RESEARCH ARTICLE OPEN ACCESS

EVALUATION OF ORGANIC PROTEIN NUTRIENTS AS BROILER FEED INGREDIENTS

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Abstract:

Organic protein is a by-product of monosodium glutamate, liquid, and dark brown fermentation. This study aimed to determine the results of the evaluation of organic protein nutrition as a feed ingredient and its ability to inhibit pathogenic and non-pathogenic bacteria. Research material using organic protein from PT. Daesang Ingredients Indonesia. The laboratory experiment research method was carried out for one month. The research variables were proximate analysis, viscosity and pH analysis, and bacterial inhibition test. The data obtained were analyzed descriptively. The results showed that organic protein contains nutrients: namely dry matter 55.14%, ash 4.80%, crude protein 40.10%, crude fat 0.30%, crude fiber 0.07%, and GE 1445 kcal/ kg, a viscosity of 30 mPas, pH 2.88 and has an inhibitory power against Escherichia coli, Salmonella sp and Lactic Acid bacteria of 0.25 mm, 0.33 mm and 0.75 mm. This study concludes that organic protein has the potential as a constituent of poultry feed ingredients because of its good nutritional and low pH content. However, organic protein has not been able to inhibit pathogenic and non-pathogenic bacteria.

Keywords **—Organic Protein, Proximate Analysis, Viscosity, Ph, And Bacterial Inhibition.**

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I. INTRODUCTION

Feed is one of the crucial factors in supporting the livestock business. The cost of feed, especially poultry, reaches 60-70% of the total cost of production. Therefore, the cost of producing feed is one of the keys to success in broiler farming. Protein sources are one of the constituent components of poultry feed. Proteins are used in the process of growth and repair of damaged tissues. Protein-source feed ingredients have a relatively higher cost than other feed ingredients because the availability of protein-source feed ingredients in Indonesia has yet to be met to suffice imports from other countries.

To reduce dependence on imports of protein source feed ingredients, utilize by-products from the industrial processing of monosodium glutamate (MSG) cooking seasoning. The manufacture of MSG itself produces liquid waste with a high organic matter content, with the potential as a medium for the growth of microorganisms. Organic protein is produced from processing MSG cooking seasoning products that have undergone a fermentation process, are liquid, and have a brown color. Organic protein is one of the single-cell

proteins because, in its processing, it utilizes microorganisms that can degrade organic matter to have good nutritional content. [14] single-cell proteins have an amino acid content resembling the amino acid content of the fish meal. In line with the opinion of [13] other advantages of single-cell proteins such as the high content of B-complex vitamins and amino acids so that they can become substitutions for protein sources ranging from soybean meal and fish meal. Judging from the advantages above,

This study aims to evaluate the nutrition of organic proteins and their ability to inhibit pathogenic and non-pathogenic bacteria so that they are suitable for use as poultry feed ingredients.

II.RESEARCH MATERIALS AND METHODS

A.Research Materials and Methods

This study used organic protein derived from by-products of the Monosodium Glutamate (MSG) cooking seasoning processing industry produced by PT. Daesang Ingredients Indonesia. This research method is a laboratory experiment carried out for one month to test the organic nutrient content of proteins using proximate analysis, Viscosity, and pH tests using a viscometer and pH meter, as well as bacteria inhibitory tests using the well method.

B. Research Procedure

1.Protein Organic Nutrient Content Test

Proximate test methods (BK, Abu, PK, LK, SK, and gross energy) according to the methods used at the Sucofindo Laboratory Surabaya, Indonesia.

2.Organic Viscosity and acidity levels of proteins

The viscosity level of organic protein can be determined by inserting organic protein into a beaker glass and then testing using the NDJ-5S Digital Viscometer tool. Meanwhile, to find out the acidity level using a Digital pH meter.

