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The production performance of native chicken by the utilization of *Aleurites mollucana L.* (pecan) seed flour in feeding

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ABSTRACT: The study aimed to determine some effects of Aleurites Mollucana L (pecan) seed flour on the performance of native chicken production. Technically, this study used 100 native chickens. An experimental method was conducted using a completely randomized design (CRD). In addition, this research used 5 treatments with 5 replications. There were 25 experimental units, where each unit employed 4 native chickens. The treatments used were P0 (Control), P1 (Basal Feed + 1% of pecan seed flour), P2 (Basal Feed + 2% of pecan seed flour, P3 (Basal Feed + 3% of pecan seed flour), P4 (Basal Feed + 4% of pecan seed flour). Variables observed consist of weight of live native chicken, carcass's weight and percentage, meat's cholesterol and percentage, abdominal fatty's percentage, spleen's weight and percentage, heart's weight, and percentage, and liver's weight and percentage. Methodologically, data were analyzed using Analysis of Variance (ANOVA) from RAL. However, if there were differences between treatments and Duncan's multiple distances, a further test was applied. As result, the study demonstrated that weight of live native chicken, carcass's weight, abdominal fat percentage, spleen's percentage, heart's percentage, liver's weight, and percentage had significant difference ($P < 0.01$), but meat cholesterol, spleen's weight, heart's weight had insignificant difference ($P > 0.05$). It was concluded that the 4% addition of TBK (Aleurites Mollucana L), or pecan, seed flour, in feeding provided the best performance of native chicken's production. Further, it was recommended to conduct a further study using pecan seed oil to reduce saponins in pecan seed.

Keywords: Pecan seed flour; native chicken; carcass's weight; meat cholesterol.

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INTRODUCTION

In 2015, the increasing population of native chickens was 285.3 million chickens, while, in 2016, it was 298.7 million chickens. Averagely, the average production in 2015 and 2016 was 299.8 million tons and 315.5 million tons, respectively (Ditjennak, 2016). This means that the increasing population of native chicken is 4,70 % and production of native chicken is 5,24 %. Public consumption of animal-based protein is 7 kg/year, and it tends to increase annually, mainly in urban.

This could be seen from numerous food stalls, restaurants, and households consuming native chicken's meat, as chicken's meat diversification. Native chicken is well-liked to be consumed since its meat is gristly and manufacture-proof, has a lower fat level than broiler and higher nutrition contents, and contains 19 types of high protein and amino acid. Further, in 2015 and 2016, product consumption per capita/year derived from native chicken husbandry was 0,626 kg, while, in 2017, it was 0,782 kg (Ditjennak, 2017). Instead of genetic factors, cultivation management of husbandry mainly in intensive cultivation is necessarily considered. Recently, a healthy lifestyle has become a public trend, so the demand for native chicken's meat is increasing to satisfy an animal protein-based national need. Specifically, the public demands low-cholesterol, safe and healthy meat of native chicken. Therefore, since today's diseases comprise degrative diseases, such as cardiovascular and cholesterol, healthy lifestyle by consuming low-cholesterol meat is highly concerned.

One of the successfully determining factors in native chicken husbandry is feed. The feed should be well-formulated so that it has better palatability and facilitate production performance of native chicken. Aleurites Mollucana L (pecan) can grow for 40–60 years in tropical and sub-tropical areas. It results in average production of pecan seed as 80 kg/tree. Technically, the heating process of pecan seed is aimed to avoid toxalbumin substances that can result in toxic (Ferek, Mudjijati, and Indaswati, 2007). In detail, the core of Aleurites Mollucana L (pecan) seed contains 55 - 66 % of oil from its seed's weight. Its primarily supporting component is non-soluble fatty acid. While, the main composition of native chicken's meat is saturated fatty acid, namely non-double binding of fatty acid. In line with science development of certain impacts of fatty acid contained in blood's fat contents, animal fat is apparently not recommended due to many saturated fatty acids (SFA) and a few polyunsaturated fatty acids (PUFA). Moreover, the importance of PUFA n-3 has been known for a long period, so that the n-3 is important. Many kinds of research have been performed concerning decreasing cholesterol levels using sardinella's and skipjack tuna's oil as omega-3 source. However, there are few kinds of research examining Aleurites Mollucana L (pecan) seed flour as fatty acid source in native chicken feed.

