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Effect of Octopus Waste Silage on Broiler Visceral Organs

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Abstract— *The aim of this research was to evaluate effect of Octopus Waste Silage (OWS) as feed ingredients on broiler visceral organs. The method was in vivo research by using completely randomized design. Two hundred day old chick strain Lohman allocated into 5 treatments and 4 replications. The treatments consisted of P0 = basal feed 100% MBM + 0% OWS; P1 = basal feed 75% MBM + 25% OWS; P2 = basal feed 50% MBM + 50% OWS; P3 = basal feed 25% MBM + 75% OWS; P4 = 100% OWS + basal feed 0% MBM. The measured variable were weights and percentages of broiler visceral organs (heart, liver, gizzard, spleen, and caeca). Data were analyzed with ANOVA and continued with Duncan's multiple range test. The results showed that there were no significant different (p>0.05) effect of treatment toward broiler visceral organs. Conclusion of this research was subtitutes of OWS up tp 100% did not cause a negative effect on broiler visceral organs.*

Keywords— *Octopus waste silage, feed ingredients, broiler, viscceral organs.*

I. INTRODUCTION

Feed is one of the most important factors in broiler farming and the costs incurred reach 60-70% of the total cost of broiler farming. Feed has a good quality must have a balanced nutrient substance so as to maximize the growth of broilers optimally. The substances needed by broilers in feed ingredients are sources of energy, protein, minerals and vitamins. Strategies are needed in order to make feed costs cheaper, efficient and effective in the broiler farming business. In this study, octopus waste feed material was used to substitute Meat Bone Meal (MBM) feed material as a source of protein.

Octopus waste is one of the efforts used to reduce feed costs as well as to increase production in livestock. Octopus waste needs to be given certain treatment so that nutrients can increase and reduce the toxic properties that exist in the waste can then be processed and used as additional feed material for broilers. [1] 100 g of octopus meat can produce 15-16 g of protein, 1 g of fat, vitamins, 73-91 calories, potassium, phosphor, selenium and iodine. Octopus product comprise 90% of human consumption and 10% are octopus waste. PT. ICS Seafood Group states that the availability of octopus waste as much as 50 tons in each month. Waste produced from frozen octopus is 80% solids and 20% fluid (digestive, respiratory, reproductive and ink organs).

Silage technology is suggested as being most useful for converting Fish waste to a high quality source of protein [2]. Octopus Waste Silage (OWS) can be prepared either by addition of acids like organic acids such as propionic, citric, and formic acids (chemical silage) or fermentation with microbial culture and sugar (biological silage) [3] [4]. The biological silage is a microbiological process and has considerable advantages over chemical silage: simpler, higher acceptability for being used in animal feed, faster, more environmentally friendly and cost-efficient process [5]. The objectives of this research are to investigate the effect of OWS on broiler visceral organ parameters.

II. MATERIALS AND METHODS

A. Materials

Materials used in this research were 200 DOC unsexed strain Lohmann with average 41.12±2.07g obtained from a commercial hatchery. Twenty unit cages were used (cage size 1x1 m), the temperature and humidity control room with feeder, drinker and lamp. The room is heated for brooding period used to lamp with 40 watt per cage. Total this research period was 35 days. Formula of basal feeds were described in the following Table 1. Basal feeds were divided into 2 types: starter (1-21 days) and finisher (22-35 days).

TABLE 1. Formula of basal feeds

Raw materials (%)	Starter	Finisher
Yellow corn	58	58
Soybean meal	23	20
Bran	0	5
Meat bone meal (MBM)	6	6
Fish meal	9	7
Methionine	0.15	0.15
Di-calciunm phosphate	0.15	0.15
Premix	0.57	0.57
Salt	0.20	0.20
Oil	2.93	2.93

OWS by using Octopus waste, molases and *Lactobacillus plantarum* 10^6 CFU/ml in a special tank (fermentation process) for 14 days. Similarly [2] also reported fresh sardine wastes (heads, viscera, scales, fins, bones, and skin) were minced trough a 5 mm sieve using a meet mincer and homogenized in blender. Each kg of fresh sardine wastes mass these was mixed with molases and inoculated with *Lactobacilus plantarum* in tank with one way valve outflow the gases produced and prevent air entry for 15 days at 25°C. The results of the fermentation are opened and make a powder was drying for 48 hours with 60-80°C in oven. Samples of OWS were used to determine the following: crude protein (CD), crude fat (EE), crude fiber (CF), ash, and dry matter (DM) according to AOAC (1990) [6].

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B. Experimental Design

The birds were allocated into 5 treatments and 4 replicates of 10 birds. The research design was completely randomized design with the treatments given were:
P0 = basal feed 100% MBM + 0% OWS
P1 = basal feed 75% MBM + 25% OWS
P2 = basal feed 50% MBM + 50% OWS
P3 = basal feed 25% MBM + 75% OWS
P4 = 100% OWS + basal feed 0% MBM

C. Variables Observed

At achieving 35 days period maintenance, 1 broiler in each research unit was sampled, and slaughtered. Then, visceral organs were taken out and each visceral organs was weighted and calculated of percentage. Visceral organs observed in this research were:
a) Heart
b) Liver
c) Gizzard
d) Spleen
e) Ceaca

D. Statistical Analysis

All data on this research analyzed with one way analysis of variance (ANOVA) and continued with Duncan's Multiple Range Test (DMRT) if there were significant differences.

