Original Research Article

THE CHARACTERISTIC OF FRIED BILIH FISH FROM TANAH DATAR AND SOLOK REGENCY

ABSTRACT

This research aim to know the comparison between the fried bilih fish from Sumpur and Paninggahan district in West Sumatra Province, Indonesia. This research conducted from February to June 2019 in Technology Fishery Laboratory of Faculty of Fisheries and Marine Science, Testing Laboratory of Faculty of Agricultural Industrial Technology. Research method is non-experimental method with fried bilih fish from Sumpur and Paninggahan area as the samples. Research parameters are chemical characteristic in form of proximate analysis, includes water, ash, fat, protein, and carbohydrate content; organoleptic characteristic in form of appearance, aroma, taste, and texture; and physical characteristic in form of hardness and fracturability. The result explains that Sumpur fried bilih fish is more preferred by panelist with the median value in appearance, aroma, taste, and texture is 9 or strongly favored. The Sumpur fried bilih fish nutrient content is consisting of 11.994% water content, 4.978% ash content, 42.067% protein, 39.47% fat, and 1.49% carbohydrate. Paninggahan fried bilih fish nutrient content is consisting of 11.237% water content, 6.818% ash, 41.333% protein, 39.108% fat, and 1.5% carbohydrate. The texture between Sumpur and Paninggahan fried bilih fish is not significant, both of them are crispy and dry. Paninggahan fried bilih fish has the highest hardness test and highest fracturability level than Sumpur friend bilih fish. The conclusion is fried bilih fish from Sumpur more prime based on proximate dan organoleptic test compared to fried bilih fish from Paninggahan which is cause by prosessing different.

Comment [MC1]: Before aim, small word about nutritional importance of fish.

Keywords: *Fried Fish, Mystacoleucus padangensis Blkr, Bilih Fish, Nutrient Content, Organoleptic.*

1. INTRODUCTION

Sumatera island in Indonesia and the islands in nearby areas has about 570 species of freshwater fishes and 46 of the species are endemic fish (Syandri, 1998) [1] . One of endemic fish from Sumatera that live in Singkarak Lake, West Sumatra Province is *bilih fish* or *Mystacoleucus Padangensis* Blkr. According to physical and chemical parameter value of the waters, Syandri *et.al*. (2011) [2] categorizes the water quality of bilih fish habitat in Singkarak Lake into 5 categories, Lower Course of Sumpur River, Upper Course of Ombilin River, Lower Course of Paninggahan River, Lower Course of Sumani River, and middle area of the water lake. The water stream from northwest area of Singkarak across the volcanic rock and the lower course is in Sumpur area. The river streams in west area of Singkarak Lake across the limestone and the lower course is in Paninggahan area.

Bilih fishes popular for specific delicious taste and many people from local or international like this fish in form of dry fish or processed. The habitat of this fish is only existing on Singkarak Lake and the fish value of the market gradually increases annually (Berkademi, 2011) [3]. According to this demand, most of the fisherman catches the bilih fish in some areas around the Singkarak Lake. Sumpur and Paninggahan regency is the nearby area of Singkarak Lake and many fishermen found bilih fish in this area, includes the bilih fish processing.

The fresh bilih fish is a fish that lacks of quality degradation, because its small fish characteristic. Therefore, the fish processing of bilih fish by the local society is in form of frying or smoking. A frying processing is one

of popular process because the cooking process is time-saving, produce a crispier taste, create an interesting color, and increase nutrient fish value.

The nutrient is the parameter that determined the processing product visibility for consumption. The nutrients that required for human body are carbohydrate, protein, fat, vitamin, mineral, and water. According to the previous study, the fried bilih fish nutrients per 100 grams are consisting of 19.86 gram of protein, 1.52 gram of calcium, 0.36 gram of magnesium, 6.2 gram of fat, and 1.05 gram of phosphor (Syandri, 2008) [4].

Most of the previous research in chemical, organoleptic, and physical characteristic of bilih fish practiced by random sampling and not yet correlating with the influence of fish processing for each area relates to the bilih fish characteristic. For that reason, research in physical, organoleptic, and chemical of bilih fish should practiced by a comparison between fried bilih fish from Tanah Datar Regency and fried bilih fish from Solok Regency.