Additionally, various researches using Aleurites Mollucana L (pecan) seed flour as feed can be analyzed from numerous parameters. Koen et al. (2018) postulated that the impacts of 3% utilization of Aleurites Mollucana L (pecan) seed flour in feeding showed the best result of others. Chemically, Aleurites Mollucana L (pecan) seed flour has dried materials (99,80 %), protein (6,21 %), fat (64,92 %), rough fiber (4,61%), ash (3,20 %), gross energy (7690 Kcal/kg), and energy 1358.40 Kcal/kg). Therefore, this research aimed to determine some effects of Aleurites Mollucana L (pecan) seed flour, materially derived from North Sulawesi, as fatty acid source in native chicken's feeding against weight of live native chicken, carcass's weight and percentage, meat' cholesterol and percentage, abdominal fatty's percentage, spleen's weight and percentage, heart's weight and percentage, and liver's weight and percentage.

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MATERIAL AND METHOD

Material

There were several steps in manufacturing process of pecan seed flour. First, pecan was smashed into small pieces, or scorns. Next, it was smoothened and dried under sunlight for 3 days, and it was ground into pecan seed flour. Further, this research used 100 unisex native chickens with mix age of 7 days. Those chicken's average weight was + 50 grams. While feed given in the starter period aged 1 day to 30 days was CP11 broiler commercial feed (containing 22% of protein).

For the aim of this research, native chicken aged 4 weeks up to 16 weeks fed by ration, containing 17 % of protein and 2800 Kcal/kg of Metabolite Energy. Feed and water were given by *ad libitum*. In detail, nutritional composition and content of treatment feed can be seen in following Table 1.

Table 1. Nutritional Composition and Content of Basal Feed and Pecan Seed Flour (TBK)

Food Substances	Basal Feed (%)	P1	P2	P3	P4
Ration	100	99	98	97	96
Pecan Seed Flour (TBK)	0	1	2	3	4
	100	100	100	100	100
Nutrition Contents					
Crude Protein (%)	17.57	17.52	17.46	17.40	17.35
Crude Fiber (%)	6.88	6.87	6.90	6.84	6.83
Fat (%)	8.33	8.61	8.89	9.17	9.46
Ca (%)	0.74	0.74	0.74	0.74	0.74
Phosphor %	0.78	0.78	0.78	0.78	0.78
Metabolite Energy (Kkal/kg)*	2829.8	2842.44	2855.08	2867.73	2880.37

Note: *The calculation result of 70 % multiplied with GE Kcal/kg

Parameter observed during this research comprised of:

a. Cutting Weight: it (gram) was obtained from the weighing result of 16-weeks native chicken, previously having been fasting for +12 hours, before they were slaughtered.
b. Carcass' Weight (gr): carcass's weight was gained from the weighing result of native chickens (in gram) without contained blood, head, neck, legs, and integral organs after they had been slaughtered.
c. Carcass's Percentage (%): it was obtained by comparing carcass's weight with cutting weight and multiplied by 100%.
d. Abdominal Fatty's Percentage: abdominal fatty's weight was divided with live weight and multiplied by 100 %
e. Giblet's Weight (gr) and Percentage (%): giblet's weight was gained by weighing internal organs, expelled out during the non-carcass measurement, including liver and spleen, gizzard, and heart. Meanwhile, giblet's percentage was obtained from the calculation of giblet's weight, divided by cutting weight and multiplied with 100 %.
f. Meat cholesterol: decision of meat cholesterol level from each treatment was analyzed using Liebermen-Burchrad model (Tranggono *et al.*, 1989). Sample of Meat cholesterol as 0,1 gr was inserted into centrifugal tube and added with mix of alcohol and hexane of 8 ml with comparison of 3:1, and well-stirred to mix completely. Then, the stirrer was washed with mix of alcohol and hexane of 8 ml, under comparison of 3:1. It was centrifugated by speed of 3000 rpm for 10 minutes. In the following, supernatant was transferred into 100 ml of roasted glass and vaporized in waterbath until it

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was dry. Residual, then, was vaporized with chloroform, little by little, while it was poured into scaling tube (up to 5 ml of volume), and added with 2 ml of acetic anhydride and 0.2 ml of colored H_2SO_4 (Pa) for two drops. Subsequently, it was rotated (vortex process) for 15 minutes and stored in the darkroom for 25 minutes. Lastly, absorbent extent was read using spectrophotometer by wavelength of 420 nm and under standard of 0,4 mg/ml.

