THE EFFECT OF PROBIOTIC SUPPLEMENTATION ON MEAT QUALITY AND FEED EFFICIENCY

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Abstract

Probiotics is microorganism reported possessing the positive effect on gut morphology and subsequent performance of poultry birds. Therefore, the present study was carried out to evaluate the effect of feed efficiency and meat quality. One hundred individuals of day old commercial broiler chicks were allocated to 4 treatment groups in a complete randomized design (CRD) and each treatment was replicated 5 times and each replicate was filled 4 chickens. The treatments consisted of fed: T-0 (basal ratio), T-1 (basal ratio with 100% fermented cow milk), T-2 (basal ratio with 50% fermented cow milk + 50 % fermented soy milk), and T-3 (basal feed with 50% fermented cow milk + 25% fermented soy milk + 25% fermented mung bean). There was no significant (P>0.05) effect on feed efficiency. However, it can improve feed efficiency. Meanwhile, all treatments give significant (P<0.05) effect on meat quality. Probiotic supplementation can improve feed efficiency and meat quality on poultry.

Key words: probiotic, feed efficiency, meat quality, broiler

INTRODUCTION

Probiotics contain lactic acid-producing bacteria, that serve to improve the digestive and nutrient absorption processes. Probiotics can increase the activity of enzymes such as sucrose, lactose, and tripeptidase in the small intestines. Providing probiotics from the starter period has been assumed to adapt the broilers to probiotic microorganism and help them to improve the balance of intestinal microflora. Probiotics can increase the activity of digestive enzymes so that the absorption of nutrients being optimized in line with the increasing area of absorption as probiotics can influence the intestinal anatomy like increased density and size of small intestine villi, and intestine histology [1], [2].

In this study, Fermented milk uses probiotic such as *Lactobacillus bulgaricus, Streptococcus thermophilus, Lactobacillus acidhophilus, and Bifidobacteria.* Soy is a group of oligosaccharides consisting of sucrose, stakiosa, and raffinose, which are hard to digest and to absorb in the intestine, and it helps within acting as a growth substrate for useful bacteria in the intestine. Lactic acid bacteria in fermented soy milk have a role in improving the isoflavone digestibility [3]. Isoflavones are secondary metabolite compounds that are widely synthesized by plants. In the soybean, isoflavone content ranges from 2 to 4 mg/g [4]. Various types of isoflavones are genistein, daidzin, and glisitin. Antioxidants have been reported to have an effect to improve intestinal villi, which in turn have an impact on increased absorption. Probiotic can improve the structures of intestinal villi in the process of nutrient absorption. Antibacterial herbs are able to suppress the growth of pathogenic bacteria in the intestine [5]. Fermented milk or soy contain flavonoid and vitamin, which can act as antioxidant, leading to the occurrence of a free radical attack on the cell membrane. Free radicals are an atom, a molecule, or a compound in which it contains one or more unpaired electrons, making it highly reactive [6]. Such radicals cause metabolic disturbances and cell disorders in the form of impaired DNA and protein function, causing mutations or cytotoxic and enzyme activity changes [7]. This can cause metabolic disorders in the body and suppress the growth of chickens. Chickens consume most are to meet requirement of the protein and energy needs in ration. Protein content in the ration is very influential on the achievement of chicken

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body weight, is required for tissue growth, tissue repair, and management of production and part of the enzyme structure, so that protein is known as one of the principal constituents of body cells and tissues [8].

Several studies have shown the benefit of probiotics on gut morphology and performance which suggest that by dietary means, it is possible to positively affect the development of the gut and provide the competitive advantage in favor of beneficial bacteria which can alter not only gut dynamics, but also many physiologic processes.

MATERIAL AND METHOD

***Research Object*:** In this research used 100 head of broilers, divided into 4 groups and each group was repeated 5 times. Each cage contains 5 chickens which maintained until the age of 10 weeks. The coefficient value of the variation of initial body weight of chicken equal to 9.47%.

Trial and Ratio: One hundred individuals of day old chicks were divided in to 4 treatment groups into a complete randomized design (CRD), and every treatment was replicated 5 times and filled 4 chickens.

1) T-0 = Basal Diet
2) T-1 = Basal ratio with 100% Fermented Cow Milk
3) T-2 = Basal ratio with 50% fermented cow milk + 50 % fermented soy milk
4) T-3 = Basal feed with 50% fermented cow milk + 25% fermented soy milk + 25% fermented mung bean

Experimental Design: Experiments were conducted experimentally design using Completely Randomized Design, consisting of 4 treatments and 5 replications. Data were analyzed using Varian Analysis and difference between treatments using Duncan Multiple Range Test.

RESULTS AND DISCUSSIONS

The Effect of Probiotic Supplementation on Meat Quality. The effect of probiotic supplementation on empty carcass, abnominal fat, and body weight gain can be seen in the Table 1.