2. RESEARCH METHODOLOGY

2.1 Time and Research Location

The research performed in February-March 2019. Chemcial tests in form of proximate and calcium test conducted in Food Technology Laboratory, Faculty of Engineering of Pasundan University and Instrumentation Laboratory of Faculty of Agricultural Technology in Andalas University. Scoring test performed in Fishery Productss Processing Laboratory of Fishery and Marine Science of Universitas Padjadjaran. Physical test practiced in Testing Laboratory of Faculty of Agricultural Industrial Technology, Universitas Padjadjaran

2.2 Tools and Material

Tools used in this research are frying pan, stove, plate, paper napkin, spatula, plastic wrap, styrofoam plate, scoresheet, pen, and sticky note. The materials are fresh bilih fish or *Mystacoleucus padangensis Blk* from Indonesia Country Sumpur and Paninggahan district, fried bilih fishes from Sumpur and Paninggahan district, salt, and frying oil.

2.3 Research Method

This research carries a non-experimental research method, an observation research without a manipulation to the variable (Raacke, 2014) [5]. There are four samples in this research, fresh and fried bilih fishes from Sumpur area and fresh and fried bilih fishes from Paninggahan area. There are three parameters during fried bilih fish observation, chemical characteristic in form of proximate test, organoleptic in form of scoring and physical test, and observation in fresh bilih fish for chemical parameter.

Comment [MC2]: How many units in one sample. The numner of sample is not representative.

2.4 Data Analysis

Data analysis proximate result from form of water content, ash content, protein, fat, and carbohydrate and the calcium test result perform with descriptive analysis from previous study comparison, crispy fish standard based on SNI (Indonesian National Standard), and the result of proximate test of fresh bilih fish.

Physical characteristic tests for fried bilih fish correlates with the texture result, specifically with the hardness and fracturability. Hardness tests description of each sample explained after generating the result of laboratory data onto the descriptive analysis.

Scoring tests completed with four parameters test from the sample, appearance, aroma, taste, and texture. The scale is one to nine. The data analysis carries out the Mann-Whitney U Tests. If the sample is more than 20 samples, then normal variable formula Z-standard applied, that is:

$$Z = \frac{U - \frac{n_1 n_2}{2}}{\sqrt{\frac{n_1 n_2 (n_1 + n_2 + 1)}{12}}}$$

Remarks:
Z = standard normal variable
U = Test statistic
n1 = Number of sample member 1
n2 = Number of sample member 2

Decision-making performed with significant degree 0.05 (5%) with accepted Ho criteria if Zcount < Ztable. Mann Whitney test calculation process supported with software IBM SPSS statistic. Then, Bayes method analysis conducted to know the characteristic priority (appearance, aroma, taste, and texture) and

considered as the most important assessment by the panelist for fried bilih fish quality. Bayes equation is as follows:

$$\text{Total value}_i = \sum_{j=1}^{M} ij \text{ value (j criteria)}$$

Remarks:
Total Value $_i$ = Final of total value from i-alternative
ij value = Value from i-alternative in j criteria
j criteria = interest level (weight) j-criteria
i = 1,2,3,…n; n = alternative number
j = 1,2,3,…m; m = criteria number

3. RESULT AND DISCUSSION

3.1 Proximate Analysis

Proximate analysis will explore the change of nutrient values between chemical composition of fresh bilih fish and processed bilih fish and to compare the nutrient between Sumpur and Paninggahan area processed bilih fish. Chemical composition analysis is consisting of water content, ash content, protein content, fat content, and carbohydrate content. The proximate analysis for fresh bilih fish explained in Table 1 and the proximate analysis of Sumpur and Paninggahan fried bilih fish is in Table 2.