Butchery Procedure of Native Chicken

Native chickens were weighed before they were slaughtered in order to know body's final weight. After 16-weeks of native chicken has been fasting for 12 hours, aimed to avoid bias from the contents of digestion channel, weighing, then, was performed to know their live weight. The butchery of native chicken was done using the Kosher method, by cutting their trachea, *vena jugularis*, *arteria carotid* and *esophagus* at the same time. After those chickens have completely died, they were put into boiling water at temperature of 50–54 ^{0}C for 30–50 seconds (Soeparno, 2005). Feather removal was by removing all feathers attached in the body of native chickens. Next, gizzards were completely expelled and chickens' head, neck, and legs were cut off, so that carcass was only left. Carcass obtained was weighted using digital scale and carcass's percentage was calculated. Data of abdominal fatty was taken from abdomen under skin, containing thick fatty layer. Further, data of meat cholesterol was derived from dried breast part of carcass. It was further analyzed in the Biochemical and Nutrition Laboratory of Husbandry Feed-in Universitas Gadjah Mada, Yogyakarta.

Method

The research utilized Completely Randomized Design (RAL), consisting of 5 treatments with 5 repetitions. Each unit of treatment was filled with 5 DOC-native chickens. In each repetition, 4 native chickens were taken randomly, aimed to be analyzed. Then, feeding treatment consisted of:

P0: Feed without pecan seed flour;
P1: 99 % of Basal Feed + 1 % of pecan seed flour;
P2: 98 % of Basal Feed + 2 % of pecan seed flour;
P3: 97 % of Basal Feed + 3 % of pecan seed flour; and
P4: 96 % of Basal Feed + 4 % of pecan seed flour.

Data Analysis

Analytically, data obtained were analyzed using Analysis of Variance (ANOVA). Whereas the analysis's result demonstrated significantly different effects of treatment, Duncan's test was performed further (Steel and Torrie. 1995).

RESULT AND DISCUSSION

The treatment effects of pecan seed flour utilization in feeding against the production performance of native chicken can be seen in the following Table 2. Based on Table 2, it showed the performance condition of native chickens, before and after butchery.

Treatment Effects against Cutting Weight

The observation result of this research depicted in Table 2 demonstrated that cutting weight of native chicken aged of 16 weeks was 658.0 – 784.7 gr/chicken averagely. In addition, cutting weight of native chicken aged 7 weeks through soybean's seed peel flour (TKBK) was 402 gr/chicken – 529,0 gr/chicken in average. Typically, cutting weight of native chicken is influenced by several factors, such as age and ration. Soeparno (2005) argued that some factors determining weight of live chicken were consumption, ration quality, sex, cultivation period, and activity. Specifically, Domestic chicken, genetically, was natural in nature, so that its feed was sufficiently classified based on its age level.

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Body's final weight of chicken was a growth description of native chicken used purposively to assess production performance of native chicken. Based on the result of mix design, it depicted that 4% of pecan seed flour in feeding provided significant effect against cutting weight (P > 0,01). This, then, postulated that there was relationship between cutting weight and carcass' weight and percentage. Cutting weight (P4) was 784.7 gr/chicken by carcass's percentage (P4) of 84.70 % and followed by carcass's weight (P4) of 664.7 (gr/chicken).

A greater weight of carcass was influenced by chicken's cutting weight. Chicken's cutting weight was determined by factor of nutritional content in feeding. This was similar to the statement of North (1982), arguing that a greater weight of carcass was influenced by chicken's cutting weight.

Growth performance of Indonesian native chicken during grower phase (6-14 weeks), given standard feeding and added with methionine and lysine, resulted in T1 body's final weight of 911gr/chicken, T2 of 910 gr/chicken, T3 of 1014 gr/chicken, T4 of 1064 gr/chicken. The average body's final weight, which was given by feeding of treatment, showed significant increasing (Lisnahan *et al.*, 2017). Meanwhile, Lesson and Summers (1980) set forth that the most dispositioned meat located in carcass's body was located in breast, thighs and drum stick.

