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## CHARACTERISTICS OF CARCASS AND INTERNAL ORGANS IN KAMPONG CHICKEN FED NONI (*MORINDA CITRIFOLIA*) SHOOT MEAL

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### Abstract

*The paper aimed to examine characteristics of carcass and internal organs in Kampong chicken fed of Noni (*Morinda citrifolia*) shoot meal (NSM). This study was conducted for 8 weeks using 240 Kampong chicken aged 4-week-old. The diet treatments were: R0: 0% NSM (control); R1: 0.5% NSM; R2: 1% NSM; R3: 1.5% NSM; R4: 2% NSM; and R5: 2.5% NSM. In this study using a Completely Randomized Design (CRD) with 6 treatments with 4 replications. The data were analyzed using ANOVA and if any significant different, data were further analyzed using Duncan's Multiple Range Test. The parameters measured were live weights, carcass characteristics (weight and percentage of carcass, breast, thigh, back and wing) and internal organs (weight and percentage of liver, spleen, kidney, heart and gizzard). The results showed that the use of NSM did not significantly affect the live weights, internal organs and characteristics of the carcass, except on weight percentage of the carcass. The conclusion of this study was that 2.5% NSM can be used to in Kampong chicken ration because can increased percentage of the carcass.*

**Key words:** carcass characteristics, *Morinda citrifolia*, Kampong chicken.

## INTRODUCTION

Kampong chicken is one of Indonesia's potential local poultry to be developed. This chicken are widely reared by the community, relatively inexpensive and easy to maintain, however but this chicken still has low productivity below its genetic potentials (Nataamijaya 2010; Darwati 2000). Kampong chicken is also one of source of animal protein in Indonesia cause many Indonesian like to consume this chicken.

An attempt to develop of Kampong chicken has hampered by slow rate of reproduction and growth (Muryanto et al. 2002). The high demand on Kampong chicken as a broiler is contrasted to the low productivity of this chicken. Kampong chicken meat is very favoured by most Indonesians because of its savoury and distinctive taste and its chewy and not mushy texture.

Based on above reasons, the Livestock Research Institute (Balitnak) conducted research to produce Superior Kampong Chicken, known as KUB. This chicken strains is capable to grow up to 1 kg in 70 days (Sartika, T. 2016). However, the price of good ration in Indonesia is quite high due to the main ingredient is imported. Due to this reason, therefore it necessary to find an alternative resource such as Noni Shoot Meal (NSM).

NSM has 20.64% protein, vitamin A 405 IU/100 g, and complete amino acid 24.44%. To anticipated the antinutrient content, so the phytochemical analysis was conducted by Analytical Chemistry-FMIPA IPB (2017). It was found that NSM contained flavonoids, phenyl hydroquinone, saponins, steroids, tannins and triterpenoids. The amount of tannin and saponin in a certain amount can influence nutrient absorption and growth of chicken body weight. The body weight is the most important component in chicken broiler production.

This study was aimed to analyze the effect of NSM on rations on characteristics of carcass and internal organs in Kampong chickens.

## MATERIALS AND METHODS

This study was using two hundred and forty Kampong chickens of 4 weeks old were reared until 12 weeks old.

The diet treatments were: R0: 0% NSM (control); R1: 0.5% NSM; R2: 1% NSM; R3:1.5% NSM; R4: 2% NSM; and R5:2.5% NSM The parameters were body weight, carcass characteristics (weight and percentage of carcass, breast, thigh, drumstick, back and wing) and internal organs (weight and percentage of liver, gizzard, spleen, kidney, and heart).

At the end of the experiment (12 weeks of ages), two male of Kampong chickens/treatment were randomly selected from each cage for carcass measurement. Eight hours before slaughtered, these chickens were fasted, and then weighed as body weight. Chickens were slaughtered using the Kosher method, namely cutting the carotid artery, jugular vein (Soeparno 2005). Slaughtered chickens were scalded in hotwater ( $\pm 80^{\circ}\text{C}$ ) for 30 seconds, manually hanged and eviscerated. Chicken already eviscerated, lung and heart were then cut off by head, neck and legs (Badan Standarisasi Nasional 2009) and then weighed as carcass weight. A Completely Randomized Design (CRD) was used with 6 treatments with 4 replications, each of 10 Kampong chickens. Data were analyzed using SPSS analysis of variance (ANOVA), then if there were significant differences between parameters followed by Duncan Test (Steel and Torrie 1993).

## RESULTS AND DISCUSSIONS

### Characteristics of Carcass

The effect of using NSM in rations on body weight, carcass weight and characteristic carcass of 12 weeks Kampong chicken can be seen in Table 1. The body weight of Kampong chickens during the study ranged from 1235.00 - 1330.00 g/head. Based on the results of the analysis of variance, the use of NSM in the ration did not have a significant effect ( $P > 0.05$ ) on body weight of Kampong chickens. Romadhoni (2013) used a mixture of rice bran and cassava leaves in 12 weeks old Kampong chicken feed, producing body weight of 517.08 - 952.57 g.

