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Performance of Bali Cattle that Given of *Lannea Coromandelica* Bark Boiled as *Feed Additive*

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Abstract

A research has been done to know the appearance of Bali cattle that given of Lannea coromandelica bark boiled as a feed additive. The research used a completely randomized block design (CRBD) with four treatments and three replications. Each replicates using three Bali cattle. The weight of male Bali cattle used was 137.5 - 235 kg. The basic ration is formulated based on dry matter percentage (%DM). A basic ration that given is the same for four treatments that are: 50% Heteropogon contortus, 20 % gliricidia, 1% urea and 29 % rice bran. The treatment is as feed additive level. Basic ration + 0 ml feed additive (A), basic ration + 1000 ml feed additif (B), basic ration + 1500 ml feed additive (C) and basic ration + 2000 ml feed additive (D). Variables observed were: dry matter intakes nutrient intake, weight body of gain and feed convertion ratio. The result of this experiment showed that present 1000 ml – 2000 ml feed additive of Lannea coromandelica boiled is significantly different (P<0, 05) increasing dry matter intake, nutrient intake, and body weight of gain. The result of the experiment can be concluded that present 1000 ml – 2000 ml feed additive of Lannea coromandelica boiled in the basic ration can be increasing dry matter intake, nutrient intake and performance of Bali cattle.

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1. Introduction

Protein necessaries that have a source from the cattle to the Indonesian community, a very day is more and more increased. This case in a row with increase community consciousness for beat consumption, inhabitant population gain, and community income. Cattle protein consumption increased with, to Indonesian community also strive for beat supplying efforts with cattle population increase. World food organization (FAO), cattle protein necessaries standard determine to Indonesian community as big as 6 g /head/day, while beat necessary to Indonesian community is just now fulfilled: 5,45 g /head/day. This case means beat requirement for Indonesian community lack still: 0,55 g /head/day. Beat lack a set of problems overcome that faced by Indonesian community, so need done lump cow rearing.

Bali cattle is one of the moment lump cattle at Indonesian, that need to conservated and developed optimal see because at this Indonesian original nutfah plasma, have a contribution that very real to income farmer increasing, religion income and beat supplies in an effort to fulfillment beat necessaries for Indonesia community. Also besides at the endogenous cattle in Indonesian, combined quality special have, with others lump cattle that cultivated in Indonesian. Quality special one of the wrong has carcass percentage as big as 56,9 % (Barker, 1975). Guntoro (2008) explain national see beat necessaries all as big as 26,60 % can be supplied by lump cow beat.

Rearing of Bali cattle as lump cattle prominent interest aimed at increasing efforts of productivity. Hardjosubroto (1994) explains that lump cattle usually evidenced as a function from reproduction and growth level. The productivity of Bali cattle shall become optimal if supported with growth. The growth of Bali cattle very effective by many factors, one of the factors among is the availability of qualitative and quantitative feeds. Oka *et al.*, (2012) explain that productivity of cattle, for growth and production superior, 60 % effectivity by feeds, nutrient content, and technology of rations formulation.

Heteropogon contortus constitute one of the nature grass, very potential to be used as feeds of cattle, but crude protein content only 5.91 % (Sio, 2012, unpublish data), until if it was given to Bali cattle as feeds one caused Bali cattle growth to become decrease, that is affected to low weight of body gains. In connection with low crude protein of Heropogon contortus, solutions that can be used is the utilization of Heteropogon contortus with gliricidia, rice bran, and urea with rations formulation technology. Gliricidia as a functional feed that can be increasing crude protein of Heteropogon contortus. Putra (1999) explain that gliricidia contain crude protein and total digestible nutrient (TDN) with high classified which fast high amoniogenetions, thus it can be increasing growth of microbe rumen and also its activity in producing high of metabolite rumen.

Sutardi (1995) explains that one of the feed that can be used as a protein source that easy degradation is glyricia, 66 % of total protein containing can be raced body protein synthesis of microbe. Rice bran as the energy source of feed ready used, and Urea as nonprotein nitrogen (NPN) source, that used ammonia source for ruminant cattle (Hartadi, 1990). Rations formulation with this feed matter, have protein and energy that balance and complete. But this case not yet able increasing cattle growth, because protein and energy that available is protozoa feed, until protein and energy necessary for bacteria not fulfilled. This case shall cause bacteria activities to feed digestibility is not optimal until metabolic rumen product that produced is not maximal. In other to one of strategy that has been done is the utilization of Lannea coromandelica bark boiled water as feed additives. Lannea coromandelica bark boiled contain saponin (30 %), fenol (31,7 %) and flavanoid (0,43 %) compound, have the quality as a defaunation agent, cause low of protozoa and increase bacteria. The bacteria population is increasing so that bactery activity increasing in metabolite is high producing an energy source to cattle growth increasing.