Table 2. Effects of Pecan Seed Flour in Feeding against Production Performance of Native Chicken

Observed Variables	Treatments					Significance
	P0	P1	P2	P3	P4	
Cutting Weight (gr/chicken)	658.0 ± 34.10^{a}	641.9 ± 9.60^{a}	671.5 ± 18.12^{a}	$778.8. \pm 17.55^{b}$	784.7 ± 9.52^{b}	Sig
Carcass's Weight (gr/chicken)	529.9 ± 12.15^{a}	518.5 ± 16.60^{a}	533 ± 14.95^{a}	656 ± 31.74^{b}	664.7 ± 10.40b	Sig
Carcass's Percentage (%)	79.49 ± 3.97^{a}	80.67 ± 2.87^{a}	80.79 ± 1.34^{a}	84.24 ± 2.25^{b}	84.70 ± 2.34^{b}	Sig
Meat Cholesterol (mg/100 gr)	121.32 ± 2.11	121.75 ± 3.04	124.08 ± 2.25	106.73 ± 5.33	89.57 ± 8.37	Ns
Abdominal Fatty Percentage (%)	1.20 ± 0.07^{a}	1.16 ± 0.22^{a}	0.88 ± 0.55^{a}	0.52 ± 0.28^{ab}	0.39 ± 0.19^{b}	Sig
Weight of internal organs:						
Spleen						
Spleen's Weight (gr)	2.42 ± 0.27	2.46 ± 0.27	2.40 ± 0.09	2.43 ± 0.24	2.50 ± 0.23	Ns
Spleen's Percentage (%)	0.38 ± 0.03^{a}	0.36 ± 0.03^{a}	0.35 ± 0.02^{ab}	0.31 ± 0.03^{b}	0.31 ± 0.03^{b}	Sig
Heart						
Heart's Weight (gr)	4.22 ± 0.21	4.34 ± 0.45	4.12 ± 0.30	4.41 ± 0.38^{b}	4.18 ± 0.08	Ns
Heart's Percentage (%)	0.64 ± 0.03^{a}	0.67 ± 0.08^{a}	0.61 ± 0.02^{a}	0.56 ± 0.05^{a}	0.53 ± 0.08^{b}	Sig
Liver						
Liver's Weight (gr/chicken)	21.04 ± 0.39	21.07 ± 1.00	21.22 ± 0.76	22.79 ± 0.66	24.50 ± 1.39	Sig
Liver's Percentage (%)	3.20 ± 0.19^{a}	3.28 ± 0.19^{a}	3.16 ± 0.11^{a}	2.92 ± 0.08^{b}	3.12 ± 0.16^{ab}	Sig

^{a,b,c,d} Superscript was different in similar line showing significant effect ($P < 0,01$)

Treatment Effects against Carcass's Weight

Based on Table 2, the observation result depicted that carcass's weight of native chickens aged of 16 weeks revealed that P0 value was 529.9 gr/chicken and P4 value was 664.7 gr/chicken. This result was in line with Lisnahan *et al*. (2017) revealed that carcass of native chicken was 499,0 – 663 gr/chicken and carcass's percentage was 59,60 – 61,55 %. From the finding, it demonstrated that carcass's weight showed increasing, but its percentage depicted the same result. The weight of carcass is body part of native chicken after butchery, removal of feather, gizzard, head, legs,

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lungs, and/or livers (SNI, 2009). Additionally, the mean value of carcass's weight was closely related to cutting weight of carcass. 4% of pecan seed flour in feeding showed increasing weight of carcass. Many factors determined difference of carcass's weight in chickens, instead of their live weight. Soeparno (2005) postulated that environment factors had affected growth of chicken. Composition of carcass's weight and percentage was typically increasing in line with improving live weight. Further, Resnawati (2004) presented that carcass's weight resulted was affected by several factors, such as age, sex, cutting weight, body's conformation and size, fatty substances, ration's quality, and quantity and cultivated strains.

Specifically, according to the result of mix design, it displayed that 4% of pecan seed flour in feeding had significant effect against carcass's weight (P < 0,01). However, carcass's weight resulted in had significant difference, since it was followed by body's final weight. In short, the more increasing the pecan seed flour level up to 4 %, the more improving the carcass's weight. Likewise, Soeparno (2005) exhibited that the greater the live weight of chicken, the more increasing the carcass production. Therefore, any improvement of chicken's live weight had close relationship with carcass's weight.

Treatment Effects against Carcass's Percentage

In Table 2, the results of this research displayed that the highest and the lowest percentage of carcass were 84.70 % - 79.49 %, in sequence. While, the observation findings from the research revealed that 4% of pecan seed flour (TBK) in feeding was higher than the findings from the research performed by Sari (2016), where soybean's seed peel flour in feeding resulted in carcass's percentage of 71.42% – 79.69 %. In addition, the carcass's percentage of *merawang* chicken against live weight of native chicken obtained by the (BPT, 2002) was 63,58 % of *merawang*'s cocks and 55,27 % of *merawang*'s hens.

