Effects of Addition of Noni Fruit Juice (*Morinda Citrifolia*) Into Drinking Water on Final Body Weight, Carcass Percentage, Abdominal Fat and Meat Cholesterol of *Sentul Debu* Chicken Phase Growth

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Abstract. The purpose of research to determine the effect of addition Noni fruit juice into drinking water on body weight, percentage of carcass, abdominal fat and meat cholesterol on *sentul debu* chicken phase growth. The research used 120 day old chicks of Sentul chicken and were raised until 12 weeks old. The research were conducted using a completely randomized design with six levels of noni fruit juice into the drinking water, P0 (without the addition of noni juice into drinking water), P1 (1 ml of noni juice/1 liter of drinking water), P2 (2 ml of noni juice/1 liter of drinking water), P3 (3 ml of noni juice/1 liter of drinking water), P4 (4 ml of noni juice/1 liter of drinking water) and P5 (5 ml of noni juice/1 liter of drinking water) and four replications, each replication consisted of five sentul chickens. The observed variables were final body weight, carcass percentage, abdominal fat and meat cholesterol on sentul chicken. Data were statistically analyzed for variance using a Duncan’s Multiple Range test. The results showed that the addition of noni juice until 3 ml/liter into drinking water gave no significant effect on the final body weight, percentage of carcass and abdominal fat and meat cholesterol but the addition of noni juice 4 -5 ml into drinking water was decreases the final body weight, carcass percentage and meat cholesterol of sentul chicken. It can be concluded that the addition of noni juice into drinking until 3 ml/liter the best result on final body weight, carcass percentage, abdominal fat and meat cholesterol *Sentul Debu* chicken phase growth.

1. Introduction

Sentul chicken is one of 32 local chicken clumps that have been identified in Indonesia. The original habitat of Sentul chicken is from Ciamis Regency, West Java [1]. Sentul chicken has the advantage that is as a producer of meat and eggs (the type of dual purpose), body weight of adult male Sentul chicken 1.3 – 3.5 kg and female 0.8 – 2.2 kg. 118 eggs of eggs per year [2]. Sentul chicken as meat producer can be cut at various age of maintenance depending on market demand, are usually cut at the age of about 8 to 12 weeks or after reaching body weight between 700 g to 1200 g. The percentage of carcass is affected by cutting age. The longer the age of the cut will be the greater the percentage of carcasses because the carcass is part of the production, so grows larger until the age of 20 weeks. The results of the percentage of carcasses vary in various studies because influenced by various factors such as genetic differences, maintenance management, rations, chicken age and others. The cut weights and percentage of chicken carcasses at 12 weeks old reached 713.70 g and 60.05% [3]. Ration is the environmental factor that can affect poultry business success, and cause to production cost more or less 60-70 percent. The increasing of production cost can be overcome by finding other alternative feed ingredients which have good quality [4]. The alternative food ingredients which has good quality, is expected to be able to reduce the production cost, is usually also added with additional feed ingredients (feed additive). Feed additive is an additional feed ingredient given to livestock
through mixing feed or through drinking water. Feed additive there are two types of natural and synthetic additive feed [5]. One of which is the fruit Noni (Morinda citrifolia) is useful to maintain endurance and help metabolism of food substances in the body. Noni fruit produces antioxidant such as: scopoletin, nitric oxide, vitamin C and vitamin A, and has the efficacy to increase the secretion of bile and substance NO (Nitrit Oxide) that can stimulate the excretion of cholesterol through feces. According [6] Noni fruit contains xeronine active substances that can reduce fat and cholesterol levels. Xeronine has a high activity in the formation of proteins for hormones, one of which is the hormone insulin that can increase the number of LDL receptors (low density lipoprotein) hepatic and extra hepatic [7, 8]. If a lot of cholesterol is wasted through the feces, cholesterol in the blood and tissues will decrease, it is good for abdominal fat reduction or waste in chicken carcass which should be reduced to make the product of animal origin more healthy and reduce production costs [9]. The main active substances contained in the noni fruit include: polysaccharide, scopoletin, ascorbic acid, β-carotene, L-arginine, proxeronine and proxeroninase [10]. The role of these active substances is closely related to the metabolic activity that supports the addition of weight and will eventually result in a high percentage of carcass. Needs to drink humans per day 1500 ml, in 1 day the use of noni fruit in humans ± 2% of the needs of drinking water. 4-week-old broiler for 250 ml/day, so the juice noni given to broiler ± 5 ml. Comparison of noni juice for dose of 1 ml/liter and 3 ml/liter is no significant than 2 ml/liter noni juice in drinking water that gives higher benefit and low feed conversion value.