Table 1. Proximate Analysis Result of Fresh Bilih Fish

Sample Code	Proximate Analysis Result of Fresh Bilih Fish				
	Water Content (%)	Ash Content (%)	Protein Content (%)	Fat Content (%)	Carbohydrate Content (%)
Sumpur	74.71	4.2	8.99	2.57	9.54
Paninggahan	73.57	4.11	7.51	3.79	11.02

Table 2. Fried Bilih Fish Proximate Analysis Result

Sample Code	Fried Bilih Fish Proximate Analysis Result				
	Water Content (%)	Ash Content (%)	Protein Content (%)	Fat Content (%)	Carbohydrate Content (%)
Sumpur	11.994	4.978	42.067	39.47	1.49
Paninggahan	11.237	6.818	41.33	39.108	1.5

3.1.1 Water Content

The water content percentage of fresh bilih fish test of Sumpur area is 74.71% and Paninggahan fresh bilih fish percentage is slightly low, 73.57%. According to the test result of fresh bilih fish from Sumpur area and Paninggahan, then a comparison of percentage of these two fresh fishes is almost similar percentage. Suwetja (2011) [6] explained that the water content of fish body is various, either for every fish species or individual fish in identical types. Consequently, there should be a significant probability of water content differences between the samples, even these two samples is in mutual habitat and an identical species.

The water content test result for fried bilih fish in Sumpur and Paninggahan area is 11.994% from Sumpur area and 11.237% for fried bilih fish in Paninggahan. Bilih fish in Sumpur area has higher water content percentage than Paninggahan area because the fish does not initiate into sun cured process, while the Paninggahan bilih fish has sun cured process of 4-6 hours before entering the frying process. According to crispy fish standard (SNI) from BSN or Indonesian Standardization Body (2013) [7], maximum water content of fried fish is 5%. The data explained that this fried bilih fish has higher water content than the standard of crispy fish with difference percentage is more than 6%.

The comparison results in fresh and fried bilih fish from Sumpur and Paninggahan based on proximate test result is in form of water content degradation, because an increasing in temperature made oil absorb into the empty space of food material and water content became evaporate (Paramitha, 2012) [8] .

3.1.2 Ash Content

Ash from fresh bilih fish test of Sumpur is 4.2% and ash content for fresh bilih fish of Paninggahan is 4.11%. Ash content value of Sumpur and Paninggahan is around in similar range. Minor differences in ash content of the two areas is caused by the food availability and consumes by the fish in their respective habitat and mineral difference that contain in waters then absorb into the fish body.

Ash content percentage of Sumpur fried bilih fish is 4.97% and ash content of Paninggahan fried bilih fish is quite higher, 6.81%. The water content test result from Sumpur and Paninggahan fried bilih fish explained that the percentage comparison number for ash content between these fried fish has close range value. According to SNI of crispy fish from BSN (2013), maximum ash content value of fried fish is 12%. The data shows the two fried bilih fishes has pass quality control percentage for ash content in accordance with the crispy fish requirement and the difference is more than 6% from the maximum requirement.

The comparison results from ash content test of fresh and fried bilih fish from Sumpur and Paninggahan area shows similarity result, there are an increment in ash content percentage before and after frying process. During the sun cured and fresh bilih fish process, salt added as a natural preservative and flavoring. Salt in fish processing increases the mineral content of the food and cause an increment in ash content.

3.1.3 Fat Content

Bilih fish is low-fat fish category because the fat is <5%. The bilih fish fat consists of triglyceride compound and fatty acids. Sumpur fresh bilih fish has 2.57% fat and Paninggahan fresh bilih fish fat is 3.79%. Paninggahan bilih fish has higher fat content than Sumpur bilih fish. Fat differences between the two areas of the fish caused by a food variance in their respective habitat.

Sumpur fried bilih fish has 39.47% fat and Paninggahan fried bilih fish fat is 3.79%. According to the comparison of two areas, then the fat content of fried bilih fish from Sumpur and Paninggahan has close range value, but Sumpur fried bilih fish has higher fat content than Paninggahan bilih fish. According to crispy fish standard (SNI) from BSN or Indonesian Standardization Body (2013), maximum fat content in fried fish is 30%. The data shows the fat content percentage of two fried bilih fishes is above of the quality requirements threshold.

