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1 PERFORMANCE AND CARCASS COMPOSITION OF MALE MA DUCKS GIVEN BAY LEAF SOLUTION IN DRINKING WATER

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Abstract: Bay leaves contain flavonoid active compounds including quercetine and fluoretine having antioxidative and antimicrobial properties. Bay leaves can be given as feed additive to improve body metabolism in animals. This study was aimed at assessing the effects of the inclusion of bay leaf solution in drinking water on the performance and carcass quality of male MA ducks. Seventy-two male one-day-old MA ducks were allocated into battery cages (50 cm length, 50 cm width, 78 cm height). The ducks were fed commercial rations containing 21-23% CP and 2820-2920 Kcal/kg ME and given drinking water containing bay leaf solution (LDS). A completely randomized design with 3 treatments and 6 replicates of 4 ducks each was used. Treatments consisted of drinking water containing no LDS (R0), drinking water containing 4% LDS (R1), and drinking water containing 8% LDS (R2). Measurements were taken on production performance and percentages of carcass parts. Results showed that the inclusion of LDS in drinking water gave significant effects ($P < 0.05$) on body weight gain but not ($P > 0.05$) on all carcass composition parameters. It was concluded that the inclusion of LDS in drinking water up to 8% resulted in a mean body weight gain of 194.88 ± 10.88 g/head/day but did not affect the percentages of carcass and its parts including breast, wing, and thigh. It was recommended that LDS be included by up to 8% in drinking water of male MA ducks for optimal body weight gain.

Key words: weight gain; intake; percentage of carcass, male MA duck, bay leaf solution

1. INTRODUCTION

The crossbreeding of mojosari and alabio ducks has been conducted in Indonesian Research Institute for Animal Production, Ciawi since 2000 (Brahmantiyo & Prasetyo, 2001). Male MA duck, also known as king MA, is a superior meat producer with excellent reproductive properties (Laihad et al., 2018). King MA ducks are found to have faster growth rate and their meat is thicker, tenderer, more tasteful, and white in color. These ducks are also more efficient in feed utilization, and vulnerable to diseases and stress. At the age of 6 weeks, MA ducks were found to have 1370 g body weight with a carcass percentage of 62.2% and a feed conversion ratio of 2.14 (Iskandar, 2020). Ducks of 0-8 week old require 18–20% protein, 2750–2800 kcal/kg metabolizable energy, 0.6-

1.1% calcium, and 0.56–0.64% phosphorus. Male ducks aged 6 weeks had a body weight of 4138 ± 4.93 g (Syaifudin et al., 2015). Duck population was found to increase from 49.055 in 2017 to 51.239 in 2018 (Kementerian Pertanian, 2018).

Bay leaf is one of Indonesian local herbs containing flavonoid, tannin, and saponin compounds having antioxidative (Rahman et al., 2014; Sutrisna et al., 2018), antimicrobial (Aldhaher et al., 2018), and antiinflammatory (Agustina et al., 2015; Harismah, 2017) activities. These compounds can also reduce blood glucose level (Hikmah et al., 2016). Flavonoids identified in bay leaves included quercetine and fluoretine (Prahastuti et al., 2013; Novira & Febrina, 2018) functioning in serum lipid binding, modification of oxidized low density lipoprotein cholesterol (LDL), and basal metabolism. Tannin binds with mucose protein and intestinal epithelium cells to inhibit fat absorption. In the intestines, saponin and fiber of bay leaves lowers cholesterol level by binding with and inhibiting the absorption of cholesterol and also functions as antimicrobe (Ramli et al., 2017).

2. METHODS

The study was conducted at the Poultry Farm of Department of Animal Husbandry, Faculty of Agriculture, Djuanda University, Bogor. Seventy-two male MA one-day-old ducks (DOD) were allowed a one-week adaptation period to the inclusion of bay leaf extract (EDS) in their drinking water. The ducks were fed commercial rations containing 21–23% CP, 2820–2920 kcal/kg ME, 5% fat (max), 7% ash (max), 0.9% calcium (min), and 0.6% phosphorus (min) (Charoen Pokphand Indonesia 2018). Ducks were allocated into 18 battery cages (50 cm length, 50 cm length, 78 cm height) equipped with feed troughs, drinking water containers, and 60-watt tungsten lamps. Gas stove, funnel, water measurement cup, and digital balance were used to prepare bay leaf extract. A completely randomized design with treatments and 6 replicates (4 ducks each) was used. Treatments consisted of drinking water containing no LDS (R0), drinking water containing 4% LDS (R1), and drinking water containing 8% LDS (R2). Measurements were taken on feed intake (g/head/day), body weight gain (g/head/day), feed conversion ratio, and drinking water intake (ml/head/week). LDS was prepared by boiling 100 g bay leaves in 2 liters of water for 20 minutes. Boiled LDS was filtered and cooled before it was mixed with drinking water.

3. RESULTS AND DISCUSSION

Measurements on feed intake, body weight gain, and feed conversion ratio were taken within the 8-week experimental period. Means of performance of male MA ducks given drinking water containing LDS are listed in Table 1.

Table 1 Mean performance of male MA ducks given LDS

Treatment	Feed intake (g/head/week)	Body weight gain (g/head/day)	Feed conversion ratio	Drinking water intake (ml/head/week)
R0	676.47±57.15	171.69±8.65a	4.05±0.31	7378.84±1152.74
R1	688.31±48.82	174.17±25.47 a	3.95±0.73	7414.07±1507.39
R2	697.11±48.31	194.88±10.88b	3.58±0.30	8954.22±1036.52

Note: Different superscripts in similar column show significant differences (P<0.05). Treatments: R0 = drinking water (0% LDS), R1 = drinking water + 4% LDS, R2 = drinking water + 8% LDS.

