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THE EFFECT OF VARIOUS LEVEL OF SKIPJACK TUNA BONE MEAL (*Katsuwonus pelamis* L) IN RATION ON BROILER CARCASS TENDERNESS AND ABDOMINAL FAT

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Abstract: Hundred day old chicks Arbor Acres CP-707 were used randomizedly in this experiment, to study the effects of various levels skipjack tuna bone meal in ration on broiler carcass tenderness and abdominal fat, and were studied for six weeks. Research using Completely Randomized Design (CRD). The dietary treatments are: R_0 basal diet as control, R_1 basal diet + 2% tuna bone meal, R_2 basal diet + 4% tuna bone meal and R_3 basal diet + 6% tuna bone meal, and each treatments were repeated five times. Results indicated that the highest carcass tenderness was get from the broiler that fed basal diet with 6% tuna bone meal (125,4 mm/g/10sec) and the lowest was get from the broiler that fed basal diet (107 mm/g/10sec). For the abdominal fat, the results is broiler that adding skipjack tuna bone meal in the ration will give more abdominal fat to the broiler (1.89% - 1.92%) versus 1.85% for basal diet.

Key words: skipjack tuna bone meal, broiler carcass tenderness and abdominal fat

Introduction

In formulating diets, it is essential to know the birds nutrient needs, and consequently the concentration of these nutrients in the various ingredients. Diets are composed of complex organic and inorganic molecules that must be reduced in size to enable absorption *(Leeson and Summers, 2001)*. According to *Arbo Acres (2009)* poor physical feed quality will have a negative impact on broiler performance. The problems with feeding broilers today is not the knowledge of optimum nutrient to use for maximum gains and feed efficiency but how to align the growth of broilers to minimize mortality and skeletal disorders to produce more saleable meat after processing. According to *Lengkey et al. (2011)*, even there are

indicated that skipjack tuna gill meal in ration has no significantly effect on broiler carcass, but it can replace the function of fish meal in the ration. Tenderness is the process of partial relaxation of the fibres. Resolution of rigor is due to enzymatis activity and physical stretching of the muscles fibres attached to bones. Tenderness is measured by use of specialized laboratory equipment or by a taste-panel *(Bell and Weaver, 2002)*. Contrary to popular belief, what the animal is fed does not directly influence tenderness. Many factor influence meat tenderness. The most important factors are genetics, age of the animal, location of the cut on the carcass, processing, method of cooking and degree of doneness *(Epley, 2011)*. According to *Widjastuti et al. (2011)*, until 6% tuna fish silage in the diet, have no significant effects, but the 4% tuna fish silage, has the best results on final body weight, carcass persentage and meat protein conversion on broiler. But, the cholesterol contents of the carcass and liver were significantly lower in Lactobacillus cultures fed broilers, but not the muscle. Supplementation of Lactobacillus culture in the broiler diets, significantly lower in fat contents of the liver, muscle and carcass *(Kalavathy et al., 2006)*. Abdominal fat of commercial broilers age of seven weeks, according to *Richardson and Mead (2006)*, in some strain are between 2.75% to 3.15% and for male (2.67%) and female (3.27%). Most poultry rations incorporate some fish meal at levels of about 2-5% of the ration; and according to Lengkey, et al (2011), for mash ration supplemented with skipjack tuna gill meal (1.89%) and crumble ration supplemented with skipjack tuna gill meal (2.08%).

Materials and Methods

One hundred day old chicks Arbor Acres CP-707 were assigned randomly and studied for six weeks. Research using Completely Randomized Design (CRD). The dietary treatments are: R_0 basal diet as control, R_1 basal diet + 2% tuna bone meal, R_2 basal diet + 4% tuna bone meal and R_3 basal diet + 6% tuna bone meal, and each treatments were repeated five times. The broiler carcass tenderness was established by meat tenderness instruments.

Results and Discussions

The effect of Skipjack tuna bone meal on broiler carcass tenderness. In Table 1, there are the results from this research of skipjack tuna bone meal in ration, to the broiler carcass tenderness. The highest carcass tenderness was get from the broiler that fed basal diet with 6% tuna bone meal (125,4 mm/g/10sec) and the lowest was get from the broiler that fed basal diet (107 mm/g/10sec).