According to the test result of the fresh and fried bilih fish from Sumpur and Paninggahan, there is an increment in fat content of bilih fish that goes through the frying process. An increment in fat content percentage appears after the fish has go through the frying processing, explaining an oil absorption event into the fish and increase the fat more than 30%. An increment of fat content after the frying process of fresh bilih fish caused by an oil absorption into the fish flesh. An increment of fat content of Sumpur bilih fish caused by frying process which directly occurs after the gutting, cause more oil absorbs into the cavity of fish flesh that previously filled by the water. Additionally, sun cured practice for 4-6 hours of Paninggahan bilih fish is to reduce the water content first and then cooked with frying process that cause less oils absorb into the fish.

3.1.4 Protein Content

Fish is one of main animal protein source, because fish has a high protein content, a complete essential amino acid, high digestibility and contain omega-3 that mostly required for human body (Aberoumand 2014) [9]. The test result explained that the percentage of fresh bilih fish protein content from the Sumpur area is 8.99% and Paninggahan fresh bilih fish protein content is 7.51%. According to the fresh bilih fish comparison from two areas, then Sumpur fresh bilih fish has higher protein content than Paninggahan fresh bilih fish. Small differences for protein content contain in the two samples caused by the food material influences that exist in each fish habitat.

Sumpur fried bilih fish has 42.06% protein content and Paninggahan fried bilih fish has 41.33% protein content. According to the comparison between these two areas, then Sumpur fried bilih fish has higher protein content than Paninggahan bilih fish. According to BSN (2013), minimum protein content for fried fish is 15%, for that reason fried bilih fish from research location has a good quality.

Fresh bilih fish from Sumpur or Paninggahan will has an increment in protein content percentage after undergo the frying process. Causal factor of protein content percentage after the fish undergo the frying process caused by a low water content inside the fried bilih fish than fresh bilih fish that caused the protein content percentage is higher after the fish is in form of dried fish than fresh fish (Permata and Murtius, 2010)

[10]. Protein content measurement from samples influenced by the number of water content lost from material. A higher protein content value measurement then a percetnage of water content lost will high. Sebranek (2009) [11] stated that the protein content measured during the test is depend on the number of additional material and influences of water content. Protein content percentage from the fish after the frying process (Sumiati, 2008) [12] should decrease about 5% from a total of water content that caused from high temperature treatment. However, the frying process reduce the water content and cause the protein content has a higher percentage.

3.1.5 Carbohydrate Content

Carbohydrate contains in the fish flesh consist of glycogen, glucose lactic acid, and other carbohydrate compounds (Khomsan, 2004) [13]. The test results explained that the percentage of fresh bilih fish carbohydrate content of the Sumpur area is 9.54% and Paninggahan fresh bilih fish carbohydrate content is 11.02%. Based on comparison between two fresh bilih fish from two areas, then it can conclude that there is no significant difference between carbohydrate content of Sumpur and Paninggahan fresh bilih fish. The difference is only 1.48% for Paninggahan fresh bilih fish which has higher carbohydrate content then Sumpur fresh bilih fish.

The carbohydrate content test result from Sumpur and Paninggahan fried bilih fish with by difference measurement presents 1.49% for Sumpur fried bilih fish carbohydrate content and 1.5% for Paninggahan fried bilih fish carbohydrate content.

According to the graphic of comparison between carbohydrate content of fresh bilih fish and fried bilih fish in Sumpur and Paninggahan area, it can conclude that proximate test result from carbohydrate content is fairly significant before and after frying process. Maillard reaction caused carbohydrate content degradation. Fish processing that practices high temperature, such as frying and oven, will cause Maillard reaction, an interaction between carbohydrate with primary amines group that produce a browned color (Winarno, 2008) [14].

3.1.6 Calcium

Calcium test result for Sumpur and Paninggahan fried bilih fish shows a significant comparison, Sumpur bilih fish has 86.03 mg/100g calcium content and Paninggahan bilih fish is 95.08 mg/100g of calcium content the shows 9.05mg/100g difference.

