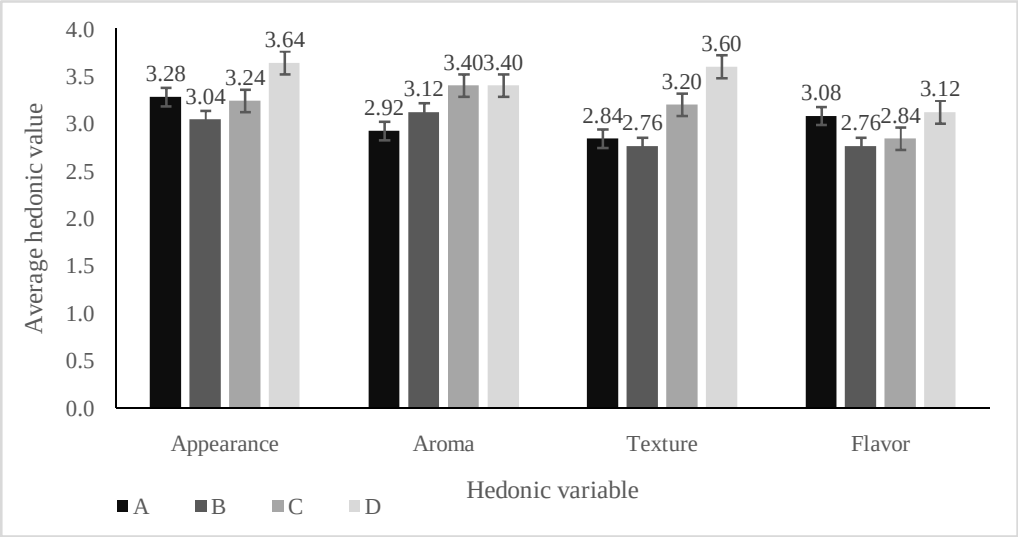

Figure 3. Average value of hedonic scale organoleptic test results of petis samples from vannamei shrimp waste

4. Conclusion

The moisture content values for treatments A, B and C met the requirements [9], while the protein values for treatment C and D were in accordance with the quality requirements of petis that had been determined according to [14]. The organoleptic values of the hedonic scale of vannamei shrimp waste petis with the addition of kluwak fruit produced the best appearance, taste, and texture parameters of treatment D and the best aroma parameters were treatment B. Organoleptic values of appearance, aroma, taste, and texture parameters of treatment A, B, C, and D met accordingly[20].

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