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Quality Analysis of Probiotic Animal Food Products: A Test of Protein and Blood Fats

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Abstract. Dissemination on Bangka Island will be carried out at the UBB Probio_FM Technology Product Downstream Partnership activity for the Institutionalization of Community Enterprises based on Organic Agriculture. The dissemination program on Bangka Island is aimed at increasing the number of technology users on Bangka Island. Animal food products are one of the agricultural commodities that have high economic value, especially on Bangka Belitung Island. Animal food products are a source of protein, examples of animal food products include fish, chicken and duck meat, eggs, and beef. Catfish, tilapia, duck and broiler and laying duck farming businesses will be carried out in the MF activities of the 2022 design shop, with the aim of producing healthy food products. The results of farming activities such as fresh catfish, tilapia, eggs, chicken meat and ducks, will be used as further research samples to analyze the content of protein, fat and cholesterol. The purpose of this study is to analyze the content of cholesterol, protein, and blood fats in duck eggs, chicken and duck meat, and probiotic fish. Produce probiotic food products with labels containing protein, and fat values. The timing of the implementation of this research began in October and ended in December 2022. The research was conducted at the FPPB UBB Basic Laboratory. The form of research is laboratory research, using a random design method using several samples as a comparison of treatments, preparing samples, testing cholesterol and fat protein content, collecting data and analyzing data. The protein content obtained was duck 31.34%, duck eggs 1.229%, probiotic catfish 42.37%, and non-probiotic catfish 34.8%. The fat content obtained was duck meat 33.79%, duck eggs 46.21%, probiotic catfish 21.46%, and non-probiotic catfish 21.359%.

Keywords : Animal Food Products, Probio FM Technology, Protein Content, Fat Content.

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Introduction

Dissemination on Bangka Island will be carried out at the UBB Probio_FM Technology Product Downstream Partnership activity for the Institutionalization of Community Businesses based on Organic Agriculture. The dissemination program on Bangka Island is aimed at increasing the number of technology users on Bangka Island. Technology has been disseminated since 2017 on Bangka Island and currently there are 5 farmer groups or around 100 breeder farmers who have used technology. Farmers on Bangka Island benefit from the application of technology to cattle, ducks, chickens, and fish. This indicates that the application of UBB Probio_FM on Bangka Island is quite accepted by breeders. The number of technology users continues to grow, information related to the benefits of technology spreads through word of mouth among farmers, so that the use of technology is carried out independently by farmers based on information received from fellow farmers. To accelerate the dissemination of the use of this technology, it is necessary to carry out dissemination activities for the application of UBB Probio_FM on Bangka Island.

The price of animal food commodities on Bangka Belitung Island is relatively more expensive, the distribution of production inputs is influenced by weather factors so that the price of production inputs is relatively expensive. Not only that, the use of manufacturers' feed and medicines also has an impact on the quality and safety of the food products produced. If you look at it from a business aspect, this is an opportunity to be able to produce animal food products that are safe and healthy whole and halal and at competitive prices. Catfish, tilapia, duck and broiler and laying duck farming businesses will be carried out in the MF activities of the 2022 design shop, with the aim of producing healthy food products. The results of aquaculture activities such as fresh catfish, tilapia, eggs, chicken meat and ducks, will be used as further research samples for analysis of protein, fat and cholesterol content. The results of previous studies have shown that the use of probiotics in feed and drinking water is able to improve the quality of meat and egg products, that is lowering cholesterol and fat levels.

Protein in the body of fish is the compound whose content is the highest after water. Protein plays an important role in the structure

and function of the body, such as growth and reproduction. Fish are not able to synthesize proteins, amino acids from inorganic nitrogen compounds (Ramlah et al, 2016:44). The quality of protein is determined by the type and proportion of amino acids it contains. All types of animals, except gelatin, are complete proteins (Almatsier, 2004:87).