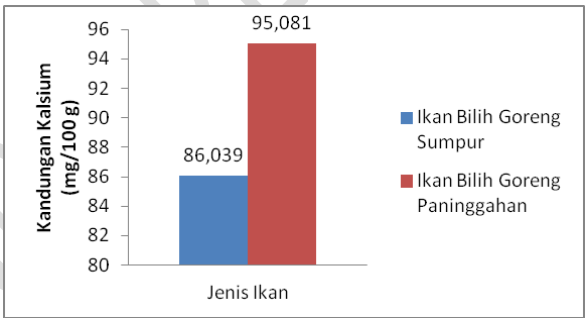

Figure. Calcium Comparison Between Fried Bilih Fish of Sumpur and Paninggahan

As a result, calcium in bilih fish habitat influence the calcium content contains in bilih fish. Paninggahan bilih fish has a higher calcium content than bilih fish from Sumpur area cause by a difference of river basin in these two areas. Paninggahan River stream passing the limestone area with higher calcium content and Sumpur River stream across the volcanic rock.

3.2 Scoring Test

Aim of scoring test is to know panelist assessment from organoleptic characteristic of Sumpur and Paninggahan fried bilih fish. The assessments are consisting of appearance, aroma, taste, and texture. The scoring test scale is 1-9 (1 is very unreasonable, 3 is unreasonable, 5 is neutral, 7 is reasonable, and 9 is very reasonable) and the reasonable threshold is 5.

3.2.1 Appearance

Appearance observation is about external appearance of the fish, in form of product cleanliness, uniformity, completeness, and brightness of specific color of the product. Fried bilih fish from Sumpur area appearances are golden and bright color in fish fin and fish tail. The body and tail form are not complete because of frying and packaging process. The fish size average is above 6.5cm and the size variance is similar with the body form is thick. Bilih fish from Paninggahan area has silver color in fin and tail area, the tail form is not complete, caused by frying and packaging process, the body color is fairly bright and fresh, the size is about 5.5 cm, and the body is thinner than Sumpur fried bilih fish. Average of statistic analysis result for fried bilih fish appearance from Sumpur and Paninggahan explained in Table 3.

Table 3. Average Appearance in Sumpur and Paninggahan Fried Bilih Fish

Sample	Appearance
Sumpur Fried Bilih Fish	8.1[a]
Paninggahan Fried Bilih Fish	7.2[b]

Remarks: Number that followed by alphabet explains a significant difference according to Mann-Whitney Test with 5% of standard test.

According to the panelist assessment result for Sumpur fried bilih fish, the average value is 8.1 and Paninggahan bilih fish is 7.2. The number explained that the panelist considered these two types of fishes is reasonable or a good food. According to the statistic analysis result with Mann-Whitney test with 5% standard test, there is a significant difference in between the appearance of Sumpur and Paninggahan fried bilih fish. The most remarkable reason from panelist is fried bilih fish from Sumpur appearance than Paninggahan.

3.2.2 Aroma

Aroma from fried fish has specific characteristic and adopted the volatile compounds content based on the aroma producer the exist in the fish and influence by fish processing that applied to the product. Sumpur fried bilih fish has a direct process that cause the fish has a specific characteristic in fresh aroma while Paninggahan fried bilih fish process is begin with sun cured then put into the frying pan that create a little of salty smell. Average value for Sumpur and Paninggahan fried bilih fish shown in Table 4.

Table 4. Avarage of Aroma Characteristic for Sumpur and Paninggahan Fried Bilih Fish

Sample	Aroma
Sumpur Fried Bilih Fish	8.1[a]
Paninggahan Fried Bilih Fish	6.9[b]

Remarks: Number that followed by alphabet explains a significant difference according to Mann-Whitney Test with 5% of standard test.

Average value from panelist assessment for aroma of Sumpur fried bilih fish is 8.1 and Paninggahan fried bilih fish panelist value is 6.9. In relation with the scoring test scale, aroma range value from panelist shows the two aroma of bilih fish is affordable and good to eat. Statistic analysis with Mann-Whitney Test for 5% standard test presents these two bilih fishes has a significant aroma difference. Sumpur bilih fish consider by panelist has stronger aroma, fresh, and specific type than Paninggahan bilih fish. Sumpur bilih fish is superior than Paninggahan bilih fish because the Paninggahan bilih fish has sun cured first that make a direct contact with the air and generating oxidation process that change the fish aroma. In addition of oxidation process, a change of fish aroma caused by fat of phospholipids that cracked by enzyme and bacteria when the fish is death and turns into trimethylamine and produce a strong fishy smell (Sugiyono, 1996) [15].

