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THE UTILIZATION OF BAY LEAF (*SyzygiumpolyanthumWalp*) FLOUR IN FEED ON CARCASS QUALITY, MICROFLORA INSTESTINE OF BROILER

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Abstract:
The research purpose was to determine the utilization of bay meal (SyzygiumpolyanthumWalp) microflora, and carcass quality of broiler. The research method was used completely randomized design with 5 treatments and 4 replicates. The materials used for this research were 80 unsex 15 days old with average body weight 307.725±22.17 g/head. The treatments used for research were dietary with T0 (basal feed), T1 (basal feed + 1% bay leaf meal), T2 (basal feed + 2% bay leaf meal), T3 (basal feed + 3% bay leaf meal), T4 (basal feed + 4% bay leaf meal). The parameters observed were intestinal characteristic bacteria (lactic acid bacteria, Escherichia coli, and Salmonella sp.) and (carcass percentage, abdominal fat, organ visceral weight, breast meat cholesterol). The data analysis was the analysis of variance (anova) and continued by Duncan Multiple Range Test. The results showed that using bay leaf effect as in feed has significant difference (P<0.05) on lactic acid bacteria and Escherichia coli and significantly different (P<0.01) (breast meat cholesterol) but didn't significant difference (P>0.05) on carcass percentage, abdominal fat and organ visceral weight. The addition of 4% bay leaf gave the best effect on microflora, and breast cholesterol quality of broiler.

Keywords: Bay Leaf; Broiler; Carcass; Microflora.

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1. Introduction

Broiler play an important role in supporting the availability of cheap animal protein sources that are easy to obtain in Indonesia. Generally, broiler rising with the selecting breed, and regularly feed that affected to the profitable. The productivity of broiler is depend on the feed consumption, body weight, and feed conversion Natsir et al., (2012). Feed cost contributes 60-80% of production cost in a common broiler farm. Effort to improve feed efficiency in order to reduce feed cost should be achieved by the used of feed additive Natsir et al., (2013). Nowadays, proportion of feed removed in feed antibiotic growth promoters (AGPs) following pressure from the antibiotics. According to the problem the used of bayleaf as phytobiotics could be used to serve as feed additives in according to the suitability and preference, lower cost of production, reduced risk of toxicity, minimum health hazards and environment friendliness. One of the feed additives currently under investigation is bay leaf (SyzygiumpolyanthumWalp).

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Bay leaf (SyzygiumpolyanthumWalp) is natural herbs that can be utilization as medicinal and ingredients. Salam et al., (2013) reported that the curative role of bay leaf (SyzygiumpolyanthumWalp) against disorder probably due to the its antioxidant properties. It is likely that the active ingredients of the herb might be able to subside the side of this anti-inflammatory. The used of the bay leaf processed into flour form for practical used an additive present in flour form that, can reach the small intestine without left the residual effects.

The bay leaf (SyzygiumpolyanthumWalp) are traditional medicine plants that have long been associated with disease prevention that a variety of other beneficial properties, making them potentially useful as multifunctional natural feed additives (pyhtobiotics) for livestock. The active substances in this bitter plant are tannin and flavonoid that can be used as anti-bacterial. Recent research on phytobiotic in bay leaf as feed additive according to the Wiryawan et al., (2007) shown encouraging results with level 3% that broiler infected with Escherichia coli can be decreasing the amount colony of the Escherichia coli. Generally, the other problem in broiler were the fat and cholesterol content are still higher and need to be optimizing in order to producing the safety and healthy product to consumption. The fat deposition increases the body weight. The highest level of fat content is depending on the palatability and the fat deposition storage on abdominal parts. The aim of this research was to investigate the utilization of bay meal (SyzygiumpolyanthumWalp) microflora, and carcass quality of broiler.

2. Materials and Methods

Materials

The materials used were eighty unsex day old chicks with Lohman strain with uniform initial body weight 39.29±2.75 g. Each experimental flock unit was of 100x90x70 cm in sizes, equipped with waterer and feeder and raised on litter floor. The basal diet used were no antibiotic that composed based on the broiler requirement based on the NRC (1994) divided into starter (0-21 days) and finisher (22-35 days) periods. The feed and drinking given ad libitum. The composition of basal diet used shown in table 1

Methods

The research method was used completely randomized design 5 treatments and 4 replicates. The treatments used for research were as follows:

T_0: Basal feed
T_1: Basal feed + bay leaf flour 1%
T_2: Basal feed + bay leaf flour 2%
T_3: Basal feed + bay leaf flour 3%
T_4: Basal feed + bay leaf flour 4%

Variables

The variables observed were the colony of lactic acid bacteria (LAB), Escherichia coli dan Salmonella sp. in instestine, carcass percentage, visceral organ percentage, abdominal fat percentage, cholesterol breast meat of broiler.

