Effect of the Addition of Phytobiotic and Acidifier as Feed Additive on Carcass Quality of Hybrid Ducks

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Abstract. The study aimed to determine the Effect of the addition phytobiotic and acidifiers as feed additives on the carcass quality of hybrid ducks. The research material was 180 hybrid ducks aged 21 days. The research method was an experiment with a completely randomized design, with 6 treatments and 5 replications. The treatment consist of P0 = Basal diet, P1 = Basal diet + 0.5% Antibiotics, P2 = Basal diet + combination phytobiotics and acidifier 0.25%, P3 = Basal diet + combination of phytobiotics and acidifier 0.5%, P4 = Basal diet + combination of phytobiotics and acidifier 0.75%, P5 = Basal diet + combination of phytobiotics and acidifier 1%. The variables observed were percentage carcass, percentage breast meat disposition, percentage part of the carcass, and cholesterol content of hybrid duck meat. Data analysis with analysis of covariance (ANCOVA) from Completely Randomized Design (CRD) and Duncan's Multiple Range Test. The results showed that the treatment had no significant effect ($P > 0.05$) on the percentage of the carcass, part of carcass cut, and meat disposition of hybrid duck, however, had a significant effect ($P < 0.01$) on the cholesterol content of hybrid duck meat. It was concluded that the addition of a mixture of phytobiotics and acidifier in the feed did not increase the carcass, carcass pieces, and the percentage of disposition of hybrid duck meat, but it was able to reduce the cholesterol content of hybrid duck meat. The addition of a mixture of phytobiotic and acidifier of 0.75% as a feed additive gave the best results.

Keywords: phytobiotics · acidifier · carcass quality · hybrid duck

1 Introduction

In 2018 more than 38,000 tons of duck meat were produced by the Indonesian people (Directorate General of Animal Husbandry and Animal Health Resources 2019). Duck meat is a solution to meet the demand for animal protein in Indonesia. The use of antibiotic growth promoters (AGP) provides feed efficiency, growth rates, and lower mortality [1]. However, the use of antibiotics can cause resistance to microorganisms in the digestive tract and leave residues when consumed by humans. The use of antibiotics has been prohibited in the Regulation of the Minister of Agriculture Number 14 of 2017.

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Alternatives feed additives that can be used is a phytobiotics and acidifiers in livestock production. Phytobiotics can be used as feed additives because of their low production costs, low toxicity risk, and environmental friendliness [2]. Phytobiotics have a role as antibacterial and antimicrobial in preventing disease by increasing livestock immunity. The phytobiotics used are a combination of several herbal ingredients such as turmeric, ginger, betel leaf, and beluntas. Turmeric contains bioactive compounds tetrahydrocurcuminoid, curcuma, demethoxy-curcumin, and bisdemethoxycur-cumin which are reported to be useful for increasing poultry productivity [3]. The herbal ingredients are obtained from the use of by-product herbal drinks. Acidifiers have also been widely studied as a substitute for AGP by controlling and balancing the microflora in the digestive tract. Citric acid can lower pH and increase LAB (Lactic Acid Bacteria) in the digestive tract [4]. Tamarind contains citric acid by 15%. The combination of two feed additives is considered to have the maximum effect by combining each of the bioactive compounds in each ingredient rather than using them alone [5]. Thus, a study was conducted to determine the effect of adding feed additives in the form of a mixture of phytobiotics and acidifiers on the carcass quality and cholesterol of hybrid ducks.

2 Materials and Method

2.1 Research Materials

The research material used was 180 hybrid ducks from a cross between Peking (male) and Khaki Campbell (female) ducks aged 21 days without sex difference (unsexed) with an average body weight of 434.31 ± 108.85 gr with a coefficient of the diversity of 25.06%. The cages used were 30 ducks, each plot measuring 2 × 1 × 1 m, each filled with 6 ducks. The cage is equipped with a place to feed and drink. Feed and drinking water in this study were provided ad libitum. The herbal phytobiotics and tamarind acidifier were obtained from the Laboratory of Animal Feed Nutrition, Faculty of Animal Husbandry, Universitas Brawijaya. The basal feed used was commercial feed with a dry matter content of 87%, crude protein 17–19%, crude fat 3%, crude fiber 5%, ash 8%, calcium 0.9–1.2%, phosphorus 0, 6–1%, Lysine 0.8%, Methionine 0.35%, Met + Sis 0.65%, and Tryptophan 0.18%.

2.2 Research Methods

The method used in this study was a field experiment using a completely randomized design (CRD) with 6 treatments and 5 replications. The variables observed were percentage carcass, percentage breast meat disposition, percentage part of the carcass, and cholesterol content of hybrid duck meat. The treatments are:

P0: Basal diet (Positive Control)

P1: Basal diet with Antibiotics (Negative Control)

P2: Basal diet + 0.25% mixture of Phytobiotics and Acidifier

P3: Basal diet + 0.5% mixture of Phytobiotics and Acidifier

P4: Basal diet + 0.75% mixture of Phytobiotics and Acidifier

P5: Basal diet + 1% mixture of Phytobiotics and Acidifier

2.3 Data Analysis

The data obtained were analyzed using an analysis of covariance (ANCOVA) from a completely randomized design (CRD). If the results are significantly different ($P < 0.05$) or very significantly different ($P < 0.01$), then proceed with Duncan's Multiple Distance test.

3 Results and Discussion

In Table 1 showed the effect of the treatment on the characteristic and quality of the carcass hybrid ducks.

