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The Effect of Soaking Time in Seasoning on the Quality of Squid Chips (*Loligo Sp.*)

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Abstract: This study aims to determine the effect of soaking time in seasoning on the panelists' preference value and the chemical quality of squid chips (Loligo sp.). This study consisted of 2 stages, namely preliminary research to determine the appropriate seasoning soaking time in making chips and the results were used as a basis for consideration in the main research and main research to determine the characteristics of squid chips. The treatments in this study were soaking in seasoning for 1 hour, 2 hours and 3 hours. The hedonic score sheet data were designed using Kruskal Wallis and analyzed using K Independent Nonparametric Tests on the SPSS 16 device. The chemical data was designed using a Completely Randomized Design and analyzed with ANOVA on the SPSS 16 device. The data from the treatment results that had a significant effect were continued with Duncan's further test. The results showed that the soaking time in seasoning had a significant effect on hedonic organoleptic analysis (aroma, taste and texture) and chemical analysis (moisture, ash and protein content) of squid chips. The results of chemical testing of squid chips have a water content of 28.345% - 32.70%, ash content of 2.26% - 3.24%, protein content of 56.64% - 58.86. Based on the standard of SNI 01-2602-1992 regarding tempe chips, in general, the water content does not meet the quality standard for fried tempe chips, namely the maximum water content of 3%.

Keywords: *Chips, Squid (Loligo sp.), Soaking Time, Hedonic, Chemical Quality*

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PRELIMINARY

Squid is an important fishery commodity and ranks third after fish and shrimp (Okuzumi and Fuji, 2000). The annual increase in squid production is 20%, which is quite large compared to shrimp and tuna (Directorate General of Fisheries, 2005). Squid production in Indonesia is estimated at 28.25 thousand tons per year (Dahuri, 2004). The high yield of squid shows that squid has great potential to be developed into a variety of products that are more practical in terms of consumption and presentation.

Squid is a type of marine fishery product that has a fairly high protein content of 14.8-18.8%. Squid in addition to the easily digestible meat, also contains essential amino acids and is rich in minerals such as phosphorus and calcium which are useful for growth (Hendrayana, 2010).

Data from the Department of Fisheries and Maritime Affairs (DPK) of Gorontalo Province (2017), shows that the amount of squid production in Gorontalo in 2017 was 876.07 tons. Of this amount, 99.09% is marketed fresh while the remaining 0.91% is in processed form. The data illustrates that the level of utilization of squid into processed products is still low. This is because the use of squid in Gorontalo, according to observations in the field, is only processed into traditional dishes such as stir-fried squid. However, in other areas, efforts to develop processed squid products have been carried out, but are still limited for local consumption, including paper squid, salted dried squid, smoked squid and canned squid (Hulalata, et al. 2013).

Squid can be developed into various processed products including chips. Calamari has delicious and chewy meat, so it is good for chips. Generally, the chips that are widely circulated in the market and consumed by the public are beef and fish chips, but there are not too many squid chips. In addition, squid contains a fairly high protein. Therefore, the use of squid with a fairly high protein content, besides being able to be used as a diversification material, also gives flavor to the chips and adds to the nutritional value of the chips.

According to Sriyono (2012) chips are snacks or snacks in the form of thin slices which are very popular among the public because they are crunchy, savory, not too filling and available in various flavors such as salty, spicy and sweet. Chips are very practical because they are dry, so they are more durable and easy to serve anytime.

Chips are a kindofsnack in theformofthinslicesoftubers, fruits, orvegetablesfried in vegetableoil. To produce a savoryandcrunchytaste, itisusuallymixedwithflourdoughthatisgivencertainspices. Chipscantastedominantlysalty, spicy, sweet, sour, savoryor a combinationofallofthem (Oktaningrum etal, 2013).

Various types of chips can be consumed in different ways, including fruit, vegetable and tuber chips. However, the making of squid chips has not been done much. Squid chips are one of the alternative food products for dry food. The dry food market opportunity is open and prospective. Based on these results, the authors conducted research on different raw materials, namely squid with the title the effect of soaking time in seasoning on the quality of squid chips (Loligo sp.).

RESEARCH METHODS

This research was conducted from January to August 2018 in Gorontalo City, Gorontalo Province. Hedonic organoleptic testing was carried out at the Laboratory of Biotechnology and Characterization of Fishery Products, Department of Fishery Products Technology, Faculty of Fisheries and Marine Sciences, UNG. Sample testing was carried out at the Laboratory of the Center for Biological Resources and Biotechnology Research, Bogor Agricultural University.