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Data Analysis

The data analysis using analysis of variance (anova) and continued by Duncan's Multiple Range Test (Steel and Torrie, 1992).

Table 1: Composition of basal diet used

Feedstuff	**Composition**	
	0-21 days	22-35 days
	(%)	
Yellow corn	60	60
Soybean meal	28	24,5
Polished rice	-	3
Meat and bone meal	7	6,125
Corn gluten meal	3	2,625
Oyster meal	0,8	0,7
Coconut oil	-	2
Premix	1	0,875
Salt	0,2	0,175
Total	100	100
Analyzed compostion		
Metabolizable energy (Kcal/kg)	2939,12	3055,58
Crude protein (%)	21,99	20,23
Crude fiber (%)	3,63	5,96
Crude fat (%)	3,72	3,74
Ca (%)	1,35	1,18
P (%)	0,59	0,53
Lysine	0,37	0,38

3. Results and Discussions

The effect of bay leaf flour on carcass percentage, abdominal fat, and cholesterol breast meat content

Table 2: Carcass percentage, abdominal fat, and cholesterol of breast meat content.

Treatments	**Variable**		
	Carcass	**Abdominal fat**	**Cholesterol of breast meat**
	(%)	(%)	(mg/100 g)
T_0	65,23 ± 9,18	2,13 ± 0,85	86,66 ± 0,57^{e}
T_1	65,50 ±1,25	1,98 ± 0,39	82,75 ± 0,51^{d}
T_2	67,35 ± 1,89	1,70 ± 0,10	78,26 ± 0,50^{c}
T_3	68,05 ± 2,39	1,44 ± 0,59	75,57 ± 0,52^{b}
T_4	67,07 ± 2,28	1,19 ± 0,74	73,54 ± 0,55^{a}

Note: ^{a,b} ($P < 0,01$).

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The Treatments Effects to Carcass Percentage

Based on the results of the research (Table 2) administration of bay leaf flour to feed did not significant effect (P>0.05) but rather it is caused by poultry feed according to its energy level needs. According to the Mide (2013) the carcass percentage are the sufficient important factors that coordinate with the productivity of livestock. The increasing of body weight the amount level of carcass weight also constantly increase.

The averages of carcass percentage according this research range were 65.23 – 68.05% from live weight. This levels are in the normal level and due to the carcass percentage constantly with body weight. The result match with North and Bell (1992) that the level of carcass percentage of broiler level around 65-75% from the body weight before slaughtered. Mide (2013) reported that the average of carcass percentage using bay leaf with its combination in feed results were 69.40-69.44%. The several factors that affected to the carcass percentage are due to the non-carcass components e.g. (head, leg, feather, and blood). Sjofjan*et al.,* (2012) reported the final body weight are depend on the carcass percentage, and non-component carcass were blood, feather, skin, head, neck, leg, and thus visceral organs.

The Treatments Effect to Abdominal Fat Weight

Based on the results of the research (Table 2) administration of bay leaf flour to feed did not significant effect (P>0.05) on abdominal fat weight. Furthermore, it is caused by poultry feed according to its energy level needs on each treatments are relative are in the sufficient levels. Recent research on the Mahata*et al.,* (2008) stated the different sufficient levels of the fat on poultry are according to thus level nutrient composition on its feed. Crespo and Garcia (2001) reported that the levels of abdominal fat content and total fat in poultry are depend on the fatty acid profile content in basal diet. The basal diet with the low level of fatty acid level will also affected to the low of deposition of fat.

The Treatments Effect to Cholesterol of Breat Meat Content

Based on the results of the research (Table 2) administration of bay leaf flour to feed were significantly effect (P>0.01) on cholesterol of breast meat content. Thus, result shown that the level of cholesterol are according with the fat content, although the decreasing of the fat level as follows will decrease with cholesterol level. The decreasing of the sufficient levels are due to the anti-nutrional factors e.g. saponin. Suharti*et al.,* (2008) the level of tannin and saponin cycle will occur by decreasing the absorption inhibitors cholesterol levels.