The purpose of research to determine the effect of addition Noni fruit juice into drinking water on final body weight, percentage of carcass, abdominal fat and meat cholesterol of Sentul chicken growth.

2. Materials And Methods

2.1. Livestock Experiments

One hundred and twenty day old chick of Sentul Debu chicken were raised in cages until 12 weeks old. The cage is use as 24 cages and measuring 90 cm long, 90 cm wide and 60 cm high, each cage consisted of 5 chickens.

2.2. Trial Rations

The feed ingredients of ration comprised of yellow corn meal (56.00%), soy-bean meal (12.00%), rice bran (21.50%), fish meal (9.25%), CaCo3 (0.50%) and bone meal (0.75%). Rations were prepared based on protein and metabolic energy requirement for Sentul Debu chicken growth phase, ie.17 percent protein and metabolic energy 2750 kcal/kg [11]. The treatment consisted of the use noni fruit juice into the drinking water, P0 (without the addition of noni juice into drinking water), P1 (1 ml of noni juice /1 liter of drinking water), P2 (2 ml of noni juice /1 liter of drinking water), P3 (3 ml of noni juice /1 liter of drinking water), P4 (4 ml of noni juice /1 liter of drinking water) and P5 (5 ml of noni juice /1 liter of drinking water).

2.3. Experimental design

The research were conducted using a completely randomized design with six levels of noni fruit juice into the drinking water, and four replications, each replication consisted of five sentul chickens. The data was analyzed with random simple test, and with Duncan’s Multiple range Test among the treatment the research, chickens were given only water addition noni juice without antibiotic and no vaccinations. The parameters were final body weight, carcass percentage, gizzard weight and the meat cholesterol content of Sentul chicken.

3. Results And Discussion

The effect of noni fruit juice into the drinking water on final body weight, carcass percentage, gizzard weight and the cholesterol content of Sentul Debu chicken, is shown in Table 1 and Figure 1.
Table 1. The final body weight, carcass percentage, gizzard weight and the meat cholesterol content of Sentul Debu Chicken.

| Variables                  | P0     | P1     | P2     | P3     | P4     | P5     |
|----------------------------|--------|--------|--------|--------|--------|--------|
| Final body weight (g)      | 721.83 | 761.28 | 787.23 | 794.90 | 650.66 | 619.25 |
| Carcass weight (g)         | 410.43 | 458.75 | 467.00 | 468.25 | 350.45 | 329.50 |
| Carcass percentage (%)     | 56.86  | 57.32  | 59.32  | 58.90  | 53.87  | 53.21  |
| Abdominal fat (g)          | 3.11   | 2.86   | 2.76   | 2.60   | 2.01   | 1.35   |
| Cholesterol mg/100 ml      | 85.50  | 76.55  | 74.33  | 72.55  | 71.50  | 68.67  |

Note: The similar superscript in the same row no significant difference (P >0.05)

Figure 1 The final body weight, carcass percentage, gizzard weight and the meat cholesterol content of Sentul Debu Chicken