The average yield of carcass percentage in this study was higher when compared to the results of study of PA cross-breed ducks (Peking & Alabio) of 58.27%, while PM-crossed ducks (Peking & Mojosari) were 54.25%. Ramina [6] adequate intake of amino acids causes cell metabolism in the body to be good which will have an impact on the process of carcass weight. The content of curcumin in turmeric affects the absorption of food substances which is manifested in the form of meat production. Selviana, et al. [7] stated that carcass weight is a straight line description of tissue and bone growth in livestock.

The percentage of breast meat weight was statistically correlated with breast weight and carcass weight [8]. The pectoral cut of the carcass is the part of the carcass that consists of muscle so its development is highly dependent on protein [9]. Stated that the greatest effect on treatment with reduced crude protein and amino acid levels at 6–12 weeks of carcass weight was a reduction in chest weight and chest muscle weight [10].

Table 1. Effect of treatment on the characteristics and quality of the carcass.

Variable	Treatments					
	P0	P1	P2	P3	P4	P5
Breast meat (%)	9,70 ± 1,68	9,46 ± 2,23	9,39 ± 1,24	9,01 ± 1,26	8,62 ± 1,69	8,47 ± 2,45
Carcass (%)	60,28 ± 1,50	58,79 ± 3,57	60,16 ± 2,05	59,47 ± 3,09	61,36 ± 1,96	58,66 ± 4,06
Wings (%)	8,70 ± 0,76	8,86 ± 0,43	8,51 ± 0,67	8,72 ± 0,98	8,82 ± 0,43	8,87 ± 0,60
Upper thigh (%)	6,75 ± 0,54	6,95 ± 0,53	7,77 ± 0,78	6,50 ± 1,27	8,51 ± 1,35	7,63 ± 1,20
Lower thigh (%)	7,62 ± 0,28	7,08 ± 0,19	7,69 ± 0,67	7,86 ± 1,12	8,04 ± 1,01	7,54 ± 0,67
Upper back (%)	5,96 ± 0,63	6,33 ± 1,51	6,77 ± 1,02	6,59 ± 1,16	7,70 ± 1,53	6,89 ± 1,88
Lower back (%)	9,74 ± 0,53	9,48 ± 0,92	9,72 ± 0,71	10,78 ± 1,07	9,82 ± 0,98	10,41 ± 1,35
Cholesterol (mg/100 g sampel)	$188,58 \pm 0,52^{d}$	$188,13 \pm 1,04^{d}$	$183,39 \pm 0,51^{c}$	$178,38 \pm 1,01^{b}$	$174,50 \pm 0,79^{a}$	$175,24 \pm 1,57^{a}$

Note: Superscript letter notation a – d on the same line shows a very significant effect ($P < 0.01$)

in their research stated that treatment with a progressive increase in lysine concentration resulted in more meat in some parts of the carcass linearly.

The percentage of the carcass affects the percentage of other carcass parts. The percentage of thigh weight is determined by the amount of carcass weight and other carcass parts [11]. Yuniza, et al. [12] in their research stated that the lower ($P < 0.05$) thigh weight on treatment showed that feed A was lysine deficient so it could not meet the lysine needs of native chickens, causing disruption of protein synthesis and resulting in stunted thigh muscle growth. The addition of lysine can improve growth including thigh and chest muscles.

The thigh muscles are more involved in movement and activity when compared to other parts of the body. So that the small size of the muscles in the thighs of cattle is also influenced by the activities of each animal. Ramdani et al., [13] stated that the lower thigh is one of the pieces of broiler carcass consisting of meat and bones and is a locomotion tool. The percentage of the lower thigh is influenced by the proportion of bones, the proportion of muscles, and other parts of the carcass. Pribady [14] The percentage of thigh cuts will decrease with decreased bone growth and muscle growth.

The small deposit of meat on the wings in the carcass parts was caused by the wing dominated by bone and fat deposition so the feed given to livestock did not have a significant effect on wing weight [15]. Wings are dominated by bones and do not contain much fat so their growth requires the role of calcium and phosphorus minerals. The wing is part of the carcass which contains more bone tissue than muscle tissue so the mineral content in the feed is more influential for the growth and development of the wing part of livestock [16].

The weight of the upper back at that time, not only by the muscle tissue but also by the skeletal framework and cells that make up the back is stable. Because the large upper spine requires sufficient mineral and calcium content, the proportion is composed of mostly bone skeleton rather than muscle. The back is a bone-dominated part and may produce results [15]. Bone growth takes place continuously at a relatively slow rate, while muscle growth is relatively faster so that the muscle ratio increases during growth.

Phytochemical substances in turmeric and ginger which contain antioxidants can inhibit formation, especially in inhibiting the activity of the enzyme 3-Hydroxy,3-Methyl-Gluteryl-Co-a reductase so that cholesterol formation in the liver is disrupted, so that total cholesterol levels in meat and blood will decrease. The decrease in blood cholesterol levels in broilers caused by the content of biocurcumin and essential oils in herbal ingredients can increase the production and secretion of bile, can activate bile secretion into the duodenum as well as a lot of excretion of bile acids and cholesterol in feces causing cholesterol. in the blood and body is reduced [17]. So that the cholesterol level of hybrid duck breast meat becomes low along with the increase in the levels of a mixture of herbal phytobiotics and tamarind acidifier was given.

4 Conclusion

It was concluded that the addition of a mixture of phytobiotics and acidifier in the feed did not increase the carcass, carcass pieces, and the percentage of disposition of hybrid duck meat, but it was able to reduce the cholesterol content of hybrid duck meat. The

addition of a mixture of phytobiotic and acidifier of 0.75% as a feed additive gave the best results. The higher quality carcass of duck meet will improved the green economic in the future.

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