Cholesterol is a precursor of all steroid hormones and bile acids as well as components of the plasma membrane. The liver is the main organ of cholesterol metabolism, generally showing the greatest response to cholesterol-containing foods. There are 2 sources of cholesterol, namely endogenous and exogenous cholesterol contained in feed ingredients. Kritchevsky (2006) reported that the content of cholesterol and vitamin A in duck eggs depends on the nutrition of the feed they consume. Cholesterol in the egg is part of the yolk. Yolk production occurs in the liver and is stimulated by estrogen. The yolk precursor is then transported from the liver through blood to the ovarian follicles. The yolk component of about 65% is a complex lipoprotein. Egg yolk lipids consist of 70-75% triglycerides, 20-25% phospholipids, and 40% are cholesterol. Cholesterol in ducks and geese is higher than cholesterol levels in chickens (Safitri, 2007).

Montgomery et al. (1993), stated that fat in the form of triacylglycerol is the main form of energy storage. The body has specially functioning mesenchymal cells, adipocytes, which are solely used to store fat. Excessive accumulation of fat in the body is associated with an increase in the number of adipocytes due to the accumulation of triacylglycerol. Fats are oily or fatty organic compounds that do not dissolve in water, but are soluble in ether, chloroform and benzene (Anggorodi, 1994). Fats can be divided into two groups, the first is a group of simple triglycerides or neutral fats found under the skin and body cavity which is a source of energy storage. The second group is compound fats such as phospholipids which are an important part of the body in metabolic processes (Muchtadi and Sugiyono, 1992).

Experimental

The form of research is laboratory research, using a random design method using several samples as a comparison of treatment, preparing samples, conducting protein and fat con-

tent tests, collecting data and analyzing data.

Tools and Materials

The equipment used in this research is kjeldahl flask, beker glass, erlenmeyer, petri dish, distillation, oven, soxhlet apparatus, blender, analytical balance, electric heater,. The ingredients used are catfish, duck eggs, ducks, filter paper, selene solution, SeO_2 , K_2SO_4 , $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$, bromocresol green 0.1%, methyl red 0.1%, H_3BO_3 2%, boric acid, HCL 0.01 N, NaOH 30%, HCL 2%, H_2SO_4 , hexane, acetone, alcohol, diethyl ether, aquades, chloroform, acetate anhydric.

Sample Preparation

Catfish, duck eggs, and duck meat are obtained from animal products with probiotics in collaboration with the MF team at Universitas Bangka Belitung. Furthermore, the sample obtained is washed with water and set aside based on the analysis to be carried out.

Protein Test

The working procedure of the protein content test is carried out by the Kjeldahl method. After weighing the sample of 1 g then put it into round-bottom flask, 1 g of a mixture of CuSO_4 and 3 g of K_2SO_4 and 25 ml of H_2SO_4 98% was added and then heated on a heating matel. Let the sample cool, then dilute it with 50 ml of aquades and put it in distillation. Then 50 ml of the cooled solution just put it in the distiller add 40 ml of 40% NaOH and 5 drops of pp indicator. Distill approximately 10 minutes, as a reservoir use 20 ml of 2% boric acid solution that has been mixed with a PP indicator of 5 drops. Titration with 0.1 N HCL solution. The titration was stopped when the color change occurred.

Fat Content Test

Analysis of Fat Content by the Soxhlet Method (AOAC, 1990) Filter paper is dried in a 105°C oven for 1 hour, then input in a desiccator after 15 minutes weigh the weight to constant (a gram). The sample was weighed ± 10 grams (b grams) of the sample then wrapped tightly with paper of known weight and tied with a rope that could not absorb the fat and then put in a soxhlet

extraction device. The sample was extracted for 3 hours with n-hexane until clear/colorless after completion of extraction the sample was taken then dried in a 105°C oven for at least 1 hour then cooled in a desiccator, after 15 minutes weigh until the weight is constant (c grams).