The cholesterol result in the research are around 73.54-82.57 mg/100g thus levels are in the normal levels. Chan *et al.*, (1995) stated the cholesterol levels of breast meat are on the normal level were 70.00-105 mg/100g. The poultry product used antibiotics are sufficiently on the breast meat level lower of cholesterol rather than, pytobiotics on the feed. The condition thus caused by antibiotics in basal feed are due to the cholesterol level in meat. The average on this research are higher than current research by Hamiyanti*et al.,* (2013) reported the cholesterol content of breast meat on basal diet were 68.02-75.74 mg/100g. The Daud*et al.,* (2007) reported that the level of cholesterol of breast meat that produced with anti-biotics were around 36.00 mg/100g.

The utilization of bay leaf with sufficient levels 4% (P_4) are shown the lower level compared with P_3, P_2, P_1 and $P_{0(control)}$. Thus, condition are depend on the bioactive compounds in bay leaf flour

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that function as decreasing the cholesterol of breast content. The increasing of the levels from the bay leaf flour in the basal diet are affect to the liver to secretion the substanes that decreasing of the fat content.

The Effect of Bay Leaf Flour on Visceral Organ Weight of Broiler

Table 3: Visceral organ weight

Treatments	**Variable**		
	Heart	**Liver**	**Gizzard**
	(%)	(%)	(mg/100 g)
T_0	0,65 ± 0,09	2,47 ± 0,46	2,60 ± 0,62
T_1	0,63 ± 0,16	2,33 ± 0,20	2,61 ± 0,28
T_2	0,54 ± 0,05	2,13 ± 0,09	2,62 ± 0,18
T_3	0,53 ± 0,10	2,10 ± 0,15	2,67 ± 0,35
T_4	0,52 ± 0,06	1,92 ± 0,24	2,68 ± 0,39

Note: ^{a,b} ($P < 0,01$).

The Treatments Effect to Heart and Liver

Based on the results of the research (Table 3) administration of bay leaf flour to feed did not significant effect (P>0.05). Thus, condition shown the positive condition in metabolites of poultry while the condition shown with the stabile condition organs on heart after given bay leaf flour level without antibiotics. Hermana *et al.,* (2008) the bay leaf were the medicinal herbs non-toxic that safer in the basal diet in accordance that did not negative effect to the blood stream of the heart. The size of heart will changes if infected by disease or toxic properties.

The average of heart weight around 0.51-0.65% from the body weight. Thus, research result are on the normal levels according to Widianingsih (2008) on the recent research with broiler (35 days) around 0.57-0.63%. It results shown the bay leaf flour are on the positive condition without any infected cause. Talebal and Farzinpour (2005) statement the liver percentage are coordinating with the function of liver function. Liver were substantially of the energi production of carbohydrate.

The Treatments Effect to Gizzard

Based on the results of the research (Table 3) administration of bay leaf flour to feed did not significant effect (P>0.05) to the gizzard percentage. The used of bay leaf on the basal diet are constantly affect to the gizzard weight percentage while, the crude fiber were 23.54%.Garipoglu*et al.,* (2005) stated the increasing of the gizzard organs are depend on the activity of gizzard accordance with crude fibre on the basal diet. According to Amerah and Ravindran (2008) the size of the due to the level treatments of basal diet given while, the development of thus organs are not affect from feed efficiency.

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The Effect of Bay Leaf Flour on Intestinal Characteristic Bacteria

Table 4: Intestinal characteristic bacteria

Treatments	**Variable**		
	Lactic acid bacteria	***Escherichia coli*****	***Salmonella sp.****
		Log CFU/g	
T_0	$6,23 \pm 0,50^{a}$	$4,21 \pm 0,39^{b}$	$3,50 \pm 0,23^{B}$
T_1	$6,27 \pm 0,84^{a}$	$3,87 \pm 0,55^{b}$	$3,01 \pm 0,35^{B}$
T_2	$6,17 \pm 0,36^{a}$	$4,12 \pm 0,48^{b}$	$2,40 \pm 0,29^{A}$
T_3	$6,53 \pm 0,14^{a}$	$3,75 \pm 0,47^{ab}$	$2,52 \pm 0,28^{AB}$
T_4	$7,31 \pm 0,42^{b}$	$3,09 \pm 0,29^{a}$	$2,16 \pm 0,09^{A}$

Note: ^{a,b} ($P < 0,05$) ^{A,B} ($P < 0,01$)

The Treatments Effect to Lactic Acid Bacteria (LAB)

Based on the results of the research (Table 4) administration of bay leaf flour to feed give significant effect ($P<0.05$). The result are depend on the bioactive compounds in the bay leaf consist anti-bacterial system that given positive correlation into intestine microflora. Dewanti and Wahyudi (2007) stated the chemicals properties in the bay leaf were (sitral and eugenol), tannin, and flavonoid that proven with anti-bacterial system.