Toolsandmaterials

The tools used in making and testing the quality of squid chips are knives, cutting boards, plastic containers, scissors, spoons, polypropylene plastic, blenders, ovens, saucers, desiccators, thermometers, digital scales, sputters (tweezers), hedonic organoleptic scoore sheets and knives. .

The materials used in making and testing the quality of squid chips are fresh squid, salt, palm sugar, coriander, garlic, shallots, tamarind, pepper and galangal, aquades, concentrated H2SO4, H2O2, aquades, H2BO3 and HCl.

Research procedure

This research was conducted in two stages, namely preliminary research and main research. The purpose of the preliminary study was to determine the duration of soaking squid in seasoning for 2 hours, 4 hours and 6 hours. The main purpose of this study was to determine the effect of soaking time in seasoning on the quality of squid chips using 1 hour, 2 hours and 3 hours of soaking.

Tests carried out on squid chips products were organoleptic (hedonic) testing and chemical testing which included water, ash, and protein content.

RESULTS AND DISCUSSION

Squid Chips Hedonic Organoleptic Assessment Results

Organoleptic testing of squid chips for treatment duration of immersion A (1 hour), B (2 hours), C (3 hours). Organoleptic testing was carried out by 25 semi-trained panelists.

Appearance

The histogram of the hedonic test results can be seen in Figure 1.

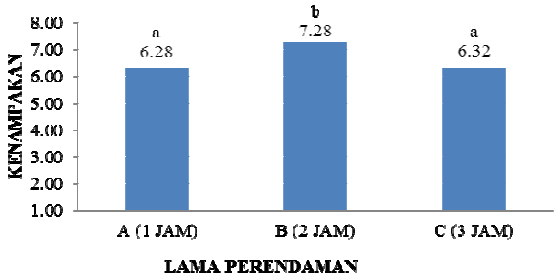

Figure 1. Histogram of hedonic test results for the appearance of squid chips with different immersion times.

Figure 1 shows that the hedonic organoleptic value of the appearance of the chips is in the interval 6.28-7.28 with an acceptance scale that is somewhat like to like. Treatment A with an immersion time of 1 hour has a hedonic value of 6.28 rounded 6 with a somewhat favorable acceptance scale as well as treatment C with a duration of 3 hours of immersion. Meanwhile, treatment B with 2 hours of immersion had a hedonic value of 7.28 rounded up to 7 with a like acceptance scale.

The results of the Kruskal-Wallis test showed that different soaking time treatments had a significant effect on the appearance of the squid chips produced. Duncan test results showed that treatments A and C were not significantly different, but significantly different from treatment B.

The results showed that the appearance of squid chips with different immersion time resulted in different color appearances. Treatment A (1 hour) had a pale brown appearance, the cut was not neat so it was somewhat favored by the panelists, as well as treatment C (3 hours) was somewhat favored by the panelists because it produced a brown appearance, uneven cuts. In contrast to the squid chips in treatment B (2 hours), the panelists liked the chips because they had a yellowish-brown and attractive appearance.

The results showed that the appearance of the color of the squid chips was significantly different. The soaking time serves to absorb the spices into the meat, so that the longer the soaking time, the panelists' acceptance value decreases. This is possible because the longer the marinade is soaked in the chips, the more brown the color of the chips will be. The appearance of brown color (formula B) on the chips was the formula favored by the panelists.

According to Kilcast in Yusuf (2011), consumers generally choose food products that have an attractive appearance. If the impression of the appearance of the product is good or liked, it will make a strong attraction for consumers to judge other parameters such as aroma, taste and texture. The level of consumer acceptance of the appearance of a product is not only seen from the color, but the shape and size uniformity visually also has an effect.

Color

The histogram of the color hedonic test results can be seen in Figure 2.

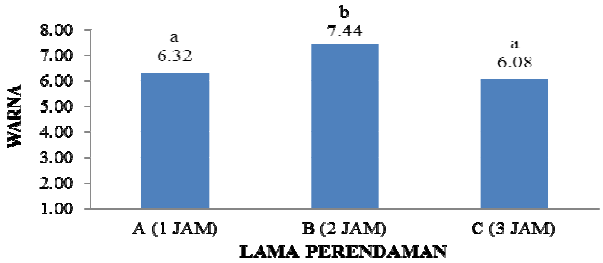

Figure 2. Histogram of the hedonic test results for the color of squid chips with different immersion times.