Table 1. The effect of skipjack tuna bone meal in ration on broiler carcass tenderness (mm/g/10 sec)

Replication	R-0	R-1	R-2	R-3
I	105	114	126	137
II	107	119	106	115
III	106	118	105	121
IV	112	107	134	131
V	105	115	134	123
Average	107^{b}	$114,6^{ab}$	121^{ab}	$125,4^{a}$

Notes :R_0 basal diet as control,
R_1 basal diet + 2% tuna bone meal,
R_2 basal diet + 4% tuna bone meal and
R_3 basal diet + 6% tuna bone meal

From Table 1, adding skipjack tuna bone meal has effect to the broiler carcass tenderness. And the tenderness will rise when the skipjack tuna bone meal level percentage more higher. In R_1 (basal diet + 2% skipjack tuna bone meal), the tenderness are 114,6 mm/g/10sec, will rise when the level of skipjack bone meal are 4% (R_2 = 121 mm/g/10sec); and in R_3 (basal diet + 6% skipjack tuna bone meal) the tenderness is 125,4 mm/g/10sec; compared to the basal diet (107 mm/g/10sec).

The effect of Skipjack tuna bone meal on broiler fat abdominal. In Table 2, there are the results of the effect of skipjack tuna bone meal in ration, on broiler abdominal fat.

Table 2. The effect of skipjack tuna bone meal in ration on broiler abdominal fat (%)

Replication	R-0	R-1	R-2	R-3
I	1.80	1.87	1.89	1.94
II	1.83	1.89	1.90	1.92
III	1.85	1.87	1.87	1.95
IV	1.86	1.88	1.92	1.89
V	1.91	1.88	1.92	1.90
Average	1.85^{c}	1.89^{b}	1.90^{ab}	1.92^{a}

Notes :R_0 basal diet as control,
R_1 basal diet + 2% tuna bone meal,
R_2 basal diet + 4% tuna bone meal and
R_3 basal diet + 6% tuna bone meal

From Table 2, the average of abdominal fat are between 1.85% to 1.92%. The highest abdominal fat is from R_3 (1.92) that using 6% skipjack tuna bone meal and the lowest is from R_0 (1.85) the basal diet without skipjack tuna bone meal. It means that adding skipjack tuna bone meal in the ration will give more abdominal fat to the broiler. But this results are under the results of *Lengkey et al. (2011)* supplemented with skipjack tuna gill meal for crumble ration (2.08%) and *Richardson and Mead (2006)*, between 2.75 and 3.15%. It means that adding

skipjack tuna bone meal, is better when used in the ration, because the abdominal fat is lower than using other supplement in the ration.

Conclusion

Results indicated that the highest carcass tenderness was get from the broiler that fed basal diet with 6% tuna bone meal (125,4 mm/g/10 sec) and the lowest was get from the broiler that fed basal diet (107 mm/g/10sec). For the abdominal fat, the result is broiler that adding skipjack tuna bone meal in the ration will give more abdominal fat to the broiler (1.89 - 1.92%) versus 1.85% for basal diet.

Uticaj različitih nivoa brašna od prugaste tune (*Katsuwonus pelamis* L.) u obroku na mekoću trupa brojlera i abdominalnu mast

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Rezime

Pilići Arbor Acres CP-707 starosti sto dana su korišćeni u ovom ogledu, kako bi se ispitali uticaji različitih nivoa brašna od prugaste tune u obroku na mekoću trupa brojlera i abdominalnu mast, u istraživanju koje je trajalo 6 nedelja. Istraživanje je izvedeno korišćenjem - Completely Randomized Design (CRD). Hranidbeni tretmani su bili sledeći: R_0 bazalni obrok kao kontrola, R_1 bazalni obrok + 2% koštanog brašna od tune, R_2 bazalni obrok + 4% koštanog brašna od tune i R_3 bazalni obrok + 6% koštanog brašna od tune, i svaki tretman je ponovljen pet puta. Rezultati ukazuju da je najveća mekoća trupova dobijena kod brojlera koji su hranjeni bazalnim obrokom sa 6% koštanog brašna od tune (125,4 mm/g/10sec) a najniža kod brojlera hranjenih bazalnim obrokom (107 mm/g/10sec). Za abdominalnu mast, dobijeni rezultati pokazuju da dodavanje koštanog brašna prugaste tune u obrok će rezultirati u povećanju abdominalne masti kod brojlera (1,89% - 1,92%) prema 1,85% kod bazalnog obroka.

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