3.2.3 Taste

The taste of two bilih fishes from different area has a slightly differences, because Sumpur bilih fish applied a direct frying process while the Paninggahan bilih fish has sun cured process for about 4-5 hours before fried

into the frying pan. Average value of panelist assessment for aroma of Sumpur fried bilih fish are 8.3 and Paninggahan fried bilih fish panelist mark is 7.2. In relation to the scoring test scale, taste range value from panelist shows the taste of fried bilih fish of Sumpur and Paninggahan is acceptable or good to eat. Average taste value of Sumpur and Paninggahan fried bilih fish explained in Table 5.

Table 5. Average of Taste Characteristic for Sumpur and Paninggahan Fried Bilih Fish

Sample	Taste
Sumpur Fried Bilih Fish	8.3[a]
Paninggahan Fried Bilih Fish	7.2[b]

Remarks: Number that followed by alphabet explains a significant difference according to Mann-Whitney Test with 5% of standard test.

In relation to the scoring test scale, taste range value of panelist shows the taste of fried bilih fish of Sumpur and Paninggahan is acceptable or good to eat. Statistic analysis with Mann-Whitney Test with 5% standard tests shows the fried bilih fishes from two locations has significant taste difference.

Sumpur fried bilih fish from panelist assessment considers has specific crispier taste fish than Paninggahan fried bilih fish. Sumpur fried bilih fish with a direct frying process has sweet taste than Paninggahan fried bilih fish. A delicious taste of the two samples after the fish processing caused by free amino acid that contains in the fishes. A sweet taste from Sumpur fried bilih fish influence by sucrose, monosaccharide, and disaccharide content (Winarno, 2008) [14]. Bitter taste of Paninggahan bilih fish could cause by alkaloid, such as caffeine, quinine, glycoside, ammonium, Mg, and Ca (Winarno, 2008) [14].

3.2.4 Texture

Fish with frying processing will have a drier characteristic and crispy, drier and crispier fish is good. Average value of Sumpur and Paninggahan fried bilih fish that examined by panelist explained in Table 6.

Table 6. Average Characteristic for the Texture in Sumpur and Paninggahan Fried Bilih Fish

Sample	Texture
Sumpur Fried Bilih Fish	8.4[a]
Paninggahan Fried Bilih Fish	8.2[a]

Remarks: Number that followed by alphabet explains a significant difference according to Mann-Whitney Test with 5% of standard test.

Average value of panelist assessment for texture of Sumpur fried bilih fish is 8.4 and Paninggahan fried bilih fish panelist value is 8.2. Based on scoring test scale, texture assessment range of panelist shows the texture of these two fishes is dry and crispy. Statistic analysis with Mann-Whitney Test for 5% standard tests explains the texture differences is not significant from texture of Sumpur and Paninggahan bilih fish. According to texture profile analyzer test, the result for Paninggahan fried bilih fish has higher hardness value than Sumpur fried bilih fish. Texture characteristic scoring test result is not significantly difference, probably the fish does not fry for the second times when presenting to the panelist. Re-frying process performed, because the fish original location is far from panelist assessment process. Consequently, during the transportation process, the fish put into the freeze and the fish freezing if not fried for the second times. This re-frying process probably causes the fish becomes crispy and has no significant difference between texture test by the panelist.

3.2.5 Decision-Making with Bayes Method

Bayes method adopted to decide and pick one from several available alternatives but produce an optimal result. Bayes method decision-making is measuring an opportunity for each decision. The measurement result in weight value of respective criteria explained in Table 7.

