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Fish Meat Processing Inovation of Striped Snakehead (*Channa striata*), Giant Snakehead (*Channa micropeltes*) And marble Goby (*Oxyeleotris marmorata*) on Nutritive Quality of Sate Lilit

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Abstract: *Sate lilit is one of fish meat-materialized food types roasted over the fire with soft and crunchy texture, stabbed with lemmon grass, instead of bamboo stick, like a common satay. The objective of the study was to know if there is any effect of using fish meat of different species on the satay qualityand to know the best fish meat is used for sate lilit processing. The fish meat was taken from striped snakehead (Channa striata), giant snakehead (C. micropeltes), and marble goby (Oxyeleotris marmorata) as treatments with 3 replications. Data collection was done through chemical analysis (protein, fat, water content, ash, and carbohydrate) andorganoleptic test (appearance, color, aroma, tast, and crunchiness). Data analysis used SPPS statistical program. Results revealed that the highest protein occurred in C. micropeltes, averagely 20.71%. The highest mean organolepticvalue was also found in C. micropeltes, 5.5% for appearance, 5.5% for color, 58% for aroma, 56% for taste, and 5.9% for crunchiness, respectively. It reflects that the use of C.micropeltes fish meatin sate lilit production has very good nutritive value.*

Keywords: *Sate Lilit, fresh water fish.*

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I. Introduction

To increase the diversity pattern of fish consumption for animal protein necessity, fish processing diversification needs to be done to add product diversity through fish processing technology implementation, one of which is fish meat milling. (Manullang and Tanoto, 1995; Beane et al, 1983).

Satay is a very popular food in Indonesia, and through high diverse tribes and traditions, different types of satays have also been produced. Satay can be obtained from the vendors, small food shops to fancy restaurants. One of the satay types is *sate lilit* made of fish meat Sri Owen, (2010). It has soft texture and crunchiness using lemongrass stick (Anonym, 2015a). Sate lilit is one of the fish meat-based food types using lemmon grass stick and roasted over the fire. The popular sate lilit in the market is called dragon satay originated from Bali. This food is made from milled fish material mixed with scrapped coconut meat and other flavor, then rolled on the lemongrass stick and roasted over the fire (Anonym, 2015)

This study is aimed to know if there is any effect of fish meat of different species on the satay quality and which meat is the best in sate lilit processing. Through this study, it is expected to be able to raise the skill and the creativity in new fish product processing in order to encourage the local communities and the entrepreneurs to develop business opportunity and to take benefit of the available fish catches.

Stripped snakehead, *Channa striata*, is rich in albumin, one of the important protein types, that occurs mostly inthe fish plasm, about 60%, (Astuti, 2008; Cholik*etal*., 2005; Firlianty*et al*., 2014). Until now, only few local people know the benefit of the fish (Suprayitno, 2003), even though this fish is easy to find the traditional markets and modern markets both in the form of fresh fish and salt fish. Unfortunately, not many people make *C. striata* as a favorite food, beside it has good taste, *C. striata* is highly beneficial for human health. Giant snakehead, *C. micropeltes*, belongs also to *Channidae* and looks similar to *C. striata* (Kottelat, 1993), with typical characteristics of predatory fish supported with sharp teeth and big size. Marble goby *Oxyeleotris marmorata* is also known as marble sleeper or lazy goby (Suryani et al., 2008) due to tending to sit on the bottom and being nocturnal to feed on small shrimps, crabs, aquatic snails.

In Indonesia, satay can be found in vendors, small food shops by the road up to fancy restaurants. The satay recipe and production technique are diverse depending upon the traditional recipe of different regions in Indonesia.

A. Method

This study was done in Fisheries Processing Technology Laboratory, Department of Fisheries, Palangkaraya University. Data were analyzed using SPSS, Materials used for satay lilit production were fish meat, brown sugar, lime leaf, salt, grated coconut, lemon grass, garlic, onion, candlenut, turmeric, and pepper. Fish meat was finely milled. Oninon, candlenut, brown sugar, and turmeric were also milled. Few frying oil was heated and all fine spices were fried, added with lemon grass and lime leaf, then left until cook.Afterwards, the mish meat was mixed with the cooked spices and stirred up to homogenous. Then, salt, brown sugar, lime leaf, and grated coconut were added and well mixed with meat. The dough was made round oval shape and wrapped on the lemon grass stick, and baked on live coals to produce satay lilit.

