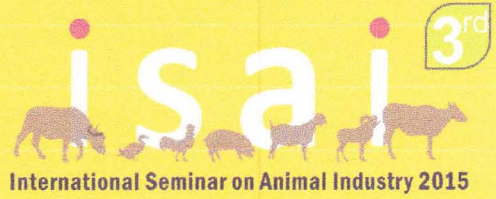




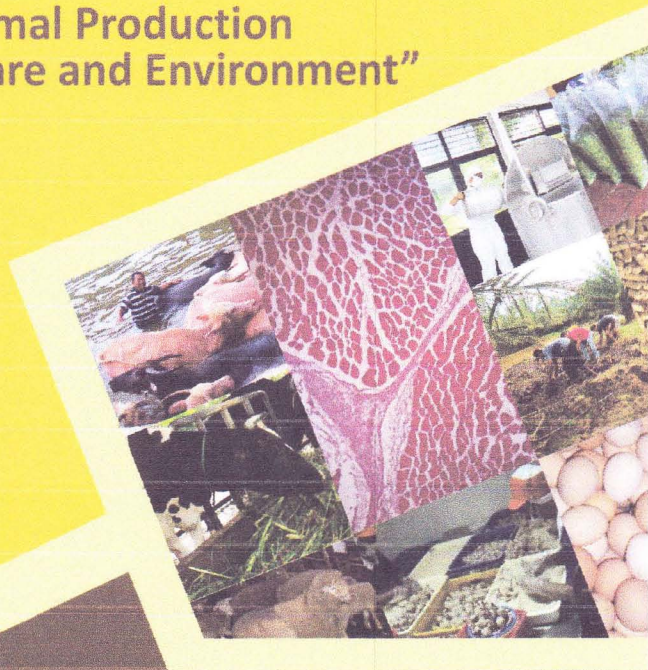
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PROCEEDING



THIRD INTERNATIONAL SEMINAR ON ANIMAL INDUSTRY “Sustainable Animal Production for Better Human Welfare and Environment”

September, 17-18 2015
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Bogor-Indonesia



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Benefit of Kemuning Leaves Meal in Ration Containing Date Fruit Waste to Suppress Gastrointestinal Parasites Infestation of Goats

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Abstract

Parasitosis is one of the obstacles in achievement optimum milk productivity. Date fruit waste (DFW) is waste from the production of date fruit juice, can be used as animal feed as an energy source, and contains flavonoid. Kemuning leaves (*Murraya paniculata* [L.] Jack) is a herb contain active compound as anthelmintic agent. The aim of this research was to study the influence of DFW without or with 1% kemuning leaves meal as anthelmintic agent to suppress gastrointestinal parasites (worm) infestation in PE goats. The research consists of the R0 (control with oxfendazole oral (dose 5 mg Kg⁻¹ BB⁻¹), R1 (ration with 10% date fruit waste (DFW)), R2 (R1 with 1% kemuning leaves meal). Nine lactating Etawah crossbreed goats of 56.7±10.2 Kg body weight, number of calving of 1–4 times and average milk production 857±173 mL day⁻¹, randomly grouped into 3 groups and each treatment 3 replicates. Data analyzed with analysis of variance (ANOVA). The parameters were feed intake, digestibility, average daily gain (ADG) and eggs per gram (EPG) of feces as indicator gastrointestinal parasites infestation. The result showed that the treatments were not influence all parameters but there was evidence that after less 6 weeks (38d and 37d) consumed the ration containing 10% without or with 1% kemuning leaves meal showed decreasing EPG similar than control. As conclusion, the ration containing 10% and with addition 1% kemuning leaves meal could be used as anthelmintic agent to solve gastrointestinal parasites infestation in PE goats.

