THE EFFECT OF SKIPJACK TUNA BONE MEAL (*Katsuwonus pelamis* L) ON URIC ACID AND BLOOD GLUCOSE ON BROILER

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Abstract

Fish bone is an industrial waste of fishery product processing which as a potential source of calcium and phosphorus for livestock. The general principle to process the fish bone to bone meal is an effort to hydrolyze non-ash components contained in the bones, especially collagen. The objective of the study was to investigate the effect of skipjack tuna bone meal on uric acid and blood glucose in Broiler. Research was carried out at Biochemistry Laboratories, Animal Husbandry, Universitas Padjadjaran. Ninety-day old chicks Arbor Acres C.P. 707 were used randomizedly in this experiment, and were studied for six weeks. Research used an experimental method with a Completely Randomized Design (CRD). There were three treatments i.e. R1 = ration with dicalcium phosphate, R2= ration with commercial bone, R3 = ration with skipjack tuna bone meal, and each treatments were repeated five times. The results of the research is adding skipjack tuna bone meal indicated the highest for uric acid and blood glucose, the lowest level is adding dicalcium phosphate and Indonesia commercial bone.

Key words: skipjack tuna bone meal, broiler, uric acid, blood glucose

INTRODUCTION

The major industry in North Sulawesi, Indonesia is to cultivate tuna fish and skipjack tuna fish into cans and smoked fish. The processing of fish waste produces solid impact. The chemical composition of the waste tuna is a high protein nutrient that is roughly 46,68%, crude fibre 46,48%, crude fibre 2.05%, crude fat% 17,21 7.04%, calcium, phosphorus, and 3.67 4492 gross energy kcal/kg (Analyse Laboratories of Nutrition Livestock Fodder of ruminants and chemical Animal Husbandry Unpad, 2009). Protein content of this waste is the protein collagen.

Collagen is a fibrous protein that has low digestion and deficient amino acids, so that not used as the feed source of protein. High fat content also causes damage to waste because of the fatty fish has an easy to rancid so usually remove the fat for utilizing this waste, so this is a limitation as fed [4; 8].

Fishbone tuna meal is waste that can be used as a source of calcium and phosphor. Although, fishbone got proteins high 29 - 56%, inappropriate to become protein because most of collagen, low protein quality of not contents tryptophan amino acids and other amino acids essential is very small. Fishbone fresh containing about 25% collagen which is the main component matrix fishbone found in skin, the fins, cartilage mouth, bone head and body [1; 8]. fishbone fresh containing about 50% dry material, and inside contains about 25% collagen, 5 - 10% lipid and about 20% is mineral. More than half of mineral amount is calcium and phosphor, that build bone structure. The twice mineral in this bone as hydroxyapatite $(Ca_{10}(PO_4)6(OH)_2$ than calcium carbonate (CaCO3. this form is hard to digest in the intestine

One treatment to lower the content of collagen is using alkali. NaOH is capable of hydrolyzing non mineral component in the materials and increase the benefits value. This component can be inflated due to the molecular structure of the power belt weakened with acid treatment under or equal

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to pH 4, and could increase up to 10 [2]. In this research will be used many sources of phosphor calcium from various sources i.e.

R1 ration using dicalcium phosphate, (DCP)

R2 ration using commercial bone meal

R3 ration using tuna bone meal /special bone meal (SBM)

In Indonesia, generally, the source of Ca and P for livestock, comes from cow's bones which are processed into commercial bone flour (calcinated bone-meal or bone-ash), also used dicalcium phosphate (DPC). Many research results indicate that to process cow bone takes longer than processing a fishbone, this shows that the density and the bone structure of the cow is more powerful compared to the bones of the fish. Cow bone components chemically higher mineral content, but the content of the water is lower compared to Fishbone [2].

MATERIAL AND METHODS

Ninety-day old chicks Arbor Acres CP-707 were assigned randomly and studied for six weeks. The research was made using experimental method with a Completely Randomized Design (CRD). There were three treatments and each treatment was replicated five times. The dietary treatments are:

P1= ration with dicalcium phosphate

P2= ration with commercial bone

P3 = ration with skipjack tuna bone meal

In this research, ration containing commercial bone meal derived bovine bone material will be compared with ration containing dicalcium phosphate derived from skipjack tuna bone meal.

The commercial dicalcium phosphate (dairy bone) as a source of calcium and phosphorous is highly use compare to SBM^{TC}, because in general both feed is used as a source of calcium and phosphorous for the preparation of feed broiler formulation in Indonesia both, particularly for the dicalcium phosphate (DCP) as a standard source of calcium and phosphate which has the highest composition in the ration with the ration of calcium and phosphate is about 1: 1. The basal feed was formulated with the basic ingredient such as corn, soybean meal, fish meal, coconut oil, with the addition of some essential amino acid like lysine and methyonine, premix and NaCl. The formulation of feed based on standard nutrient requirements and energy metabolism (EM) of Cobb broiler strain.