Figure 2 shows that the hedonic organoleptic value of the chip color is in the interval from 6.32 to 7.44 with an acceptance scale that is with an acceptance scale of somewhat like to like. Treatment A with an immersion time of 1 hour has a hedonic value of 6.32 rounded up to 6 with a moderate acceptance scale, as well as treatment C with a hedonic value of 6.08 rounded up to 6 for a 3 hour immersion time. Meanwhile, treatment B with 2 hours of immersion had a hedonic value of 7.44 rounded up to 7 with a like acceptance scale.

The results of the Kruskal-Wallis test showed that different soaking time treatments had a significant effect on the color of the squid chips produced. Duncan test results showed that treatments A and C were not significantly different, but significantly different from treatment B.

The color of chips with different soaking time produced different colors, namely treatment A (1 hour) was slightly pale brown, treatment B (2 hours) was yellowish brown and treatment C (3 hours) was brown. Of the three treatments, the panelists preferred the product with treatment B with 2 hours of immersion because it had an attractive color, namely yellowish brown. The appearance of brown color in the product can also be caused by a browning reaction (Malllardreaction) due to the presence of protein and sugar in the basic ingredients for making chips.

Beef chips with different spice compositions have a darker color than the control, this is due to the sugar added to the chips reacts with amino acids contained in the meat which causes a non-enzymatic browning reaction that triggers the formation of melanoidin pigments (Bailey, 1998).).

Aroma

The histogram of the hedonic aroma test results can be seen in Figure 3.

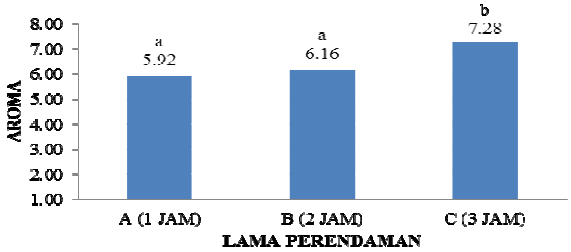

Figure 3. Histogram of hedonic test results for the aroma of squid chips with different immersion times.

Figure 3 shows that the hedonic organoleptic value of the chip aroma is in the interval 5.92-7.28 with an acceptance scale of somewhat like to like. The results of the Kruskal-Wallis test showed that squid chips with different soaking times had a significant effect on the aroma produced. The Duncan test results of squid chips treatment A and B were not significantly different but significantly different from C.

The aroma of chips with different soaking time produces different aromas, the longer the soaking time the aroma produced is more favored by the panelists because of the distinctive aroma of squid chips. This is due to the presence of spices, temperature and drying time used. Along with the length of immersion in the spices, the aroma produced is different and the longer the soaking, the more spices that enter the fish meat, causing a different smell. The longer the marinade is soaked, the more pronounced the aroma produced on the chips, the aroma is obtained from herbs and spices that have a distinctive aroma such as coriander, shallot, garlic, galangal and ginger that seep into the squid during soaking.

One of the spices used in making chips is coriander which has a distinctive aroma, the aroma is caused by the chemical components contained in the essential oil. Based on the type of constituent elements of essential oil compounds, coriander oil belongs to the group of oxygenated hydrocarbon compounds. These compounds cause a fragrant aroma in essential oils, and are more resistant and stable to the oxidation process (Suhirman and Yuhono, 2007).

According to Mustar (2013) that through aroma, panelists or the public can find out the ingredients contained in a product. The aroma usually arises from the processed material because the volatile compounds contained in the food come out through a certain processing or treatment.

Flavor

The histogram of the hedonic taste test results can be seen in Figure 4.

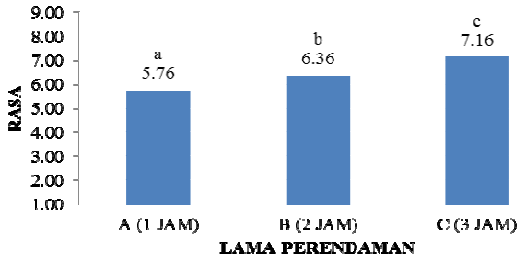

Figure 4. Histogram of hedonic test results for the taste of squid chips with different soaking times.