II. Results and Discussion

1. Results

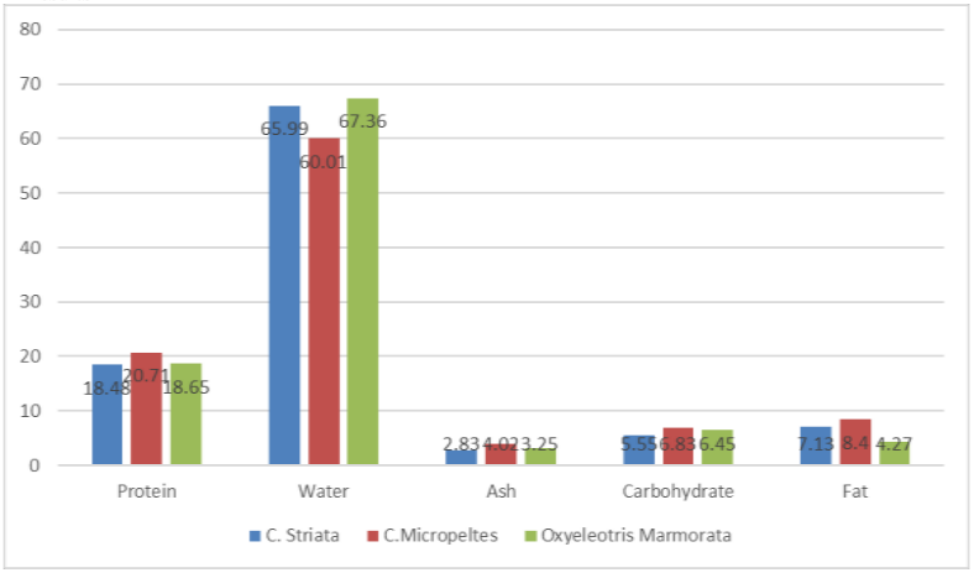

Figure 2. Proximate of fish Sate lilitIkan

2. Discussion

Proteinis a macro-molecule with molecular weight of 5,000 to several millions, consisting of long-chained amino acids in peptide bonds. Amino acids comprise carbon, hydrogen, oxygen, and nitrogen. Nitrogenis main component of protein due to its presence in all proteins with 16% proportion of total protein (Almatsier,2009).

The highest protein content was recorded in treatment B with an average of 20.71%in *Channamicropeltes*, and the lowest in treatment A, 18.49%, in *C. striata*. High protein content the fish meat could result from food type, habitat, and food availability. Fat is important component for human health, and occurs in nearly all food materials in different content(Winarno,2004). It consists of mixed triglyceride (Ketaren, 1986), if the fat is hydrolyzed it will produce 3 molecules of long-chained fatty acids and one glycerol molecule. The lowest fat content occurred in treatment C with an average of 4.27%, while the lowest water content was in treatment B with an average of 60.02%. Fat oxidation reaction is affected by water content in the diet.Fat-containing materials usually hold enzyme that enables to hydrolyze fat to yield free fatty acid and glycerol.

According to Purnomo (1995), water plays great role in food material structure and is main factor in fat oxidation as well. Decline in water content will raise the concentration of ionization radicals and contact level with According to Winarno (2002), heat-irresistant materials, such as high sugar materials.

Water content analysis of food, including fish and their products can be done through several different methods depending upon its properties. The simplest and most common method is oven-drying. In this method, the sample is heated at about 102^0C to 105^0C for 3 hours or more up to obtaining a constant weight. Water content is calculated as loss of saple weight divided by initial sample weight(Tranggono,1991).

Water is an important chemical compound that makes up the food. It is made of hydrogen atom (H) and oxygen (O) bindingto form H_2O. Food contains water in different numbers and affects the freshness, stability, durability, and easiness to activate chemical reactions, enzymatic activity, microbial growth. Water in food materials can occur as free water, absorbed in the tissue, or chemically bound in other compound (Kusnandar, 2010). According to Sudarmadji *et al*. (2007), water content determination uses thermogravimetric method, evaporating the water of the food material through heating then weighting up to gaining constant weight.

