

The use of kume grass (*Sorghum plumosum* var. *Timorensis*) bioconverted with white-rot fungi (*Pleurotus ostreatus*) fed on local goat in East Nusa Tenggara

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ABSTRACT: This experiment was undertaken for three months to study the use of kume grass (*Sorghum plumosum* var. *Timorensis*) bioconverted with white-rot fungi (*Pleurotus ostreatus*) fed on local goat due to the increased perception that antibiotics and chemical compounds should not be routinely used as feed additives. The experiment used twenty four local goat of 1 – 1.5 years old with an initial body weight ranging from 11.65 to 16.49 kg and coefficient of variation 10.31 %. Experimental design used was completely randomized design consisted of three treatments and five replications. The treatments were T₀ = 100% basal feed; T₁ = 84% basal feed + 16% kume grass; and T₂ = 84% basal feed + 16% bioconverted kume grass. The variables measured were nutrients (dry matter, organic matter, crude fat, crude fiber, and nitrogen free extract) intake. The results of the research indicated that nutrients intake (dry matter, organic matter, crude fat, crude fiber, and nitrogen free extract) of T₁ was significant (P < 0.05) better than the other two treatments except crude protein. Meanwhile, nutrients digestibility (dry matter, organic matter, crude fat, crude fiber, and nitrogen free extract) of T₂ was significant (P < 0.05) better than the other two treatments except nitrogen free extract, and for body weight gain as well, T₂ was significant (P < 0.05) better than the other two treatments. It is concluded that kume grass bioconverted with white-rot fungi increased nutrients digestibility of the diet and positively affected the growth of local goat, and in turn increased body weight gain.

Key words : kume grass, white-rot fungi, bioconversion, local goat

INTRODUCTION

The availability of good quality for animals during a year is a main problem facing by smallholder farmers, especially in eastern part of Indonesia as the biggest contributor of national meat production. Most of feeds available in this region have high fiber but low protein content, such as rice straw and low quality grass. This feed has a potential role on ruminant animal productivity and environmentally friendly in the region (Suharyono *et al.*, 2006). Annual native grass like kume grass (*Sorghum plumosum* var. *Timorensis*) are abundant during a short period of rainy season in West Timor, particularly in Kupang and its surrounding with an average of production exceeding 17 tonnes of fresh matter. Attempts have been made to utilize it as feed to both Bali cattle and local goat. However, kume grass contains high proportion of lignin (i.e. 7.51%) and its digestibility is very low. As a result, small amount of kume grass is being used for feed for ruminant animals (Dami Dato, 1998). In our studies with cattle, we found that the use of kume standing hay (*Sorghum plumosum* var. *Timorensis*) hydrolyzed with natural alkali as Bali cattle feed and supplemented with additives of bioplus and bioport probiotic each at level of 100 g was able to increase the intake of dry matter, organic matter, crude protein and crude fiber and growth of Bali cattle (Dami Dato *et al.*, 2010). However, increasing attention has been placed on the use of natural products, instead of chemical feed additives such as antibiotics and ionophores, as manipulators of rumen fermentation. There has also an increased perception that antibiotics and chemical compounds should not be routinely used as feed additives (Russell and Rychlik, 2001). Therefore, the experiment presented was carried out to study the use

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kume grass (*Sorghum plumosum* var. *Timorensis*) bioconverted with white-rot fungi (*pleurotus ostreatus*) as feed on Kacang goat.

MATERIALS AND METHODS

The experiment used twenty four local goats of 1 – 1.5 years old with an initial body weight ranging from 11.65 to 16.49 kg and coefficient of variation 10.31 %. They were selected according to body size and age based on teeth examination recommended by Mulyono dan Sarwono (2004) and then they were weighed in order to find uniform body weight. Experimental design used was completely randomized design consisted of three treatments and five replications. The treatments were T₀ = 100% basal feed; T₁ = 84% basal feed + 16% kume grass; and T₂ = 84% basal feed + 16% bioconverted kume grass. They were formulated to meet National Research Council (NRC, 1985) requirements for goats. The variables measured were nutrients (dry matter, organic matter, crude fat, crude fiber, and nitrogen free extract) intake. Nutrient content of dietary treatments were presented in Table 1. Feed intake was recorded daily, while bodyweight was weighed biweekly. SAS programme package was employed to analyze data (SAS Institute, 1989).

Table 1. Nutrient analysis of dietary treatments (% DM basis)

Nutrient	Treatment		
	T ₀	T ₁	T ₂
Dry matter	20,17	90,21	65,63
Ash	11,63	4,93	8,94
Organic matter	8,54	85,28	56,69
Crude protein	7,56	1,89	10,91
Crude fiber	32,84	49,94	30,28
Crude fat	2,92	0,87	1,94
Nitrogen Free Extract	45,05	42,37	47,93
Total Digestible Nutrients	56,49	50,89	58,51

RESULTS AND DISCUSSION

The statistical analysis of the experiment are presented in Table 2. Statistical analysis showed that treatment significantly ($P < 0.05$) affected the all variables measured. Nutrients intake of kume grass bioconverted with white-rot fungi treatments were better than control. Further test, in general, the results indicated that kume grass bioconverted with white-rot fungi treatments were significantly differ ($P < 0.05$) from control. This study was in agreement with the previous reports of Devendra and Burnt (1994) who reported that total feed intake determine nutrients intake and in turn increased body weight gain. It means that lignocellulose content of kume grass hay was eliminated by white- rot fungi through the bioconversion process. Working with sheep, Tarmidi (2004) also found the use of 16 % tofu-by product in the diet of sheep was improved by bioconversion process of white-rot fungi.

Table 2. Mean of nutrients intake (g d⁻¹) and bodyweight gain (kg d⁻¹) of goats fed on kume standing hay bioconverted with white-rot fungi.

Nutrients	T ₀	T ₁	T ₂
Dry matter	415,26 ^a	559,52 ^c	501,49 ^b
Organic matter	366,97 ^a	500,44 ^c	445,32 ^b
Crude protein	31,39 ^a	37,21 ^b	40,62 ^c
Crude fat	12,13 ^a	14,49 ^c	13,84 ^b
Body weight gain, kg	16.29 ^a	27.63 ^b	32.77 ^c

Notes : ^{a,b,c}Means within a row with unlike superscripts differ ($P < 0.05$).

CONCLUSIONS

From the results obtained during the three months of feeding trial, it can be concluded that kume grass bioconverted with white-rot fungi increased nutrients digestibility of the diet and positively affected the growth of local goat, and in turn increased body weight gain.

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