Then, the result of mix design displayed that 4% of pecan seed flour in feeding of native chicken had significant effect (P < 0,01) against carcass's percentage. This postulated that 4% of pecan seed flour in ration provided a better response for native chickens aged of 16 weeks, not decreasing percentage of carcass's weight. The carcass's percentage was size of carcass's weight where there was positively reciprocal effect between carcass's weight and percentage. (Dewanti, Irham dan Sulisyono, 2013) reported that carcass's percentage was influenced by cutting weight. This percentage was initially from growth acceleration jointly accompanied by increasing of body's weight and cutting weight resulted.

Treatment Effects against Abdominal Fatty Percentage

The observation results as depicted in Table 2 displayed that the highest and lowest abdominal fatty percentage were P0 (1.20 %) and P4 (0.39 %) systematically.

Moreover, the result of mix design showed that 4% of pecan seed flour in feeding of native chicken demonstrated significant difference (P > 0,01) against abdominal fatty percentage. The lower fatty percentage found in this research was assumedly due to significant effect of the extent of pecan seed flour in feeding. The higher level of pecan seed flour (TBK), the lower abdominal fatty percentage. In detail, viewed from its palatability, pecan seed flour had sour taste, so that native chicken disliked it.

The sour taste of pecan seed flour was due to the existence of saponin substance. A lower percentage of fat has resulted from its retard growth caused by increasing saponin in pecan seed flour level. In pecan fruit, there is saponin and alkaloid substance. Saponin is colloid dissolved in water, bitter, and has foam after shaken (Syamsuhidayat and Hutapea, 1991). Bitter taste in pecan

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seed flour is due to its saponin substance. Saponin then is secondary metabolite in biological activity. A low percentage of fat was due to slow development resulted from an increasing level of saponin in pecan seed flour. As a result, ration consumption decreased, causing declining of nutritional content absorbed including energy and fat. By decreasing energy, the fatty process in native chicken was low and it could be seen from significant decreasing in abdominal fat.

Treatment Effects against Meat Cholesterol

In Table 2, the results of this research presented that the highest meat cholesterol was displayed in the treatment of P3 (124.08 mg/100 gr) and the lowest was in the treatment of P4 (89.57 mg/100 gr). Normally, meat cholesterol of domestic chicken was 116 mg/100 gr and broilers' meat cholesterol was 110 mg/100 gr. In her research, Marfuah (2016) analyzing the utilization of garlic flour in ration against broiler's meat cholesterol level and carcass quality concluded that meat cholesterol was 73,3 – 123,2 mg/dl. The content of blood cholesterol in broiler was 107,40 – 118,52 mg/dl and abdominal fat in the 42-weeks broiler were 1,57 – 2,50 % (Meliandasari, Mahfudz, and Sarengat, 2013).

Moreover, the result of mix design exposed that 4% of pecan seed flour in feeding for native chickens had insignificant effect ($P > 0,05$) against meat cholesterol. Evidently, there was no significant influence of pecan seed flour addition against meat cholesterol of native chickens. Typically, cholesterol, originally derived from food, had significant role since this was main sterol in body and important component in cell surface and intracellular membrane. The accelerated development of feeding resulted in increasing cholesterol in ration. There is relation between level of meat and blood cholesterol. If meat cholesterol improves, it then will be followed by blood cholesterol and *vice versa*. The process of cholesterol metabolism is useful for vitamin dissolvent, membrane of cell layers and protection of neuron network. The research performed by Iriyanti *et al*. (2005) displayed that biosynthetic process of cholesterol metabolism took place in line with liver cholesterol and bile secretion increased.

Treatment Effects against Spleen's Weight and Percentage

According to Table 2, the result from research's observation presented that spleen's weight was obtained by weighing spleen. After obtained, score was divided with live weight and multiplied with 100%. The spleen's weight (gr/chicken) after treatment of 4% of pecan seed flour in feeding was 2.42 (P0), 2.46 (P1), 2.40 (P2), 2.43 (P3) and 2.50 (P4) respectively, and spleen's percentage (%) was 0.38 (P0), 0.27 (P1), 0.36(P2), 0,35(P3) and 0,31 (P4).

Thus, the result of mix design disclosed that 4% of pecan seed flour in feeding for native chicken had significant difference in spleen's weight and percentage ($P < 0,01$). Therefore, it could be said that 4% of pecan seed flour (TBK) had significant effect against spleen's weight and percentage of native chickens. Additionally, the function of spleen is blood filter and depositor of zinc, reused in hemoglobin synthesis. Nabiul *et al*. (2017) argued that lymphoid network was divided into central and peripheral. In native chicken, lymphoid network includes spleen and all mucosa, including digestion channel with *cecal* jointly related to lymphoid network consisting of harserine gland, lacrimal channel, eyelids, and mucosa larynx.