Ash content of a food material indicates the number of minerals contained in the food material (Apriyantono *et al*.,1989). The ash is composed by various types of minerals in diverse composition depending upon the type and the source of the food material. Information on ash and mineral content of the food material is very important to obtain the highly needed minerals by human body. These minerals cannot be optimally used since their presence is sometimes in the form of bound with food component so that their absorption is disturbed. Effect of processing on the food material could also affect the availability of minerals in the body (Andarwulan *et al*., 2011).

Ash is inorganic substance of combustion debris of organic substance. Ash content and its composition depend on material type and its ashing technique.Ash content is related with mineral of a material. The objective of total ash determination is to know whether or not a processing process is appropriate to know the material type used and as food material nutritive value parameter (Sudarmadji *et al*., 2007). The highest ash content was recorded in treatment B with an average of 4.03%.

Carbohydrate is major source of calory for almost entire world population. Although number of calories that are produced by 1 g of carbohydrate are lower than protein and fat, only 4 ccal, carbohydrate is an inexpensive source of calory. Besides, several carbohydrate groups yield dietaryfibers useful for digestion (Winarno,2004). Carbohydrate is polyhydroxy aldehyde or ketone with empirical formula of $(CH_2O)n$ (Razuna, 2010) that can be changed through hydrolysis,and composed by 2-8 monosacharrides as olygosacharride. It is widely distributed in either animal or plant tissues. In plants, carbohydrate is produced through photosynthesis and includes cellulose and starch. In animal tissues, carbohydrate occurs in the form of glucose and glycogen. Carbohydrate functions as energy source, food sweetener, protein safer, fat metabolic regulator, toxin antidote, good for constipation disease.

Organoleptic test indicated that the highest mean value of texture was found in treatment B with mean value of 5.5%. Change in texture and viscosity of the material could alter the taste and flavor, because it could affect the rate of sensation appearance on the receptor olfactory cells and salivary glands. The denser the material is, the lower the acceptance to the taste, smell, and flavor will be. Increase in temperature will raise the stimulation on the sweet taste but push down the stimulation on salty and bitter taste (Riwan, 2008). Moreover, texture of a food material is affected by ration of fat content, protein, protein type, processing temperature, water content, and water activity (Purnomo, 1995). Color is one of the parameters beside taste, texture, and nutritive value determining the consumer's perception to the food materials. Brigther color gives higher attratibility to the consumer. Color of food materials possess several functions, such as maturity indicator, especially in fresh food products, such as fruits, as freshness indicator in meat and vegetables, properness indicator in food processing process, such as frying, and brown color appearance as indicator of final maturity of the food product (Fajriyati, 2012)

Flavor is simply defined as food material aroma, a sensation caused by volatile or non-volatile chemical components, either natural or artificial, that appears when eating. Food aromain the mouth will be received by the sense of smell through estachius tube. Number of volatile components released by a product is affected by temperature and its natural component. Aroma-related compounds of food materials heated isfuranone, 4-hydroxy, 3dimethyl-3- dihydroxyfuranone with smell of caramel. The compound of 4-hydroxy-5-methyl-3- dihydrofuranonehas smell of roasted chicory root,2,5dimethyl-3-dihydrofuranonehas smell of newly ovened bread, Food material containing fat, if exposed to oxygen, will result in oxidation and yield short-chained fatty acid, ketone, and volatile aldehyde releasing rancid smell (Riwan,2008).

Greeting sensation is divided into 4 main greetings, sweet, bitter, sour, and salty, and there are possible responses when modification is done (Zuhra,2006). Moreover, Riwan (2008) stated that taste was influenced by several components, chemical compound, temperature, concentration, and interaction with other taste component. A variety of chemical compounds yield different tastes. Sour is caused by proton donor, for example, sour in vinegar, fruits, and vegetables.Sweet taste is produced by aliphatic organic compound containing OH group, such as alcohol, amino acids, aldehyde and glycerol. Bitter taste is caused by alkaloids, such as caffein, theobromine, quinone, glycoside, phenols, such as naringin, salts, Mg, NH4, and Co. The organoleptic value of *sate lilit* was 56% for taste and 5,9% for crispness.

III. Conclusion

The use of different fish meat significantly affects the quality of *sate lilit* since different fish species have different content content of protein, water, ash, fat, and carbohydrate. *C. micropeltes*. Based chemical test and organoleptic test, C. micropeltes has the best nutrition quality.

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