3. Inhibition Test Against Bacteria

Organic protein with a concentration of 100% was tested for inhibition of bacterial growth by following a method according to [8], which has been modified:

1. The diluted bacteria are by the medium for growth by mixing one ose suspense of the test bacteria (BAL, Salmonella sp, and Escherichia coli) into a test tube containing NaCl solution and standardized according to a concentration of 0.5 Mc Farland.
2. Diluted bacteria are applied to the agar medium.
3. Holes are made around the agar medium that has been given bacteria.
4. Inserted protein organic matter with micropipettes into each hole in the agar media

   Incubated with an incubator for 24 hours at 37°C.
5. Observed and measured the bright/clear zone (Clear zone) visible around the hole using a caliper.

B. Variables

The variables observed were proximate tests (BK, Ash, PK, LK, SK, and GE), Viscosity, pH, and inhibitory power of bacteria from organic proteins against pathogenic bacteria (Salmonella sp and Escherichia coli) and their response to non-pathogenic bacteria (BAL).

C. Data Analysis

The data obtained in this study were analyzed descriptively.

III. RESULTS AND DISCUSSION

A. Organic Proteins

Organic protein is a trademarked name derived from the by-product of monosodium glutamate produced by PT Daesang Ingredients Indonesia. Organic proteins have a characteristic liquid shape, blackish color, and characteristic odor. As for the organic appearance of the protein can be seen in figure 1.

Figure1. Organic Protein

Organic protein is part of a single-cell protein because it is processed through a fermentation process using microorganisms so that it can degrade organic matter and has excellent nutritional content. Single-cell protein (PST) was first discovered in 1966, defined as a source of protein derived from yeast, bacteria, and algae. It can be used as an alternative feed protein source[10]. Single-cell protein can be used as an alternative in feed preparation compared to animal and vegetable protein because the need for single-cell protein growth does not depend on the season, so it can be produced throughout the year. [11] single cell protein content of approximately 60%, low fat, B-complex vitamin source and has a complete amino acid composition.[1] sources of microorganisms in the manufacture of single-cell proteins, namely Brevibacterium sp, Acromobacter delegate, Aeromomonas hydrophilic, Bacillus sp, Methylophillus sp, Cellulomonas sp, Methylomonas sp, Acinetobacter calcoaceticus, Pseudomonas sp, Rhodopseudomonas sp, Lactobacillus sp, and Flavobacterium sp.

B. Organic Protein Food Content

The results of the organic protein proximate test can be seen in Table 1.

Table 1. The content of food substances in organic protein

Food substances	Sum
Dry matter (%)	55,14
Abu (%)	4,80
Crude protein (%)	40.10
Crude fat (%)	0,30
Crude fiber (%)	0,07
GE (kcal/kg)	1445

Description: Proximate Test Analysis Results at Sucofindo Laboratory Surabaya Indonesia (2020)

Assessment of the quality of the content of food substances can be done using the method of proximate analysis. The results of the proximate test on organic protein showed dry matter at 55.14%, ash at 4.80%, crude protein at 40.10%, crude fat at 0.30%, crude fiber at 0.07%, and GE 2002.26 kcal/kg. [12] explained the content of food substances from the fermented mother liquor: dry matter 28% and crude protein 69%. [5] protein composition consist of amino acids that act as building agents, and a significant enough protein content can positively impact the effects of good nutritional value. Organic protein is a single-celled protein with a high protein sourced from one-celled microorganisms, bacteria, and yeast. The high protein content in organic protein is because organic protein is a by-product of monosodium glutamate, which has previously undergone fermentation using microbes. In addition, the glutamic acid content in monosodium glutamate also affects the amount of protein produced in organic proteins. [15] Glutamic acid is included in non-essential amino acids, which are acids that are one of the natural constituent components of almost every food ingredient contained in high protein. [20]

stated that other protein sources could be produced through single-cell proteins derived from microorganism cells and fructose and glucose are one of the nutrients needed in the process of microorganism growth. In line with[4],the manufacture of monosodium glutamate occurs through a microbial fermentation process using molasses or molasses that contains organic acids, amino acids, nitrogen compounds, and others.

