

Effect of *Terminalia catappa* Leaf Extract in Drinking Water on Performance and Carcass Production of Crossbred Native Chicken

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ABSTRACT

This research aimed to examine the effect of *Terminalia catappa* extract in drinking water on Crossbred-native chicken's performance and carcass production. The research was arranged in a completely randomized design with five treatments and 5 replications (8 birds each). The samples in the present study were two hundred crossbred native chicken with an average body weight of 120.58 ± 12.60 g. The treatments were as follows: drinking water without *Terminalia catappa* extract (T0); Drinking water with 1% of fresh *Terminalia catappa* leaf extract ten ml/1 l water (T1); Drinking water with 2% of fresh *Terminalia catappa* leaf extract 20 ml/1 l water (T2); Drinking water with 3% of fresh *Terminalia catappa* leaf extract 30 ml/1 l water (T3); Drinking water with 4% of fresh *Terminalia catappa* leaf extract 40 ml/1 l water (T4). Parameters observed were drinking water consumption, feed consumption, body weight gain, feed conversion ratio, and carcass production. Results show that *Terminalia catappa* extract in drinking water significantly affects drinking water consumption but has no effect on other parameters. Fresh *Terminalia catappa* leaf extract can be used in drinking water until 4%.

Key words: *Terminalia catappa*, crossbred native chicken, performance, carcass production

INTRODUCTION

Cross-breed native chickens are widely consumed in Indonesia. Cross-breed native chickens, often called super native chickens, are crosses between male native chickens and female laying hens (Pakaya et al., 2019). This type of chicken is preferred because it tastes like native chicken and has lower cholesterol than broiler chicken (Nugraha et al., 2016). The productivity of cross-breed chicken needs to be further developed so its availability can be continuous. Optimizing productivity and continuity can add to the economic value of cross-breed chickens. One way to increase the productivity of cross-breed chickens is by adding additives to feed and drinking water. One of the addictive substances that do not cause resistance is the use of plant bioactive substances (Pasaribu, 2019). Plant bioactive substances such as phenols, saponins, and flavonoids can inhibit the growth of pathogenic microbes in the digestive tract and improve the health status of chickens.

One of the natural ingredients that are widely found around us but have not been widely used for livestock is *Terminalia catappa* leaves. *Terminalia catappa* leaves are found in tropical regions, including Indonesia. The roadside usually plants this plant for shade. Fresh leaves are green, and the dry leaves are reddish to

brown. *Terminalia catappa* leaves are widely used in fishing (Rahayu et al., 2009). *Terminalia catappa* leaves contain antibacterial and antioxidant compounds that can be used to support livestock productivity (Amata, 2011). The content of saponins, tannins, and flavonoids is a source of antioxidants and has a natural antibacterial effect (Chanda et al., 2011). The synergy of several compounds from *Terminalia catappa* leaf extract gives this plant good antibacterial and antioxidant properties. Due to its antibacterial property, *Terminalia catappa* leaf extract is expected to maintain the ecology of the digestive tract to maximize the utilization of nutrients. As an antioxidant, *Terminalia catappa* leaf extract is expected to reduce stress so that growth and productivity can increase.

MATERIALS AND METHODS

The research was carried out for three months in the cages of the Faculty of Animal Science and Agriculture, Universitas Diponegoro. This study used two hundred unsex crossbreed chickens aged 2 weeks with an initial weight of $120.58 \text{ g} \pm 12.60 \text{ g}$. The study used a completely randomized design (CRD) with five treatments, five replications, and eight individuals per experimental unit. The treatments applied include:

- T0 : drinking water without *Terminalia catappa* leaf extract
 T1 : water with 1% (10ml/1L) fresh *Terminalia catappa* leaf extract
 T2 : drinking water with 2% (20ml/1L) of fresh *Terminalia catappa* leaf extract
 T3 : drinking water with 3% (30ml/1L) fresh *Terminalia catappa* leaf extract
 T4 : drinking water with 4% (40ml/1L) fresh *Terminalia catappa* leaf extract

Terminalia catappa leaf extraction was carried out using the aqueous (water solvent) method. Fresh *Terminalia catappa* leaves were washed with running water and air-dried. After air drying, the leaves were separated from the leaf bones and ground to form a flour. The leaves were soaked in water with a concentration of 1:5 (20g leaves in 100 ml water) for 72 hours and stirred periodically. The nutrient content of the research ration is shown in table 1.

Table 1. Research ration nutrient content

Nutrient	Content	
	Starter*	Finisher*
Water content (%)	13	12
Crude protein (%)	21.5	20
Crude Fat (%)	5	5
Coarse Fiber (%)	7	6
Ash (%)	7	8
Calcium (Ca)	0.9	0.9
Phosphorus (P)	0.6	0.5
NNFE (%)**	46.5	49
Metabolic Energy (kcal/kg)***	2,916	3,049

Information:

*) Proximate analysis results

**) NNFE is calculated by the formula $NNFE = 100 - (WC + CP + EE + CF + Ash)$

***) ME is calculated using Balton's formula cited by Sibbald (1989)

$$\text{Metabolic Energy} = \text{ME} = 40.81 (0.87 (\text{CP} + 2.25 \text{CF} + \text{NNFE}) + \text{Ca})$$

The research data were analyzed statistically using the analysis of variance (Steel and Torry, 1960), and if there were differences, it was interpreted by Duncan's multiple range test.