III. Results and Discussion

The results of OWS subtitutes with MBM in broiler feed to weights and percentages of visceral organs in showed in Table 2 until 6. Statistical analysis calculation results showed that the effect of OWS did not significantly ($p>0.05$) influence visceral organs weight and percentage. That early feed restriction had no significant effects on the relative weight of internal organ of broiler [7].

A. Effect of OWS on Weight and Percentage of Heart

TABLE 2. Effect of OWS on Weight and Percentage of Heart

Treatment	Heart	
	Weight (g)	%
P0	7.33±0.96	0.59±0,08
P1	6.33±0.92	0.56±0,07
P2	6.63±0.89	0.55±0.09
P3	5.81±1,37	0.49±0.09
P4	6.64±1.27	0.50±0.07

Our results indicated that weight and percentage of heart in the feed did not significantly from OWS. In the other research reported was level of olive pulp had no significantly linear or quadratic effect on weights of broiler heart [8]. Similiarly findings were reported when broiler fed diets high in fiber in replacement of corn [9]. In the previous report were not affected to relative weight of heart in bird from oregano oil, garlic oil and oregano oil + garlic oil compared with that of birds from control [10].

B. Effect of OWS on Weight and Percentage of Liver

TABLE 3. Effect of OWS on Weight and Percentage of Liver

Treatment	Liver	
	Weight (g)	%
P0	26.46±1.97	2.14±0.19
P1	22.70±3.48	2.02±0.37
P2	21.34±0.35	1.76±0.14
P3	25.68±4,78	2.16±0.22
P4	29.80±7.46	2.24±0.51

In the present study showed of weight and percentage of liver broiler in treatment had no affected. Simliarly the inclusion of whole corn did not influence relative weight of liver [11]. In the other research the effect of red betel leaf extract did not significantly influence in broiler liver [12]. Similiarly, [13] also reported liver was no significant of broiler fed soy isoflavone containing feed. In previous report, the relative weight of the liver unaffected by different concentrations of nutrient [14]. [15] These studies also showed no differences in the relative weight of the liver by the treatments.

C. Effect of OWS on Weight and Percentage of Gizzard

TABLE 4. Effect of OWS on Weight and Percentage of Gizzard

Treatment	Gizzard	
	Weight (g)	%
P0	24.38±3.88	1.99±0.41
P1	21.86±2.23	1.91±0.16
P2	24.16±4.05	1.95±0.25
P3	21.90±1.11	1.86±0.13
P4	21.16±1.90	1.59±0.07

Result of research indicate that the OWS as a feed ingredients had unaffected on weight and percentage gizzard of broiler. In other studies was results showed that the effect of red betel leaf extract did not significantly influence in broiler liver [12]. The inclusion of whole corn did not influence relative weight of gizzard [11]. In previous report, gizzard percentages were not changed by alfalfa meal until 6% in feed. Also when [16] found no differences in gizzard weight of broiler chickens fed with wheat-soyabean meal base diets supplemented with two plant extracts.

D. Effect of OWS on Weight and Percentage of Spleen

TABLE 5. Effect of OWS on Weights and Percentages of Spleen

Treatment	Spleen	
	Weight (g)	%
P0	1.63±0.11	0.13±0.00
P1	1.35±0.22	0,12±0.02
P2	1.65±0.43	0.14±0.03
P3	1.30±0.19	0.11±0.01
P4	1.39±0.37	0.10±0.03

The effect of research treatments on weight and percentage spleen of broiler showed no significant. In the previous report the effect of dietary supplementation with essential oils and both essential oil combination on weight of spleen there were no differences between treatments [10]. Similarly, the relative weight spleen were not affected by the treatment [17].

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E. Effect of OWS on Weights and Percentages of Caeca

TABLE 6. Effect of OWS on Weights and Percentages of Caeca

Treatment	Caeca	
	Weight (g)	%
P0	5.64±0.91	0.45±0.07
P1	4.52±0.85	0.40±0.06
P2	5.39±0.97	0.44±0.07
P3	4.07±1.18	0.34±0.07
P4	5.60±1.21	0.42±0.07

The statistical calculation results showed that effect of OWS did not significantly influence weight and percentage caeca of broiler. The inclusion of whole corn did not influence relative weight of caeca [11]. Also [18] when feeding whole grains to chicks resulted in an unaffected in caeca with all concentration.

IV. CONCLUSION

Based on research results, it could be concluded that substitutes OWS with MBM up to 100% in broiler visceral organs showed did not affect significantly. Therefore OWS can be replace MBM for feed ingredients.

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