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CHANGES OF AMINO ACID CONTENT IN MANGGABAI FISH OF FERMENTATION RESULTS Faiza A. Dali*, Rita Marsuci Harmain Tehcnology of Fishery Products Department, Faculty of Fisheies and Marine Sciences, State University of Gorontalo, Jalan Jenderal Sudirman No. 6 Gorontalo City, 96128 Gorontalo Telp (0435) 821125, Faks (0435) 821752 *Correspondence: dali.faiza@yahoo.co.id Abstract This study aims to determined the content of amino acids in fresh manggabai fish and fermented products.

Manggabai fresh fish obtained from fishermen in the waters of Limboto lake, Gorontalo. Manggabai fish washed, cut into small pieces then fermented with 15% salt mixture, 20% and 40% carbohydrates for 15 days anaerobically at ± 45 °C. Amino acid testing was performed on fresh manggabai fish and dried fermented products.

Test results obtained that fresh manggabai fish and fermented products contain the highest amino acids in glutamic acid and the lowest in histidine. Levels of amino acids contained in manggabai fish increased after the fermentation process with carbohydrate 20%. The existence of fermentation technology can increase the nutritional value of manggabai fish. The amino acid content decreases in value after fermented 40% carbohydrate.

Keywords: carbohydrate, manggabai fish (Glossogobius giuris), Limboto lake, salt INTRODUCTION Foods that have many benefits for human health include fish. Currently the Indonesian people have a consumptive nature of fish, due to the nutritional content of fish, especially proteins that are needed to stabilize the performance of the human body. Fish meat has shorter protein fibers than protein fibers of chicken and beef. Fish protein content of 15-25% w / w composed of amino acids.

The content of amino acids in fish meat varies depending on the type of fish. One of the freshwater fish that is popular with Gorontalo people is manggabai fish, living in the waters of Limboto lake. Suryandari and Krismono (2011) stated that biologically manggabai fish are carnivorous fish and spawn more than once a year.

Gorontalo people consume manggabai fish in the form of fried foods, broth or baked. Utilization of manggabai fish to be a variety of food has not been optimally done, especially to avoid fish from decay. Fermentation includes processing technology in preserving fish by utilizing enzymes in fish tissues and microorganisms.

During the fermentation process the food will undergo changes in physical and chemical properties. Fermented food products made from raw fish such as in Indonesia, namely Bakasang (Yanti and Dali 2013), Bekasem (Nuraini et al. 2014), Peda (Thariq et al. 2014), Terasi (Suwandi et al. 2017). Fish fermented products are also found outside of Indonesia, for example in India called Lona ilish (Majumbar and Basu 2010).

Carbohydrate sources for the fermentation process are limited in the fish body, so additional carbohydrates are needed from the outside. Carbohydrates in the fish body mostly in the form of polysaccharides is glycogen. Kalista et al. (2012) states, that the content of amylopectin in rice flour is lower than other carbohydrate sources, so the bacteria more easily use it as a medium of growth.

Lactic acid bacteria and fermentation results better. Carbohydrates, protein and fat in fish is a medium used as a source of nutrients for microorganisms that play a role in the process of fermentation. The fermentation process is influenced by several factors such as acid, temperature and oxygen (aerob or anaerob).

This study was conducted with the aim of knowing the amino acid content in fresh manggabai fish and fermented products. MATERIALS AND METHODS The equipment used in this study includes incubators, ovens, scales, large basins, knives, cutting boards, gloves and masks. The materials used, namely fresh manggabai fish purchased directly to fishermen on the coast of Limboto lake, salt and carbohydrates.

Fresh manggabai fish is washed with ice water, then the fish is drained, cut small to

facilitate the process of mixing the ingredients. The fish was then weighed, then mixing with 15% salt and 20% carbohydrate added as C and carbohydrate treatment as much as 40% as D treatment. After mixing the ingredients, the sample was put into a sealed container and incubated at ± 45 ºC for 7 days, then dried at 60 ºC for 8-12 hours, then fermented again for 8 days. The sample was then dried again at 90 ºC for 35 hours. Result of drying of fermentation sample was analyzed amino acid.

Fresh manggabai fish and fermented products were then tested for amino acid content. Analysis method for amino acid content in manggabai fish using HPLC (High Performance Liquid Chromatography). RESULTS AND DISCUSSION Amino Acid of Fresh Manggabai Fish The nonessential content of amino acids in fresh manggabai fish raw material showed that the highest level was glutamic acid of 1.6%, followed by aspartic acid 0.97%, while the lowest value in tyrosine was 0.32%.

The highest essential amino acid content in lysine and the lowest in histidine. Mohanty et al. (2014) argues, freshwater fish such as carp and catfish are rich in glutamic amino acids. Maggabai fish have glutamic acid that can be used as a flavoring agent, as well as aspartic acid.

Mouritsen (2012), reported that the amino acid aspartate can add a savory taste after the amino acid glutamate. Fermented Amino Acid Fermentation of manggabai fish with 15% salt and 20% carbohydrate (C treatment) shows differences in amino acid levels. The highest nonessential amino acid content of glutamic acid was 3.41% and the lowest in serine was 0.76%, while the highest essential amino acid in leucine was 1.62% and the lowest in histidine was 0.29%.

Treatment with 40% carbohydrate (D) showed changes in amino acid levels after fermentation. Nonessential essential amino acids have the highest value on glutamic acid of 3.17% and the lowest in serine is 0.64%, while the highest essential amino acid in leucine is 1.57% and the lowest in histidine is 0.31%.

Fresh manggabai fish and fermented products obtain varying amino acid values. Nutritional value of amino acids that increase through the fermentation process can provide added value to manggabai fish for consumption. Pawiroharsono (2007), explains the benefits of fermented food products such as the value of nutritional food increased

due to the formation of new nutrient compounds metabolism results. The results of the analysis can be seen in Table 1. Table 1.

Amino Acid Content In Maggabai Fish Amino Acids _ Manggabai (%) _ _Nonessential : _Fresh Manggabai _C (20%) _D (40%) _ _Asp _0,97 _1,84 _1,73 _ _Glu _1,6 _3,41 _3,17 _ _Ala _0,64 _1,45 _1,15 _ _Gly _0,5 _1,17 _0,77 _ _Ser _0,39 _0,76 _0,64 _ _Tyr _0,32 _0,99 _1,02 _ _Essential : _ _ _ _ _Arg _0,57 _0,84 _0,74 _ _His _0,19 _0,29 _0,31 _ _Iso _0,45 _1,12 _1,09 _ _Leu _0,77 _1,62 _1,57 _ _Lys _0,88 _1,15 _1,11 _ _Met _0,29 _0,54 _0,6 _ _Phe _0,42 _1,04 _0,97 _ _Thr _0,37 _0,64 _0,61 _ _Val _0,47 _1,25 _1,23 _ _ Graphically the Amino Acid Content of Fresh Manggabai Fish, the fermentation C (20%) and D (40%), both nonessential and essential can be shown in Figure 1. _ Figure 1.

Amino Acids content in fresh Manggabai fish, fermented C (20%) and D (40%) CONCLUSION Changes in amino acid levels contained in manggabai fish occur in the presence of fermentation technology. The fresh manggabai fish and fermented yields of amino acids vary with the highest levels of glutamic acid and the lowest in histidine. Fish manggabai after fermented with 20% carbohydrate, the value of amino acid nutrition has increased.

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