Protein Content

Analysis of sample protein data using formulas:

$$\%N = \frac{(A - B \times N \text{ HCL } X \times 14)}{\text{mg Sample}} \times 100\%$$

Protein content = %N x Conversion factor

Information:

A = sample titration

B = titration of blanks (Hafiludin, 2011)

Fat Content

The percentage of crude fat is calculated using the calculation:

$$\text{Fat Content} = \frac{w1 - w2}{w2} \times 100\%$$

Information:

W= weight of empty flask (g),

w1= weight of flask + fat extract (g),

w2= sample weights (Ramlan, 2016).

Results and Discussion

Protein Test

This test is carried out to determine the protein levels contained in some animal food products quantitatively with the kjeldahl method where this method can determine the total nitrogen content as rough as possible. The determination of protein levels using the Kjeldahl method is basically divided into three stages, namely: the digestion stage, the distillation stage, and the titration stage (Sudarmadji, 2003). The following is a test of the protein content of several animal food products with Probio FM_UBB probiotics.

Table 1. Food Product Protein Test Results

Product	Volume (mL)	Percentage (%)
Blanks	0.25	
duck	76.35	31.34
Duck Eggs	10	1.23
Catfish Probiotics	48.65	42.37
Non Probiotic Catfish	40	34.8

The protein content obtained was duck 31.34%, duck eggs 1.229%, probiotic catfish 42.37%, and non-probiotic catfish 34.8%. The results obtained show that the protein content contained in duck meat and catfish is categorized as high, while in duck eggs it is categorized as low. Based on research conducted by Kim et al. (2006) the protein content of duck meat ranges from 18.6-20.1%. According to Madyawati (2021) the protein content of duck eggs on average reaches 12%. The protein content of catfish has a high protein content of more than 16.375% (Ayeloja et al., 2013). From the test results, it shows that the probiotic le protein is higher than that of non-probiotic catfish. This is due to catfish feed affecting the content of proteins contained.

Fat Test

The extraction of fats with an organic solvent i.e. n-hexane. Fat is separated from the solvent by evaporating the The method used in the analysis of the fat content of food products is the soxhlet method. The principle of soxhlet is extraction using an always-new solvent so that a continuous extraction occurs with a constant amount of solvent in the presence of a reverse coolant. The

principle of crude fat analysis by the Soxhlet method is solvent by heating (Nurcholis 2013). The following is a test of the fat content of several animal food products with Probio FM_UBB probiotics.

The fat content obtained was duck meat 33.79%, duck eggs 46.21%, probiotic catfish 21.46%, and non-probiotic catfish 21.359%. The results obtained show that the fat content contained in duck meat, duck eggs and catfish is categorized as high. From the results, it is shown that duck eggs have the highest fat content. According to Kim et al. (2006) the fat content in duck meat ranges from 2.7-6.8%. Research conducted by Madyawati (2021) shows that the fat content in duck eggs reaches 10%. The fat content in catfish ranges from 2-15% (Sikorsi, 2003).

Conclusion

Based on the results of research conducted protein levels obtained, namely ducks 31.34%, duck eggs 1.229%, probiotic catfish 42.37%, and non-probiotic catfish 34.8%. Protein levels with probiotics in catfish were higher than those without probiotics. Meanwhile, the fat content obtained was duck meat 33.79%, duck eggs 46.21%,

Table 2. Food Product Fat Test Results

Produk	W1 (g)	W2 (g)	W3 (g)	Percentage (%)
Duck	10	171.100	174.479	33.79
Duck Eggs	10	171.102	175.723	46.21
Catfish Probiotic	10	178.2440	180.39	21.46
Non Probiotic Catfish	10	178.2365	180.3724	21.359

probiotic catfish 21.46%, and non-probiotic catfish 21.359%. The results obtained show that the fat content contained in duck meat, duck eggs and catfish is categorized as high. Duck eggs have the highest fat content

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Author Contributions

In conducting this research, the team's contribution included Widia as the person in charge of supervising the course of research and conducting data analysis, Faizah contributing to conducting protein tests, Tutinah contributing to conducting fat tests, and Robby Gus Mahardika as facilitators in this research.

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