The factors affected to the higher of colony number lactic acid bacteria were pH of ileum. The adding of the bay leaf in the feed probably effect to the decreasing of the pH of intestine while, the number colony of lactic acid bacteria increased due to the level of the treatments. The lactic acid bacteria producing the lactic acid that affect to decreasing the number of pH and minimizing ke pathogen microorganism. Mozin*et al.,* (2015) reported the decreasing of pH in the gut affected to the increasing colony number of lactic acid bacteria furthermore, the pathogen microorganism should be minimizing.

The average of lactic acid bacteria colony in this research were (6.23-7.31 log cfu/ml). The total average of thus research are not higher than Putra *et al.,* (2014) that the amount of the lactic acid bacteria with garlic powder were (5.83-6.00 log cfu/ml). Thus, differences are accordance with several factors such as feed composition, age, and environmental condition. Sjofjan and Ardyati (2011) reported that the population of the bacteria in the gut were coordinating with age, feedstuff, and environmental. In addition, by Lumpkin, Batal, and Lee (2008) that microflora composition in the gut are has the similarity at least 30%.

The Treatments Effect to *Escherichia Coli*

Based on the results of the research (Table 4) administration of bay leaf flour to feed give significant effect ($P<0.05$). Thus, condition were caused by the bio-chemical properties in the bay leaf flour that has function as an anti-bacterial. Azizah (2004) the eugenol in the bay leaf can be disturibing the development of membrane or core of the pathogen bacteria. In addition, Dewanti and Wahyudi (2007) reported the tannin can be precipitation agent from hydrolysis of protein by react with core of cell, inactivate enzyme, and destruction and or inactivation the genetic function of bacteria.

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Sjofjan*et al.*, (2012) reported the decreasing of the Escherichia coli pathogen bacteria of number colony can be affected by the decreasing of pH caused by lactic acid bacteria that produced their enzyme (lactic acid) furthermore, the colony of Escherichia coli. Thus, statement supported with Afdora*et al*., (2010) that the Escherichia coli were the bacteria that can be growth at least with pH at least minimum 4 at maximum 9. Widodo (2010) reported the pH on ileum part were 7.00-7.50. Furthermore, the environmental condition in gut were below the 4 the bacteria can't be suitable well for growth. The lactic acid bacteria can producing the hydrogen peroxide and bacteriosin has anti-bacterial properties.

The amount of the Escherichia coli colony bacteria on this research were 3.09-4.21 log cfu/ml. The result on the treatments higher compared with Putra *et al.*, (2014) that the colony of *Escherichia coli* using garlic flour in the feed were 2.94-3.40 log cfu/ml. Thus, condition probably by the composition of basal diet and free antibiotics content. The content of antibiotics were probably were effect to the gut microflora condition while, the anti-biotics properties will decreasing both pathogen and non-pathogen microorganism.

The Treatments Effect to *Salmonella Sp*.

Based on the results of the research (Table 4) administration of bay leaf flour to feed give significantly effect (P<0.01) to the total colony of the *Salmonella sp.* on the gut microflora. The increasing of the level in the treatments on basal feed will decreasing the Salmonella level. The condition happens from the bio-active compounds that occur that can inhibit the development of pathogen bacteria while, the growth and metabolites will not occur. According to Suhari*et al.*, (2008) reported the bio-active chemicals on the bay leaf can be decreased the total colony of pathogen bacteria e.g. Salmonella sp., Bacillus cereus, Bacillus subtilis, Staphylococcus aureus, Escherichia coli, dan Pseudomonas fluorescens.

According to the Sjofjan*et al.,* (2015) stated the decreasing of the total colony of Salmonella sp bacteria are due to the treatments given also accordance with pH on the gut while the flour form of bay leaf also given that affect to the microorganism can't develop and defending theirs. Thus, on recent research were (2.16-3.50 log cfu /ml). The differences accordance with the bio-chemicals compounds in the basal feed and the environmental factor. Afdora*et al*., (2010) reported that microflora in the intestine are depend on the feed and environment. The balance composition of microflora will made gut will be optimum and absorption process also incrasing while feed efficiency also connected to theirs.

4. Conclusions and Recommendations

It could be concluded the utilization of bay leaf flour (*SyzygiumpolyanthumWalp*) can increasing the colony number of lactic acid bacteria, decreasing the Escherichia coli dan Salmonella sp. on intestine of broiler.

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