Keywords: anthelmintic, date fruit waste, gastrointestinal parasites (worm), kemuning (*Murraya paniculata*)

Introduction

Population of Indonesia and awareness of the importance of animal protein were increased caused demand from livestock products increased, one of which milk, but it has not been fulfill by domestic milk productions. Domestic milk productions still low, influenced by several factors, including the number of dairy goats population low, the management of maintenance, feeding and disease prevention were less optimum. Characteristic tropical climate with high humidity caused easily livestock disease with a high prevalence of parasites infection. Parasites (worm) infection can decrease performance and productivity of dairy goats at 6.25%–21.5%, thus caused to economic losses (Alberti *et al.* 2012). The used of synthetic anthelmintic of worms has long been used, in a long-term period caused to resistance. Therefore can be required alternative anthelmintic medicines work effectively to suppress the viability of parasites, economical price and simple application.

Herbs plants contain active compounds can be used as anthelmintic, one of which kemuning. Kemuning leaves contain active compound such as tannins, coumarin, flavonoids and alkaloids that have anthelmintic activity. Kemuning leaves have 13 types of coumarin out of 39 types of coumarin in kemuning plants, 10 types of flavonoids out of 20 types of flavonoids in plants kemuning, and the type of alkaloid isyuehchuken (Ng *et al.* 2012). The content of phenol and flavonoid compounds in the methanol extract was 53 mg Kg⁻¹ and 41.92 mg Kg⁻¹ (Vagashiya *et al.* 2011). Chaira *et al.* (2009) recently reported that among the famous Tunisian dates the highest content of flavonoids was present in the Korkobbi variety (54.46 quercetin equivalents/100 g fresh weight). The results of phytochemical test qualitatively showed date fruit waste (DFW) contains many flavonoids (Yuniarti 2013). This research was aim to study the effects of kemuning leaves meal in rations based dates fruit waste as antiparasites in dairy Etawah crossbreed goats.

Material and Methods

This experimental used 9 Etawah crossbreed goats of first to fourth lactation period, were divided into 3 similar groups and 3 feeding treatments. The average body weight were 56.7±10.2 Kg and milk

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production 857±173 mL day⁻¹. The basal ration was consisted of 35% forage and 65% concentrate. Rations have a balance of protein and energy, with the feed additives of kemuning leaves meal and 10% level dates fruit waste (DFW). Rations were based on the requirements of goats lactation, such as 12-17% crude protein and 53-66% TDN (NRC 2007). The compositions of the nutrient content of rations of this study were presented in Table 1.

Goats were housed in the individual stall barn, made of bamboo and wood with the average size of 2 x 1.5 meters. Each stall barn was equipped with a feed and a drink. Temperatures in the stall barn between 18–32.9 °C and humidity 48%–99%, 18.0–29.3 °C and 66–99% humidity in the morning and afternoon temperatures between 22.0–28.9 °C and humidity 65–99%. Feed given 3 times a day consisting of concentrates, DFW and forage. Feed given every hour 06.30, 14.00, and 16.00, and the drink was given *ad libitum*.

Feed intake was evaluated by calculating the amount of feed intake in the form of fresh rations levels multiplied by the result of the proximate analysis. Feces collection were research end, ie for 6 days to observed digestibility of DM and organic matter (OM). DM digestibility and OM was calculated as:

$$\text{Digestibility (\%)} = \frac{\text{Intake nutrients} - \text{Feces nutrients}}{\text{Intake nutrients}} \times 100 \%$$

Egg per gram (EPG) inspection carried out before granting an anthelmintic and every week during maintenance. EPG was calculated with the method of McMaster (Permin and Hansen 1998). The efficacy of each treatments were evaluated by a decrease in the number of worm eggs or faecal eggs counts reduction (FECR) with the formula as follow:

$$\text{FECR (\%)} = \frac{\text{Average EPG before treatments} - \text{average EPG after treatments}}{\text{Average EPG before treatments}} \times 100\%$$

Table 1. Composition of feed and nutrient content (% DM)

Item	Diet		
	P 0	P 1	P 2
Ingredient, % of DM			
<i>Permisetum purpureum</i>	25.00	25.00	25.00
Pellet <i>Indigofera</i> sp.	10.00	10.00	10.00
Date fruit waste	0.00	10.00	10.00
Tempe waste	42.00	31.00	31.00
Coconut meal	15.68	16.36	16.36
Premix	0.52	0.55	0.55
White brain	5.23	5.45	5.45
<i>Dicalcium phosphate</i>	0.52	0.55	0.55
CaCO ₃	1.05	1.09	1.09
Kemuning leaves meal *)	0.00	0.00	1.00
Nutrient composition, % of DM unless stated			
Dry matter ¹	43.84	44.61	44.61
Ash	7.97	8.56	8.56
Ether extract ¹	5.17	5.07	5.07
Crude protein ¹	14.13	13.93	13.93
Crude fiber ¹	28.64	26.54	26.54
NFE ²	44.08	46.24	46.24
TDN ³	61.26	61.46	61.46