Figure 4 shows that the hedonic organoleptic value of chip flavor is in the interval from 5.76 to 7.16 with an acceptance scale of somewhat like to like. Treatment A with 1 hour of immersion had a hedonic value of 5.76 rounded 6 with a somewhat favorable acceptance scale as well as treatment B with 2 hours of immersion. Meanwhile, treatment C with 3 hours of immersion had a hedonic value of 7.16 rounded up to 7 with a like acceptance scale.

The results of the Kruskal-Wallis test showed that different soaking time treatments had a significant effect on the taste of the squid chips produced. Duncan test results showed that all treatments A, B and C were significantly different.

The taste of squid chips with 3 hours treatment is the chips preferred by panelists compared to other treatments, because the taste of squid chips has a distinctive taste of chips (flavored with chips) so that panelists like it. In accordance with research conducted by Maryani (2001) that the catfish filet chips are soaked with spices, the longer the soaking in the seasoning allows more spices to enter the fish meat so that the chips are more delicious.

According to Lubis (2010), table salt (NaCl) is an additional ingredient that is almost always used to make a dish. The salty taste caused by table salt serves as another flavor enhancer. This is reinforced by Suprapti (2000), that the added salt also affects the taste because salt is a giver and enhancer of pre-existing seasonings. Foods containing less than 0.3% salt will taste bland and unwelcome.

According to Rahayu and Berlian (1994) stated that the content of essential oils in garlic can cause aroma and give a savory taste and contain taste. Besides providing taste, the content of essential oils also functions as a preservative because it is fungicidal for certain bacteria and fungi.

Texture

The histogram of the texture hedonic test results can be seen in Figure 5.

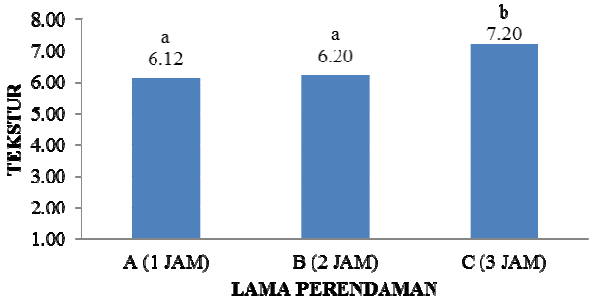

Figure 5. Histogram of hedonic test results of squid chips texture with different immersion time.

Figure 5 shows that the hedonic organoleptic value of chip flavor is in the interval 6.12 – 7.20 with an acceptance scale of somewhat like to like. Treatment A with an immersion time of 1 hour had a hedonic value of 6.12 rounded up to 6 with an acceptance scale of somewhat like the same as treatment B with a hedonic value of 6.20 rounded up to 6 for an immersion time of 2 hours. Meanwhile, treatment C with 3 hours of immersion had a hedonic value of 7.20 rounded up to 7 with a like acceptance scale.

The texture of squid chips with different soaking time produces different textures. The panelists preferred the texture of treatment A and B chips because they were rather soft, while the texture of treatment B was favored by the panelists because the texture of the squid chips produced was the same, namely soft. This is due to the longer immersion. The longer the marinade soaks, the more it sinks in, so that it produces a soft texture. According to Winarno (2008) that the texture of an ingredient will affect the taste caused by the food ingredient.

The longer the marinade in this seasoning is in line with the increase in the water content of the squid chips as the storage time increases. The water content of squid chips (Figure 6) is higher than the SNI standard. According to Purnomo (1995) most foodstuffs have an aw value of more than 0.80 because in this condition they are much preferred by consumers because the food is a bit wet and easy to chew (tender).

Squid Chips Proximate Test Results

Water content

The histogram of the water content test results can be seen in Figure 6.

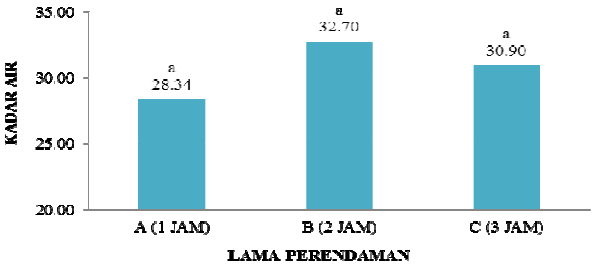

Figure 6. Histogram of the results of the water content test of squid chips with different immersion times.