RESULTS AND DISCUSSION

The performance of cross-breed chickens includes feed consumption, body weight gain, feed conversion, and drinking consumption, as shown in table 2. The results showed that the total feed consumption of cross-breed chickens given liquid *Terminalia catappa* leaf extract did not show a significant effect ($P > 0.05$).

The provision of fresh *Terminalia catappa* leaf extract did not affect feed consumption, body weight gain, or ration conversion of cross-bred chickens ($P > 0.05$). The feed consumption of cross-breed chicken fed with *Terminalia catappa* leaf extract ranged from 2693.86 to 2789.07 g during the study. The increase in body weight (BW) during rearing native chickens given fresh *Terminalia catappa* leaf extract was 602.99 g/head to 671.68 g/head. Feed conversion during the study ranged from 4.30 to 4.50. Feed consumption is influenced by quality (Widyaratne and Drew, 2011). Complete feed quality will affect livestock performance and growth. Feed consumption is influenced by the availability of nutrients, especially protein. The results showed that drinking water consumption in native chickens increased by 12%, from 5545.90 ml/head to 6184.7 ml/head. Chikumba and Chimonyo (2014) stated that the drinking water consumption in local chickens is approximately 5700 – 7000 ml/head.

Table 2. Performance of cross-village chickens given fresh *Terminalia catappa* leaf extract

Treatment	Variable			
	Feed consumption	Body weight gain	Feed conversion	Water consumption
T0	2789.1±269.3	656.73± 56.1	4.30± 0.81	5545.90 ^b ±23.14
T1	2720.6±158.3	655.30± 66.73	4.18± 0.38	6825.20 ^a ±594.93
T2	2693.8±250.3	657.06± 41.04	4.11± 0.41	6511.80 ^a ±441.9
T3	2735.1±136.8	671.68± 32.09	4.08± 0.30	6491.30 ^a ±468.93
T4	2698.86±116.54	602.99± 43.30	4.50± 0.41	6184.7 ^a ±467.8
P-Value	0.9411	0.2597	0.6728	0.0033

Information :

^{a,b} Different letters in the same line show significant differences ($P < 0.05$)

The administration of fresh *Terminalia catappa* leaf extract (T1, T2, T3 and T4) increased drinking water consumption by 12% compared to T0. The content of active ingredients in drinking water such as tannins, polyphenols, saponins and flavonoids increases the rate of metabolism in the body. Increased metabolic rate causes diuresis in chickens, where excessive urination occurs in response to increased metabolic rate. Excessive urination decreases the water content in the chicken's body, so the chicken increases drinking water

consumption as compensation for losing body fluids due to diuresis. Gunawan and Sihombing (2004) stated that the metabolic rate due to the presence of certain substances that enter the digestive tract increase, and the increase in metabolism makes chickens increase their drinking water consumption. This is supported by the opinion of Nuningtyas (2013) who states that broiler chickens fed with garlic flour in feed containing active ingredients such as tannins, flavonoids and phenols can increase drinking water consumption.

Table 3. Average carcass production of crossed Kampung chickens treated with fresh *Terminalia catappa* leaf extract

Treatment	Parameters			
	Live weight (g)	Carcass weight (g)	Carcass percentage (%)	Breast to thigh meat ratio
T0	772±31.20	440.3±39.20	56.9±2.98	0.81±0.16
T1	801±72.30	463.6±54.2	57.8±1.90	0.81±0.08
T2	796±57.80	455.8±46.6	57.2±1.70	0.80±0.07
T3	791±42.90	440.6±27.8	55.7±0.67	0.79±0.06
T4	747±79.4	430±54.8	57.5±2.1	0.84±0.1
P Value	0.61	0.78	0.53	0.91

Note: The mean value shows no significant difference ($P>0.05$).

The results showed that the average live weight was between 747-801 g. The results of this study are lower when compared to Munira et al. (2016) research that the slaughter weight of cross-breed native chickens aged ten weeks reached 837.5-903.8 g. The live weight did not differ between treatments. Ouyang et al. (2016) stated that basal feeding with the addition of the flavonoid alfalfa 15 mg/kg increased carcass yield, antioxidant activity, and reduced-fat percentage. The average value of carcass weight is close to the results of research by Munira et al. (2016), where carcass weight ranges from 460–509.3 g/head. This study's average value of the carcass percentage ranged from 55.7 to 57.8%. The carcass percentage in this study was lower than that of Darmawan et al. (2017), where the percentage of super range chicken carcasses aged 12 weeks reached 59.56% -64.15%. According to Abdullah et al. (2010), the carcass percentage will increase as the chicken ages. The weight of the breast meat is lower than the weight of the thigh meat. According to Iskandar (2005), the size of the weight on the thigh of a crossed chicken depends on the genetics or nature of the chicken. The breast and thigh meat ratio was not significantly different between treatments because live weight and carcass weight were not significantly different. According to Samsudin et

al., (2012), the higher the chicken's body weight, the higher the meat produced. The ratio of breast meat in cross-breed chickens has a lower proportion than thigh meat.

CONCLUSION

Terminalia catappa leaf extract can be given through drinking water to cross-breed chickens to a level of 4% and can maintain livestock productivity and increase drinking water consumption.

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