C. Viscosity and pH of Organic Proteins

Table 2. Viscosity and pH of Organic Proteins

Sample	Viscosity	pH
Organic Proteins	30 mPas	2,88

Description: Viscosity and pH test results at the Faculty of Nutrition and Animal Feed LaboratoryAnimal Husbandry Universitas Brawijaya Malang (2021)

Organic protein is a fermented product in a liquid form derived from the processing of monosodium glutamate cooking seasoning. Organic protein can be one of the sources of feed ingredients as a source of protein that can be used in the preparation of poultry feed. Organic proteins that have liquid physical properties need to be tested for Viscosity which aims to determine the Viscosity of the material. [3] explain that cannabis is defined as the nature of a liquid affiliated with the constraints of a fluid flowing. The higher the viscosity level in the liquid, the greater the force required to flow at a certain speed.

Analysis of the organic Viscosity of proteins in this study using the NDJ-5S digital viscometer tool. The results of the viscosity analysis can be seen in Table 2, where organic proteins have a viscosity of 30 mPas. The property of resistance to the circulation of a material that has the form of liquid, paste, gel, or slurry can be interpreted as Viscosity. Products containing lactic acid and other total dissolved solids can influence Viscosity [9]. As is known, organic protein is a by-product of processing monosodium glutamate (MSG) cooking seasoning products, which uses molasses raw materials in their processing. Molasses comes from the by-products of processing the cane sugar industry, which contains compounds such as glucose, fructose, sucrose, and other carbohydrates. Sucrose content can increase Viscosity or Viscosity [16].

pH can be called the degree of acidity used to measure a solution's acidity level. The results of the analysis of the organic pH of proteins can be seen in Table 2, where the resulting value reaches 2.88. From the results observed, organic proteins are acidic.[19] explained that an overhaul of acid compounds from the metabolism of lactic acid bacteria caused a decreased pH. Hence, the final result produced H + ions. [7] fermentation process using lactic acid bacteria have characteristics, namely the presence of organic acids accompanied by a decrease in pH.

D. Bacterial Inhibitory Power Against Organic Proteins

Table 3. Bacterial Inhibitory Power Test Results

Concentration solution (%)	Bacteria	Bening Zone (mm)
Organic Protein 100	Escherchia coli	0,25
	Salmonellasp	0,33
	BAL	0,75

Description: Results of Bacterial Inhibitory Power Test in Plant Disease Pest Laboratory, Faculty Agriculture Universitas Brawijaya Malang (2021).

The inhibitory power test is used to identify the area of resistance of an antimicrobial substance to microorganisms[2]. The results of testing the inhibitory power of bacteria against organic proteins can be seen in Table 3, wherein the test lactic acid bacteria have the largest clear zone. [18]

calcified the inhibitory response of bacterial growth based on the inhibited zone, namely ≥2 0 mm (powerful), 11-19 mm (substantial), 5-10mm (medium), and <5 mm (weak). Wijayanti, Sjofjan, and Djunaidi, in the antimicrobial activity test study using star fruit with a concentration of 30%, can inhibit Escherichia coli by 6.8 mm, Salmonella sp by 5.07 mm and Bal by 5.2 mm. Added [6] in testing the inhibitory power of ethanol extract of the leaves at a concentration of 75% resulting in an inhibitory zone diameter against Salmonella sp of 6.6 mm and Escherichia coli of 7.5. Compared to this study, organic proteins have low inhibitory power against Escherichia coli bacteria, Salmonella sp, and lactic acid bacteria. This is due to the organic content of protein, namely glutamic acid, which functions as a constituent of protein.

IV. CONCLUSION

Organic protein derived from the fermentation of monosodium glutamate (MSG) in cooking seasoning processing has the potential as a constituent of poultry feed ingredients in terms of good nutritional content. It has a low pH content, but organic protein has been unable to inhibit pathogenic and non-pathogenic bacteria.

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