Treatment Effects against Heart's Weight and Percentage

The result of this research as depicted in the Table 2 above exhibited that 4% of pecan seed flour in feeding resulted in heart's weight (gr/chicken) of 4.22 (P0), 4.34 (P1), 4.12 (P2), 4.41 (P3) and 4.18(P4), and its heart's percentage (%) as 0.64 (P0),

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0.67 (P1), 0.61(P2), 0,56(P3) and 0,53 (P4). Meanwhile, the study performed by Fathoni, Tanwiriah and Indrijani (2016) exhibited that average of edible part from cock was carcass's weight (511 gr/chicken), carcass's percentage (59,71 %), heart's weight (5,41 g/chicken), heart's percentage (0,64 5%), liver's weight (17,86 gr/chicken), liver's percentage (2,11 %), gizzard's weight (21,25 gr/chicken), gizzard's percentage (17,91 %). The size of its heart was relatively bigger than heart's size of small poultry and its weight average of heart was 0,44% of live weight, and relative weight of heart against cutting weight was affected by poultry's size, species, age, and sex.

As a result, the mix design showed that 4% of pecan seed flour in feeding for native chicken had insignificant effect against heart's weight. However, it had significant difference ($P < 0,01$) against heart's percentage. Additionally, there was significant difference in percentage based on internal organs from heart and spleen. This was in accordance with body's final weight and cutting weight of native chicken, where percentage of internal organs was determined by consumption and addition of body's final weight.

Particularly, heart functioned as a pump and driving motor in blood circulation, and liver functioned as an exchange place of substances, such as fat, protein, bile secretion, detoxification of toxic substances and excretion of metabolite substances, not required anymore by the body. Taugan *et al*. (2013) stated that butchery in chicken affected on cutting weight and had a correlation with carcass's weight and chicken's internal organs. A positive and significant correlation during butchery was with chicken's breast, thighs, wings, heads, back part, and internal organs.

Treatment Effects against Liver's Weight and Percentage

Based on Table 2, the treatment result of this research found that 4% of pecan seed flour (TBK) in feeding resulted in liver's weight (gr/chicken) respectively as 21.04 (P0), 21.07 (P1), 21.22 (P2), 22.79 (P3) and 24.50 (P4). While, the liver's percentage (%) was 3.20 (P0), 3.28 (P1), 3.16 (P2), 2.92 (P3) and 3.12 (P4), respectively. Particularly, liver's weight resulted from 4% of pecan seed flour in feeding was still in normal state and showed health condition of native chickens. The findings of Prajwalita *et al*. (2015), examining growth study and carcass's aseel and kadanath chicken aged 5 weeks, showed that liver's percentage of 2.08 % and 1.58 %, liver was 10.73 – 9.78 and gizzard was 10,02 – 9,98. While, Isidahomen *et al.* (2012) argued that internal organs of chicken had positive correlation between live weight, carcass's weight, and chicken's weight breast.

Subsequently, the findings of mix design demonstrated that 4% of pecan seed flour in feeding of native chickens had significant effect against the liver's weight and percentage. Haunshi et al. (2013) set out that utilization of pecan seed in feeding aimed for native chicken in India could improve liver, giblet, gizzard, and abdominal fat. Liver has role in bile secretion, metabolism of fat, protein, carbohydrate, zinc, and red-blood artery, detoxification, and vitamin depositor.

Pecan seed flour contained a high fat level of 64,92 % and bile salt resulted from liver emulated fat in duodenal curve. Such fat in the form of emulation was then sliced into fatty acid and glycerol by lipase enzyme, a result of pancreas juice. Those substances were final result of fat digestion. Whereas fatty concentration in feed was significantly higher, liver would dispose of bile salt to emulate fat, presumably resulted in liver embellishment.

Conclusion and Suggestion

Conclusion

The utilization of *Aleurites Mollucana L* (pecan) seed flour in feeding as for 4 % could provide the best performance of live native chicken's

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weight, carcass's weight and percentage, meat cholesterol, abdominal fatty's percentage, spleen's weight and percentage, heart's weight and percentage, and liver's weight and percentage.

Suggestion

From this research, it recommends for further study on the utilization of *Aleurites Mollucana L* (pecan) seed flour with treatment of *Aleurites Mollucana L* (pecan) oil, so that saponin content can be purposively reduced.

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