This is due to the content of cyanide acid (HCN), tannins and crude fibre in the feed. This difference is due to NSM contains 0.03% tannin and 0.26% saponin. The tannins and saponins in rations were still below the tolerance limit, where the tolerance limit of the tannin content in chicken rations were 2.6 g/kg (Kumar et al, 2005) and saponins at 10 g / kg (Cheeke, 1989).

So it did not affect the growth of Kampong chickens during this study.

One of the success factor in chicken production is the ratio of body weight to carcass weight (Sunari et al. 2001). Cutting age is one of the parameters that affects body and carcass weight. A high body weight will increased the carcass weight (Matitaputty et al. 2011).

Tabel 1. Carcass Characteristics

Parameter	Treatments					
	R0	R1	R2	R3	R4	R5
Body weight (g)	1330.00 ± 95.02	1270.00 ± 90.08	1272.50 ± 141.80	1257.50 ± 155.82	1248.75 ± 79.54	1235.00 ± 129.95
Carcass weight (g)	811.45 ± 57.86	777.54 ± 50.58	789.06 ± 103.35	786.86 ± 108.04	773.04 ± 64.94	806.21 ± 68.90
Carcass (%)	61.04 ± 1.54 <sup>a</sup>	61.26 ± 1.52 <sup>a</sup>	61.80 ± 1.79 <sup>a</sup>	62.51 ± 1.74 <sup>a</sup>	61.93 ± 3.76 <sup>a</sup>	<b>65.49 ± 3.73<sup>b</sup></b>
Breast (g)	195.81 ± 16.64	190.66 ± 15.36	203.71 ± 29.55	198.39 ± 26.86	194.78 ± 14.32	197.69 ± 29.96
Breast (%)	24.15 ± 1.30	24.52 ± 1.15	25.79 ± 0.88	25.24 ± 1.11	25.22 ± 0.55	<b>24.41 ± 1.88</b>
Thigh (g)	297.11 ± 21.81	277.39 ± 21.24	285.70 ± 43.22	277.93 ± 39.07	280.99 ± 18.83	297.61 ± 20.77
Thigh (%)	36.62 ± 0.80	35.67 ± 1.40	36.15 ± 0.86	35.34 ± 1.33	36.42 ± 1.56	<b>37.00 ± 1.97</b>
Back (g)	190.80 ± 20.99	182.36 ± 17.61	173.59 ± 17.79	178.55 ± 25.22	172.91 ± 17.47	183.51 ± 16.02
Back (%)	23.46 ± 1.09	23.43 ± 1.12	22.13 ± 1.69	22.71 ± 1.42	22.45 ± 1.18	22.79 ± 1.17
Wing (g)	127.64 ± 6.43	118.80 ± 12.75	121.39 ± 16.31	1313 ± 27.22	117.51 ± 7.34	123.55 ± 9.83
Wing (%)	15.77 ± 0.84	15.27 ± 1.20	15.39 ± 0.39	16.64 ± 1.82	15.24 ± 0.70	15.43 ± 0.61

Average weight and percentage of the carcass of Kampong chickens were 773.04 - 811.45 g/head and 61.04 - 65.49% per head, respectively. The analysis showed that NSM did not have a significant effect on body and carcass weights. However, the percentage of carcass were significantly increased ( $P < 0.05$ ) on R5 (2.5 % NSM). According to Ayu (2016), the percentage of unsexed Kampong chickens at 12 weeks was 59.0 to 62.36%. The percentage of carcass obtained in this study was slightly higher than Ayu (2016) findings. It was suspected that NSM helped absorption process of nutrients, so that the carcass formation process was better.

The breast weight of Kampong chicken on this study was 190.66-203.71g with the breast percentage was 24.15-25.79%. Futher analysis showed that NSM did not have a significant effect ( $P > 0.05$ ) on breast weight and percentage. Compared to control, the use of NSM in the ration increased the breast carcass percentage of Kampong chicken. The thigh weight of Kampong chicken during this study was 137.04-150.74g with the thigh percentage was 24.15-25.79%. Futher analysis

showed that NSM did not have a significant effect ( $P > 0.05$ ) on thigh weight and percentage.

Kampong chicken back weight during this study was 172.91-190.80g with the back percentage was 22.13-23.46%. Futher analysis showed that NSM did not have a significant effect ( $P > 0.05$ ) on back weight and percentage.

The wing weight of chicken was 117.51-127.64g with the back percentage was 15.24-16.64%. Futher analysis showed that NSM did not have a significant effect ( $P > 0.05$ ) on wing weight and percentage

It showed at Table 1, that 2.5% NSM in ration (R5) gave an increase on percentage of carcass weight, chest weight percentage and thigh weight percentage. Meanwhile, the percentage of backs and wings tend to decline. NSM in the ration will increase the body's metabolism and maximize absorption of nutrients so that the

formation of meat will be better and it can be used to produce broiler chicken.