P0: control; P1: rations with 10% concentrate DFW; P2: rations with 10% concentrate DFW with kemuning leaves meal; *) Kemuning leaves meal: 1% of the concentrate DM. ¹ Results of laboratory analysis of Biological Resources and Biotechnology, BAU (2014). ² Based on calculation (%) NFE = (%) DM [(%) Ash + (%) EE + (%) CP + (%) CF]. ³ TDN = 37.937 - 1.018 (CF) - 4.886 (EE) + 0.173 (NFE) + 1.042 (CP) + 0.015 (CF)² - 0.058 (EE)² + 0.008 (CF) (NFE) + 0.119 (EE) (NFE) + 0.038 (EE) (CP) + 0.003 (EE)² (CF) (Hartadiet *al.* 1980).

Measurement of physiological responses of goat include rectal temperature, respiratory rate, and heart rate were analyzed twice a day with three replicates, in the morning at 6.00 to 07.30 and the afternoon at 14.30 to 16.00. FECR data were described in descriptive whereas the other data were subjected to statistical analysis by using *Analysis of Variance* (ANOVA) in a randomized complete block design.

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The effect of addition kemuning leaves meal (KLM) and date fruit waste (DFW) in the ration on feed intake and dry matter (DM) and organic matter (OM) digestibility were presented in Table 2. There were significantly differences in the level of feed intake (DM and OM) with the addition of kemuning leaves rations based date fruit waste (DFW), although there was a trend to higher feed intake in the group without kemuning leaves meal. The percentage of dry matter intake against body weight amounted to 3.2% (NRC (2007) stated requirements DM goat lactation 2.8%–4.6%). This indicates that DFW and KLM were not decreased palatability and the intake of dry matter and organic matter rations goats weren't disturbed by the presence of parasites (worm) infection. As well as digestibility of dry matter and organic matter were not significant differences among the treatments. Thus, it was indicated that parasites disease was not until disturbed digestibility caused by ideal feed as DFW mixture in the ration.

Anthelmintic is a chemical compound that destroy or remove worms from the gastrointestinal tract of other organs and tissues in the body of host (Permin *et al.* 1998). The impact of anthelmintic is presented in Table 3 and Figure 1. Calculation of the reduction of the number of eggs aimed to determine the effectiveness of used anthelmintic in goat. Oxfendazole directly reduces the number of eggs of *Strongylid* sp. the fourth week was the largest decrease of 100% of before treatment due to inhibiting the fecundity of the gastrointestinal nematode larvae stage (Gonzalez 1997).

Table 2. Feed intake and digestibility of Etawah crossbreed goat

Parameter	Diets		
	P 0	P 1	P 2
DM intake (g day ⁻¹)	2142 ± 430	2020 ± 280	1755 ± 295
OM intake (g day ⁻¹)	1910 ± 384	1790 ± 248	1553 ± 260
DM digestibility (%)	75.52 ± 6.30	83.21 ± 4.55	75.03 ± 4.86
OM digestibility (%)	77.88 ± 5.63	83.36 ± 4.59	76.75 ± 4.87

Reduction of the number of worm eggs kind of *Trichuris* sp. only on P2 significant drop from 700 to 600 eggs in second week treatment, then to be static until the fourth week. In other words, fecal egg count reduction (FECR) of *Trichuris* sp. -91.43%, means was decreased of 91.43% worm eggs from before treatment. Furthermore FECR *Trichuris* sp. was decreased until not found the worm eggs in the fifth week. It was a possibility due to the effected of kemuning leaves meal to suppress the development of worms, so that the worms didn't get to grow and reproduce. Thus, kemuning leaves potentially work better to suppress the number of worm eggs *Trichuris* sp. compared worms *Strongylid* sp. The result showed treatments were less 6 weeks (38d and 37d) consumed rations (P1 and P2) can be decreased similar with control (-100%). EPG factors were affected the stadium parasites, fecundity of female worms, male-female ratio of worms, immune response and experience an infection (Permin and Hansen 1998; Tizzard 1988).