It was shown that the inclusion of bay leaf solution of various levels in drinking water of male MA ducks aged 2-8 weeks did not significantly (P>0.05) affect feed intake. Feed intake ranged from 676.47±57.15 to 697.11±48.31 g/head/week and mean feed intake was 687.30±51.43 g/head/week. LDS inclusion in drinking water up to 8% was not found to give significant effect on feed intake.

Body weight gain (Table 1) was found to be significantly different (P<0.05). The highest body weight gain of 194.88±10.88 g/head/day was found in R2 (8% LDS). This indicated that in male MA ducks treated with 8% LDS inclusion in drinking water, flavonoids contained in LDS improved basal metabolism. Result of this study was in line with the notion that in addition to binding serum lipid and modifying oxidized Low Density Lipoprotein Cholesterol (LDL), quercetine and fluoretine also function in improving basal metabolism.

No significant difference (P>0.05) was found in feed conversion ratio (Table 1) which ranged from 3.58±0.30 to 4.05±0.31. However, there seemed to be a tendency of reducing means of FCR values in R0, R1, and R2

Drinking water intake was found to be not significant (P>0.05). Mean drinking water intake was 7794.04±1309.31 ml/head/week. This high drinking water intake was higher than that of other kinds of fowls as duck is a waterfowl requiring more water.

Mean feed intake, body weight gain, and drinking water intake are depicted in Figure 1. It was shown that feed intake kept increasing until week 7 and started to fall in week 8 (Figure 1a). Similar pattern was found in drinking water intake (Figure 1c). A sigmoid curve of growth with its peak indicating the attainment of physical maturity in week 8 was observed (Figure 1b).

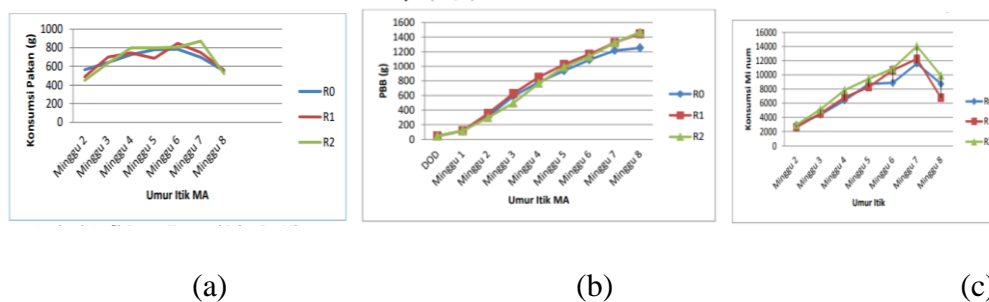


Figure 1 Means of feed intake (a), body weight gain (b), and drinking water intake (c) (/week)

Mean percentages of carcass, wing, breast, back, and thigh are presented in Table 2.

Table 2 Mean percentages of carcass and its parts of male MA ducks given LDS

Treatment	Percentage (mean \pm sd) (%)				
	Carcass	Wing	Breast	Back	Thigh
R0	62.81 \pm 14.45	17.81 \pm 1.86	27.13 \pm 1.81	25.76 \pm 4.60	26.24 \pm 5.93
R1	62.04 \pm 15.65	18.92 \pm 2.96	28.17 \pm 4.74	26.07 \pm 2.03	27.96 \pm 2.12
R2	62.77 \pm 19.69	22.55 \pm 2.79	32.23 \pm 4.42	29.49 \pm 2.00	31.38 \pm 2.90
Mean	62.54 \pm 16.59	19.76 \pm 6.64	29.18 \pm 4.62	27.12 \pm 3.07	28.53 \pm 4.73

Note: No significant differences were observed ($P > 0.05$). Treatments: R0 = drinking water (0% LDS), R1 = drinking water + 4% LDS, R2 = drinking water + 8% LDS.

No significant differences ($P > 0.05$) were found on the effects of LDS inclusion in drinking water on the percentages of carcass and its parts including wing, breast, back, and thigh (Table 2). Carcass percentage depends remarkably on slaughter weight and carcass weight. However, increased body weight gain in R2 was not linearly accompanied by increases in slaughter weight and carcass weight. This resulted in no differences ($P > 0.05$) in mean carcass percentage. Mean carcass percentage (62.54 \pm 16.59%) found in this study was higher than that (56.95 \pm 1.79%) of male Cihateup-Alabio (CA) ducks slaughtered at the age of 8 weeks in another study by Putra et al. (2015). Carcass percentage of Bali ducks fed bay leaf meal was 65.33–68.23% (Yadnya al., 2014).

Although they were not significantly different ($P > 0.05$), the percentages of wing, breast, and thigh tended to increase as the levels of LDS inclusion in drinking water increased. Breast percentage (29.18 \pm 4.62%) and thigh percentage (28.53 \pm 4.73%) found in this study was higher than those (25.38 \pm 5.16% and 26.85 \pm 3.24%, respectively) found in male CA ducks in another study (Putra et al., 2015).

4. CONCLUSION

It was concluded that the inclusion of LDS in drinking water up to 8% gave significant effects on body weight gain but not on the percentages of carcass and its parts including breast, wing, and thigh. The mean body weight gain was 194.88 \pm 10.88 g/head/day. It was recommended that 8% bay leaf solution be given through drinking water to male MA ducks for optimal body weight gain.

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