Table 7. Criteria Score Value for Fried Bilih Fish

Criteria	Criteria Weight
Appearance	0.12
Aroma	0.16

Taste	**0.58**
Texture	0.15
Total	1

According to score to value calculation result, then the highest criteria for panelist in selecting the fried bilih fish, significantly consider by the taste criteria with criteria weight value is 0.58, followed by 0.16 of aroma weight value, 0.15 of texture weight values, and the last is 0.12 for appearance weight value. Weight value data for each criterion explained that if the fried bilih fish taste is not favored by the panelist then the product will be rejected.

Moreover, couple comparison results data for appearance criteria, aroma, taste, and texture of fried bilih fish onto 20 panelists semi-professional with preferred level, shown in Table 8.

Table 8. Decision Matrix of a Product with Bayes Method that practice Mean Value

Sample	Criteria				Alternative Value	Priority Value
	Appearance	Aroma	Taste	Texture		
Sumpur Bilih	8.1	8.1	8.3	8.4	**8,260**	**0,531**
B. Paninggahan	7.2	6.9	7.2	8.2	7,300	0,469
Criteria Value	0,117	0.15	0.57	0.147	15,560	1

According to the calculation result with Bayes method, fried bilih fish from Sumpur is the highest alternative value which is 8.26 and Paninggahan fried bilih fish alternative value is 7.3. According all data result for appearance, aroma, taste, and texture criteria, fried bilih fish from Sumpur sample is more preferred by panelist than Paninggahan fried bilih fish.

3.3 Physical Test

Physical test in form of texture analysis for Sumpur and Paninggahan fried bilih fish are hardness and fracturability test. Average texture value for Sumpur and Paninggahan fried bilih fish from TPA analysis shown in Table 9 and 10.

Table 9. Texture Average Value for hardness of Sumpur and Paninggahan Fried Bilih Fish

Sample	Hardness (N)
Sumpur Fried Bilih Fish	3020.4
Paninggahan Fried Bilih Fish	4108.17

Table 10. Texture Avarage Value for Fracturability of Sumpur and Paninggahan Fried Bilih Fish

Sample	Fracturability (mm)
Sumpur Fried Bilih Fish	3.63
Paninggahan Fried Bilih Fish	2.44

Sumpur fried bilih fish hardness value is 3020.4 N and hardness of Paninggahan friend bilih fish value is 4108.17 N. According to hardness value then there is a hardness difference between Sumpur fried bilih fish and Paninggahan fried bilih fish test result. Paninggahan fried bilih fish has higher hardness value than Sumpur fried bilih fish. Hardness test result is similar with calcium test result, Paninggahan fried bilih fish has higher calcium content than Sumpur fried bilih fish that cause hardness Paninggahan fried bilih fish is higher than Sumpur fried bilih fish. Water content in fried bilih fish is also influence the hardness of the sample. Moreover, water content factor that contain in fried bilih fish is also influence the hardness level. Water content test result shows Paninggahan fried bilih fish water content has a lower percentage that cause by sun cured process during 4-6 hours. Low water content causes the fish has crispy and hard texture.

Fracturability is the test result from a product durability to counter an existing pressure. Fracturability value provide from Sumpur fried bilih fish is 3.63mm and Paninggahan fried bilih fish is 2.44mm. Fracturability

value result generated from the first peak that read in the first pressure. As a result, the fracturability level of Paninggahan fried bilih fish is higher than Sumpur fried bilih fish. Low water content in Paninggahan fried bilih fish cause the fish texture becomes crispy and fragile.

4. CONCLUSION

Based on research of comparison the characteristics of fried bilih fishs that are in one lake but different steams and processing method is obtained the best nutrient content from fried bilih fish is from Sumpur bilih fish. According to calcium test, the highest calcium content of bilih fish is 95.08 mg/100g, Paninggahan bilih fish. The decision-making result with Bayes method presented that Sumpur fried bilih fish more preferred by the panelist, because Sumpur fried fish has the highest priority or 0.531. According to scoring test result from panelist, both samples has good characteristic in aroma, taste, and texture. Physical test result for fried bilih fish has differences in hardness and fracturability parameter. Paninggahan fried bilih fish has the highest hardness test and highest fracturability level than Sumpur friend bilih fish but the crispiness not have many different.

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