Figure 6 shows that the water content of squid is in the interval 28.34% – 32.70%. The results of the ANOVA test showed that the squid chips with different immersion time did not significantly affect the water content produced.

Moisture content of squid chips with different immersion time resulted in water content that was not statistically different, this was due to the presence of the same seasoning, temperature and drying time. However, in terms of numbers, the longer the immersion the lower the water content of the squid chips. This is thought to be influenced by the seasoning in making chips.

These spices cause a lower percentage of water content reduction, especially sugar. The added sugar in the manufacture of chips is able to bind the free water contained in the chips, besides that sugar also plays a role in preventing water evaporation (Soeparno, 2005). In addition, salt in processed meat products serves to increase water holding capacity during processing, increase shelf life, because it can inhibit the growth of spoilage organisms (Ridayanti et al, 2006). In addition, the high water content in the chip product is not in accordance with the SNI for beef chips, namely Max. 12%, this is because according to Muljanah (1992) squid contains high enough water, namely 77-80%.

Ash Level

The histogram of the ash content test results can be seen in Figure 7.

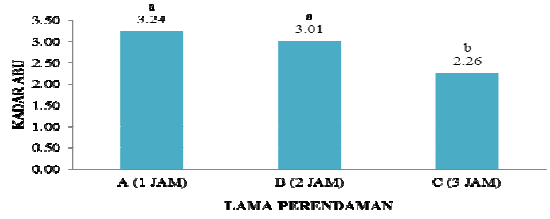

Figure 7. Histogram of the ash content of squid chips with different soaking times.

Figure 7 shows that the ash content of squid is in the interval 2.26% – 3.24%. The results of the ANOVA test showed that the squid chips with different immersion time had a significant effect on the water content produced. Duncan test results of squid chips treatment A (1 hour) and B (2 hours) were not significantly different but significantly different from C (3 hours).

The results showed that the duration of soaking in different seasonings on squid chips resulted in different ash content. The longer the immersion the ash content decreases. The decrease in ash

content in squid chip products at 3 hours of immersion is thought to be because fresh squid contains low ash content. According to Okuzumi and Fuji (2000), the ash content of fresh squid is 1.5%.

Protein Level

The histogram of the protein content test results can be seen in Figure 8.

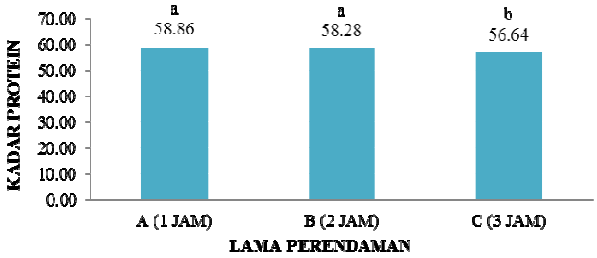

Figure 8. Histogram of test results for protein content of squid chips with different soaking times.

Figure 8 shows that the value of squid protein content is in the 56.64% - 58.86% interval. The results of the ANOVA test showed that the squid chips with different soaking time had a significant effect on the protein content produced. Duncan test results of squid chips treatment A (1 hour) and B (2 hours) were not significantly different but significantly different from C (3 hours).

The longer the immersion, the lower the protein content of the squid chips produced. This is presumably because protein is concentrated more when the water content is low. Treatment C (3 hours) produced the lowest water content (56.64%). The longer the immersion in formula C causes the water content in the chips to be low so that the protein content is low.

The decrease in protein content in this study was also caused by the processing process. According to Astawan et al (2004), the decrease in protein content is caused by the presence of volatile nitrogen compounds that evaporate during processing. The heating process will cause the protein to degrade and reduce its nutritional value.

Conclusion

Based on the results of research on the effect of soaking time in seasoning on the preference value of panelists and the chemical quality of squid chips (Loligo sp.), it can be concluded that the soaking time in seasoning has a significant effect on the hedonic and chemical organoleptic analysis (moisture, ash and protein content) of squid chips. The results of chemical testing of squid chips have a water content of 28.345% - 32.70%, ash content of 2.26% - 3.24%, protein content of 56.64% - 58.86. Based on the standard of SNI 01-2602-1992 regarding tempe chips, in general, the water content does not meet the quality standard for fried tempe chips, namely the maximum water content of 3%.

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