RESULTS AND DISCUSSIONS

Table 1 The Effect of Skipjack tuna bone meal on level of uric acid and blood glucose

Treatment	P1	P2	P3
Uric Acid (mg/dl)	3.78	5.20	9.70
Blood Glucose (mg/dl)	240.00	240.17	274.83

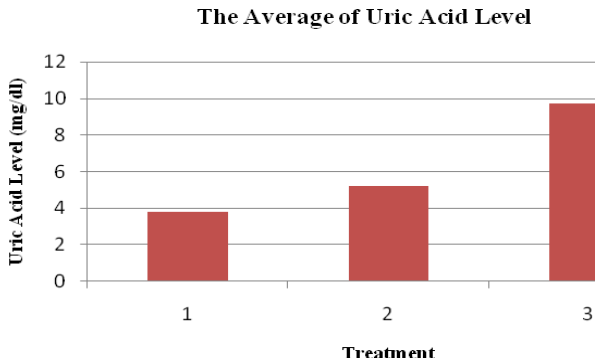

Illustration 1.The effect of Skipjack tuna bone meal on broiler uric Acid

From Table 1, it can be observed that adding skipjack tuna bone meal has effect on uric acid level. In R1 (ration+ Ca2PO4), the uric acid level is 3,78mg/dl, R2 (Ration using commercial dairy bone), = 5,2mg/dl, and R3 (ration using skipjack tuna bone) = 9,7mg/dl. The uric acid level on R3 was significantly higher (P>0.05) compare with R2 and R1. The lowest level of uric acid is R1. It means that adding skipjack tuna bone meal in the ration gave the highest of uric acid level because skipjack bone meal contains of 25% protein collagen which is a major component of bone matrix on fish skin, fins, cartilage mouth, head and bones of the body and less able to digest [1, 7]. Enzymes are crucial contributors to protein digestion, the only protease able to digest collagen (the fibrous protein found in animal connective tissue).

Uric acid is a by product of protein metabolism. It is released into the blood stream as a waste product that results when the digestive system breaks down dietary proteins from bone, poultry and many other protein-rich collagens. Usually, the kidneys filter uric acid out of the bloodstream and it is excreted in the urine. If uric acid levels get too high, however, the kidneys may not readily excrete all of it.

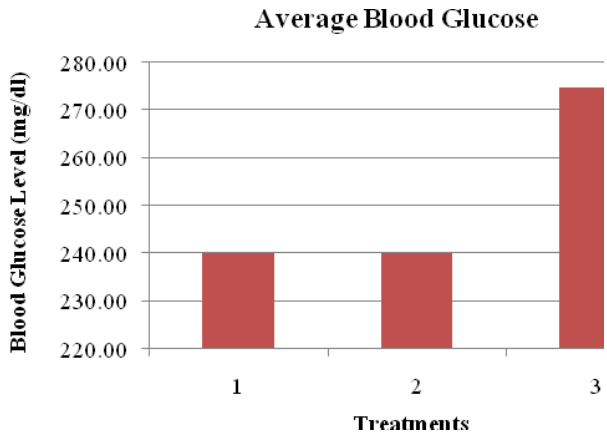

Illustration 2.The effect of Skipjack tuna bone meal on broiler blood glucose

From Table 1, there are the results from this research of skipjack tuna bone meal in ration, on blood glucose. The level of blood glucose of the treatments was get from the broiler that ration using Ca2PO4 (R1=240.00 mg/dl), ration using commercial bone (R2= 240.17 mg/dl), ration using skipjack tuna bone meal (R3= 274.83 mg/dl). The lowest blood glucose was get from the broiler that using Ca2PO4 and commercial bone meal. The skipjack tuna bone meal treatment is better when used in the ration due to they are content of collagen which are a poor-quality source of protein since they do not contain all the essential amino acids in the proportions that the human or animal body requires, also are not 'complete proteins'. Pepsin is highly specialized protease for hydrolyze collagen protein and only active in an acid environment with a pH of 2.0 – 3.0. Besides that, high collagen content can cause low protein digestibility and low absorption of amino acid. It influences energy resource usage. In protein metabolism, only 15% of protein in the body converted into energy, and the rest is turn over. High collagen protein content is less able to hydrolyze therefore the heat increment will increase. It results in the body usage of homeostasis in order to reduce body heat by increasing gluconeogenesis and then will increase blood glucose.

High content of uric acid reflect the high collagen-containing feed morbidly degraded by less enzymes protease, it will stimulate the secretion of corticotrophin-releasing hormone

(CRH) by the hypothalamus and stimulates anterior pituitary secretion of adeno-corticotrophic hormone (ACTH). ACTH is carried by the blood to the adrenal cortex, where it will trigger glucocorticoid secretion. The glucocorticoids get their name from their effect of raising the level of blood sugar (glucose). One way they do this is by stimulating gluconeogenesis in the liver: the conversion of fat and protein into intermediate metabolites that are ultimately converted into glucose.

CONCLUSIONS

The result indicated that the highest uric acid was gained from the broiler that fed basal diet adding skipjack tuna bone meal (9.7 mg/dl) and the lowest was gained from the broiler fed basal diet adding dicalsium phosphat (3.7 mg/dl). For the blood glucose, broiler that fed by adding skipjack tuna bone meal gave more blood glucose 274.83 mg/dl, versus using dicalsium phosphate (240 mg/dl), and commercial bone meal (240,13 mg/dl).

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