Table 3. FECR *Strongylid* sp. for 5 weeks.

Week	Diets	
	P0	P1 P2
1	100.00	100.00
2	-29.72	38.42 79.87
3	-60.00	18.53 67.44
4	-70.86	18.78 69.88
5	-100.00	-18.31 -39.91
6	-100.00	-75.35 -43.67

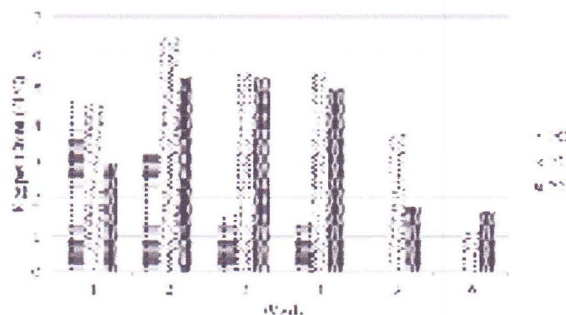


Figure 1. EPG *Strongylid* sp for 5 weeks.

Dates fruit waste not only as an energy source feed, but also has the largest active compounds flavonoids is affect against immunity, thus reduces EPG. Kemuning leaves have the most active compounds tannins, coumarin, flavonoids, alkaloids which have anthelmintic activity. The number of active compound content in the kemuning leaves and DFW allowed mechanism of synergistic or antagonistic, so it could not be predicted compounds that can inhibit or enhance these herbs work activities.

Tannins inhibit egg hatching and infective larvae development of worm by reduces the availability of nutrients for the growth of infective larvae, disrupt oxidative phosphorylation reaction or binding of free proteins in the digestive tract of the host body or glycoprotein on the cuticle of parasite (Gulnaz and Salvitha 2013; Min and Hart 2003). These activities can interfere with the metabolism and homeostasis in the body of the worm and the worm will eventually die due to lack of ATP. In addition, the collagen matrix with reactive tannins caused the lost of flexibility, hence the worm didn't moved and non-functional causes paralysis followed by death (Gulnaz and Savitha 2013).

Physiological responses of Etawah crossbreed goats belongs to normal such as heart rate heart rate 81.11–102.11 times min^{-1} , respiratory rate 27.27–52.99 times min^{-1} and a rectal temperature of 38.62 °C–39.95 °C. Qiston and Suharti (2005) reported that the physiological response of goats were 86.6 times the heart rate min^{-1} , respiratory rate 67.6 times min^{-1} and rectal temperature of 38.7 °C. The results showed that the physiological response P1 and P2 with controls (P0) were not significantly differences. Thus the rations didn't affected on the physiological response of goats.

Table 4. Physiological response of Etawah Crossbreed Goats

Parameter	Time	Diets		
		P 0	P 1	P 2
Heart rate (times min^{-1})	Morning	81.11 ± 8.68	89.96 ± 11.03	87.54 ± 14.16
	Afternoon	92.99 ± 10.67	91.38 ± 8.10	102.11 ± 15.65
Respiratory rate (times min^{-1})	Morning	27.27 ± 6.99	37.22 ± 10.77	32.23 ± 10.25
	Afternoon	41.22 ± 12.14	57.08 ± 16.40	52.99 ± 11.49
Rectal temperature (°C)	Morning	38.62 ± 0.20	38.66 ± 0.18	38.67 ± 0.18
	Afternoon	39.01 ± 0.18	38.95 ± 0.22	39.11 ± 0.19

Conclusion

It is concluded that combinations of dates fruite waste and kemuning leaves meal were potential as anthelmintic to reduce parasitic (worm) egg counts *Strongylid* sp. and *Trichuris* sp. and could be alternative solution as anthelmintic, to lowers the risk of disturbance of the parasite on goat, but with slow activities.

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