### Internal Organs

Internal organ morphology is influenced by nutrients absorbed by the body to produce growth. Weight and percentage of internal organs in 12-week-old Kampong chickens were presented in Table 2. The use of NSM had no significant effect ( $P > 0.05$ ) on weight and percentage of internal organs in 12-week-old Kampong chickens.

Liver weight was ranged from 23.20-25.79 g with a percentage of 2.89-3.19% of carcass weight or 1.82-1.97% of body weight. This findings were in accordance with the findings of Putnam (1991) which stated that the percentage of chicken liver ranges from 1.70% -2.80% of body weight. So the size of the heart in this study

was normal and did not enlarged, this indicated that the liver did not experience abnormalities. Increased liver weight occurs when there are foreign objects that enter the body so that the liver works harder in an attempt to attack the foreign body (McLelland, 1990). In addition, liver abnormalities are usually characterized by swelling and thickening of one of the lobes in the liver and this can cause an increase in liver weight (Spector, 1993). Saponin in rations helped liver work in detoxifying poisons by inhibiting and killing toxin-producing bacteria in the digestive tract, so that blood carrying nutrients that flow from the digestive tract through the liver is not toxic. Saponins are substances that can increase membrane permeability so that bacterial hemolysis occurs. The bacterial cell wall will break or lysis when saponins interact with bacterial cells (Robinson, 1995).

Tabel 2. Internal organs

Parameter	Treatments					
	R0	R1	R2	R3	R4	R5
Liver (g)	25.79 ± 3.15	23.11 ± 2.13	24.50 ± 3.30	23.39 ± 4.45	24.63 ± 2.28	23.20 ± 4.84
Liver (%)	3.19 ± 0.47	2.98 ± 0.31	3.16 ± 0.61	3.02 ± 0.77	3.21 ± 0.44	2.89 ± 0.64
Spleen (g)	2.61 ± 0.89	2.33 ± 0.38	2.80 ± 1.17	2.13 ± 0.50	2.68 ± 0.63	3.45 ± 2.08
Spleen (%)	0.32 ± 0.11	0.30 ± 0.06	0.36 ± 0.14	0.28 ± 0.08	0.35 ± 0.09	0.43 ± 0.26
Heart (g)	6.45 ± 1.26	5.26 ± 0.29	5.86 ± 1.06	5.34 ± 0.39	5.73 ± 0.62	5.06 ± 1.45
Heart (%)	0.79 ± 0.12	0.68 ± 0.04	0.75 ± 0.16	0.69 ± 0.12	0.75 ± 0.10	0.62 ± 0.16
Kidney (g)	6.16 ± 2.28	4.19 ± 1.92	6.21 ± 0.78	5.59 ± 1.86	6.11 ± 1.50	6.29 ± 1.40
Kidney (%)	0.76 ± 0.29	0.54 ± 0.27	0.80 ± 0.18	0.73 ± 0.31	0.79 ± 0.17	0.78 ± 0.19
Gizzard (g)	43.73 ± 4.70	44.73 ± 4.63	40.39 ± 4.45	41.74 ± 7.47	34.71 ± 14.10	38.65 ± 4.78
Gizzard (%)	5.84 ± 0.1	5.90 ± 0.51	4.81 ± 0.58	4.83 ± 0.59	4.37 ± 0.89	4.85 ± 0.70

The weight of spleen was ranged from 2.13-3.45 g with a percentage of 0.28-0.43% of the carcass weight. There was no difference in average weight and percentage of spleen compared to the control. This indicated that NSM at 2.5% did not provide negative effect on the work of the spleen.

Heart weight was ranged from 5.06-6.45 g with a percentage of 0.62-0.79% of carcass weight. There was no difference in weight and percentage of heart compared to the control.

This showed that NSM at 2.5% did not have a negative effect on heart.

The kidney weight was ranged from 4.19-6.29 g with a percentage of 0.54-0.79% of carcass weight. There was no difference in average weight and percentage of kidneys compared to control. This indicated that the content of tannin and saponin up to 2.5% level did not not affect the Kampong chicken kidney.

The gizzard weight ranged from 2.13-3.45 g with a percentage of 0.28-0.43% of carcass weight. There was no difference in average



weight and percentage of gizzard compared to the control. It indicated that NSM at 2.5 % level did not make gizzard work hard because of crude fiber content of the NSM was low.

Amrullah (2004) stated that gizzard weight was influenced by modification of size, arrangement of type of ration, and feeding phase. If the ration given had a high crude fiber content, the gizzard will work harder and can increased the size and weight of the gizzard itself.

## CONCLUSIONS

Noni shoot meal can be used up to 2.5% in Kampung chicken rations and it can increase the percentage of carcass weight and did not give a negative influence on the weight and percentage of internal organs in Kampung chickens.

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