Table 1 is shown the data regarding the effect of probiotic on carcass quality

Parameter	T-0	T-1	T-2	T-3
Empty Carcass	921.4^{a}	915.1^{a}	991.9^{b}	905.8^{a}
Abdominal Fat	22.5^{bc}	21.7^{c}	17.5^{a}	18.35^{ab}
Body Weight Gain	1241.6^{a}	1242.3^{a}	1294.3^{b}	1238.3^{a}

Note : T-0 (Basal Feed)
T-1 (Basal Feed with 100% Fermented Milk)
T-2 (Basal Feed with 50% Fermented Cow Milk + 50 % Fermented Soy Milk)
T-3 (Basal Feed with 50% Fermented Cow Milk + 25% Fermented Soy Milk + 25% Fermented Mung Bean)

Based on the ANOVA test, the use of probiotic gives a significant result ($P<0.05$) on all parameters. Then, T-2 the combination of Basal Feed with 50% Fermented Cow Milk + 50 % Fermented Soy Milk has the best effect in increasing Empty Carcass and Body Weight Gain and decreasing Abdominal Fat. The primary purpose of the supplementation of probiotics in poultry feed is to keep and improve the performance of the broilers [9], [10], and also to prevent and control pathogenic bacteria. The research on probiotic supplementation in poultry industry gives the effective result on the growth performance of broiler and their carcass [11], [12]. It could be related to the alteration of carcass quality. The supplementation of probiotics in the diet allows rapid development of beneficial bacteria in the digestive tract of the host and improving its performance. T-2 is the treatment, which gives the best result in improving empty carcass and body weight gain if compared with the other treatments. These improvements might be as a result of the cumulative impact of probiotic's action in the combination of fermented cow milk and fermented soy milk such as, increased digestive enzyme ability, maintenance of beneficial non-pathogenic bacteria, and neutralized the effect of feed toxins in the gut environment to improve digestion and nutrient absorption [13], [14], [15]. Those findings are in line with the prior study of [16], [17] which have reported that *Lactobacillus* and *Saccharomyces* can increase the higher body

weight and better carcass. The combination of fermented cow milk and fermented soy milk also can decrease the fat level in carcass because the lactic acid produced by probiotics in fermented milk can make the low pH in the digestive tract and inhibit the growth of pathogenic bacteria. Then, it also makes the energy from the carbohydrate is converted into lactic acid so that the fat formation in carcass will decrease. Besides, Fermented soy milk can generate isoflavone, which is an active substance and has the function as a biological agent. Then, probiotics generate β-glucosidase enzyme, which can hydrolyze isoflavone to be free isoflavone compound called aglycone. Aglycone has higher activity in lowering total cholesterol. The fermentation process can also hydrolyze aglycone component to be glycoside, which shows the high antioxidant activity. Another compound found in fermented soy milk is flavonoid. Flavonoid can inhibit the activity of the enzyme 3-hydroxy-3 methyglutaryl CoA, which plays a role in inhibiting cholesterol synthesis and acetyl CoA so that it can decrease the esterification of cholesterol in the intestine and live.

The Effect of Probiotic Supplementation on Feed Efficiency. The data regarding the effect of probiotic supplementation on feed efficiency is showed on the table 2 below.

Table 2 The effect of Probiotic Supplementation on Feed Efficiency

Parameter	T-0	T-1	T-2	T-3
Feed Consumption	1858.52[a]	1799.69[a]	1893.01[a]	1822. 13[a]
Feed-Conversion Ratio (FCR)	1.42[a]	1.39[a]	1.38[a]	1.41[a]

Note : T-0 (Basal Feed)
T-1 (Basal Feed with 100% Fermented Milk)
T-2 (Basal Feed with 50% Fermented Cow Milk + 50 % Fermented Soy Milk)
T-3 (Basal Feed with 50% Fermented Cow Milk + 25% Fermented Soy Milk + 25% Fermented Mung Bean)

ANOVA test shows that the probiotic supplementation is no significant difference (P>0.05) either on feed consumption or on feed conversion ratio. However, there is a tendency in T-2 to improve the feed consumption and FCR because T-2 has the best value in increasing feed consumption and has the lowest FCR. The supplementation probiotic in T-2 can increase feed efficiency, feed conversion, and better quality of broiler meat [18]. Then, Wiseman [19] and Mudalgi [20] have reported that broilers feed supplemented with probiotic shows the improvement feed intake than control. The use of probiotics in feed has a beneficial effect on body weight gain of broiler from 4th to 6th week of age. Other studies have also reported that supplementation of probiotics in poultry feed generates a significant improvement in 42 days of body weight and feed conversion. Fermented milk contains Lactic Acid Bacteria such as Lactobacilli. The supplementation of Lactobacilli in feed can stimulate the favorable microbial balance in intestine and consequently improve feed efficiency and growth performance. It will increase weight gain and feed efficiency when compared to control [21].

CONCLUSION

The usage of 100% fermented cow milk (T-1) and combination 50% fermented cow milk + 25% fermented soy milk + 25% fermented mung bean (T-3), it does not give significantly different results on empty carcass and body weight gain compared to control However, the giving of combination fermented cow milk (50%) + fermented soy milk (50%) (T-2) gives a significantly different result in decreasing abdominal fat.

All of the treatments do not give significantly different result on feed consumption ratio (FCR) and feed Consumption. But, there is tendecy improvement at the giving of combination fermented cow milk (50%) + fermented soy milk (50%) (T-2).

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