3.1. Final Body Weight

The final body weight were variation from the lowest P5= 619.25 gram to the highest P3=794.90 gram. Analysis of variance showed (Table 1) that addition noni juice into drinking water until 3 ml did not significant influence (P0,P1,P2,P3) on final body weight of sentul chicken, but has significant effect (P <0.05) when using 4 ml (P4) and 5 ml in drinking water (P5). Adding noni juice until 3 ml/1 liter of drinking water still gave a good result, because the noni fruit contains bioactive polyphenol compounds. Polyphenolic compounds such as anthraquinone compounds ranges from 5 - 36 g / 100 g of dry matter, that can increase the body's metabolism and have the ability to fight infectious bacteria. These compounds are useful for inhibiting the growth of gram-positive and negative bacteria that can eradicate pathogenic bacteria in the gastrointestinal tract and also make the pH of the gastrointestinal tract into an acid that enables the protein-breaking enzyme to work optimally [12]. While saponin compounds are also found in noni fruit which can increase the permeability of the cell wall of the intestine so as to increase the absorption of food substances. Then [13] added that the noni fruit contains nutrients comprising proteins, minerals and vitamin C that can give a good effect on final body weight. A decrease in final body weight to increased level noni juice 4 - 5 ml (R5 and R6), because in the treatment of P4 and P5 the content of crude fiber in noni juice too high so that the performance of the less optimum proxeronine enzyme that causes little growth decreased. This is in line with research conducted [14] that the use of noni fruit juice decrease body weight if used of 5% through drinking water, which caused increased crude fiber content proxeronin compounds contained in noni fruit does not work optimally.
3.2. Carcass Weight and Carcass Percentage
The carcass weight and carcass percentage were variation, from analysis of variance showed that by addition noni fruit juice into drinking water until 3 ml did not significant influence (P0,P1,P2,P3) on carcass weight and carcass percentage, but has significant effect (P <0.05) when using 4 ml (P4) and 5 ml in drinking water (P5). These results indicate that using noni juice during maintenance provides and increased response to carcass weight and carcass percentage. This is because the active substances of xeronine in noni juice will reactivate the dead cells so that the respiration process from the cell back to run, the nutrients consumed by the chicken will be absorbed perfectly. The presence of xeronine will balance or normalize body [8]. Noni juice also contains Scopoletine and L-arginine, both active substances can work synergistically in optimizing the absorption of nutrients in the small intestine villi, such as protein. The function of protein is primarily to build muscle or meat. Carcass weight a part of chicken that contains muscle or meat and is proportional to the final body weight, so when calculated on a percentage of final body weight result is relatively the same percentage [15]. Treatment P4 and P5 was the lowest produced on carcass weight and carcass percentage, because proportion of noni juice in P4 and P5 was higher than those in P1,P2 and P3. The limiting factor for the use of noni juice is the content of crude fiber which is consumed poultry through Noni juice. At the treatment P4 and P5 crude fiber content in noni juice too high so the performance of the less optimum proxeroin enzyme that causes final body weight decreased. This is in line with research conducted [14] that the use of fruit juice noni decrease in body weight use of 5% juice noni fruit through drinking water, which caused increased crude fiber content so proxeronine compounds contained in noni fruit does not work optimally.

3.3. Abdominal Fat
The average levels of abdominal fat content of the treatments showed in Table 1. The weight of abdominal fat were variation, where P6 by giving 5 ml of noni juice /1 liter of drinking water is most lowest (1.15 g) and those in P0 without noni juice in drinking water was the highest (3.11 g). Analysis of variance showed by adding 1–3 ml of noni juice /1 liter of drinking water have no significantly effect (P>0.05) on the abdominal fat of sentul chicken, but has significant effect P <0.05) when using 4 ml (P4) and 5 ml in drinking water (P5). By adding 4 - 5 ml of noni juice /1 liter of drinking water, these was a tendency levels abdominal fat content going to decreased (P<.05). The decrease in abdominal fat because the bioactive substance as xeronine would improved the metabolism of carbohydrate and fat in the carcass. In line with the opinion [6] states that noni fruit contains xeronine active substances that can reduce fat and cholesterol levels.

3.4. Meat Cholesterol
The average meat cholesterol levels were showed at Table 1. Analysis of variance showed that by addition of noni fruit into drinking water has significantly effect (P< 0.05) on the meat cholesterol of sentul chicken. The result indicated that by treatment adding until 4 ml of noni juice /1 liter of drinking water gave the best results of meat cholesterol. Noni fruit produces antioxidant such as: scoptoletin, nitric oxide, vitamin C and vitamin A, and has the efficacy to increase the secretion of bile and substance NO (Nitrit Oxide) that can stimulate the excretion of cholesterol through feces. According [6] Noni fruit contains xeronine active substances that can reduce fat and cholesterol levels. Xeronine has a high activity in the formation of proteins for hormones, one of which is the hormone insulin that can increase the number of LDL receptors (low density lipoprotein) hepatic and extra hepatic [7, 8].

4. Conclusion
It can be concluded that the addition of noni juice into drinking until 3 ml/1 liter the best result on final body weight, carcass percentage, abdominal fat and meat cholesterol Sentul Debu Chicken phase growth.
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