2. Materials and Methods

2.1 Location and Experiment Time

The research has been done at cattle pen of breeder **"**Ulnaet Tuan" Letmafo village, Insana Central sub-district, North Central Timor Regency, East Nusa Tenggara province (NTT) during 3 months.

2.2 Pen and Cattle

Pen used in this research is an individual pen with dimension 1,5 x 2,0 m, as many as 12 for 12 Bali cattle. The pen has eaten place 75 cm x 60 cm, and pail as drink place. Pen roof from *gewang* leaf, floor from cement and eat place from the wood shelf. Cattle that used in this research is 12 Bali cattle, age two-three years with body weight average is 178 kg.

2.3 Ration and drink water

Rations used in this research consist of Heteropogon *contortus*, *gliricidia*, rice bran, urea that formulated based percentage dry matter (% DM) and *feed additives Lannea coromandelica* boiled. Cattle drink water is from the well.

2.4 Ration and Drink water Present

All treatments acquired same ration, and *Lannea coromandelica* bark boiled as *feed additives* present for treatment A = 0 ml, B = 1000 ml, C = 1500 ml and D = 2000 ml. Present *Lannea coromandelica* boiled is mixed with rice bran and urea in the mash, then given at cattle treatment appropriate. After that given mash, Heteropogon *contortus* and *gliricidia* can be given. Drink water is given after *Heteropogon contortus* and *gliricidia* present.

2.5 Lannea coromandelica Boiled Production

The bark of *Lannea coromandelica* taken from the tree, then of equal weight and boil with water (bark 1 kg: water liter 2) during 20 minutes at boil drip 20^0 c. Bark boiled water then filtered from the bark and mixed with rice bran treatment appropriate.

2.6 Research Tools

The tools that used in this research consisted electronic egual (Allflex) for body weight, egual with 50 kg capacity to ration weight, egual for ration residue weight, chopping knife, sickle, spade, bucket, and washbasin.

2.7 Experimental Design

The design used in the study is a randomized block design (RAK) with 4 treatments and 3 groups rations for cattle as replication. Each replay (experimental units) using three Bali cattle males aged two to three years with the average weight: 177.5 kg (I), 175.5 kg (II), 177.3 kg (III) and 181,7 kg (IV). Fourth ration treatments tested were: ration basalt without any feed additive as a control (A), rations basic with *feed additive* 1000 ml (B), rations basic with *feed additive* 1500 ml (C) and a ration basis with the *feed additive* in 2000 ml (D).

2.8 Variable Observed

The variables measured in this study are dry matter intake, nutrient intake, weight gain, feed conversion ratio (FCR).

2.9 Statistics Analysis

The collected data can be analyzed with variance and if be found significantly different ($P < 0.05$) among the treatment so continued with Duncan's multiple tests (Steel and Torrie, 1989).

Table 1
Rations Composition of Observation (%DM)

Rations Composition	Treatment			
	A	B	C	D
Heteropogon Contortus (%)	50	50	50	50
Glyricidia sp (%)	20	20	20	20
Urea (%)	1	1	1	1
Rice bran (%)	29	29	29	29
Feed Additives (ml)	-	1000	1500	2000
Total	100	100+1000	100+1500	100+2000

Table 2
Nutrient Content (%DM)

Nutrient Content (% DM)	Treatment				Standard Kearl (1982)
	A	B	C	D	
Dry Matter (%)	92.37	92.37	92.37	92.37	
Energy (Kcal/kg)	4086.79	4086.79	4086.79	4086.79	
Crude Protein (%)	12.4	12.4	12.4	12.4	12.32
Crude Fiber (%)	18.63	18.63	18.63	18.63	
Crude Fat (%)	5.96	5.96	5.96	5.96	
Organic Matter (%)	88.45	88.45	88.45	88.45	
Lannea Coromandelica boiled					
Fenol (g)	-	2,7	4,05	5,4	
Flavanoid (g)	-	4,30	6,45	8,60	
Saponin (g)	-	6	9	12	
Tanin (g)	-	0,08	0,12	0,16	

Analysis at Laboratorium feeds chemistry, Faculty of Husbandry, Nusa Cendana University, Analysis at Laboratorium Analytic Udayana University, Analysis at Laboratorium Cattle Research Office Ciawi and laboratorium Biofarmaka, faculty of Formation, Hasanudin University.

Sample collections and the remain rations as soon as analysis procedure. Rations consisted of sample collections Heteropogon contortus, Gliricidia, and rice bran was taken each 200 g per day before that given. The remain rations of Heteropogon contortus, Gliricidia, and rice bran were taken 200 g at the morning before that given. After all rations and the remaining sample to be collected, each sample and the remain of rations were mixed appropriate of the treatment and subsamples were taken as many as 200 g for to analyzed at the laboratory. Feces and urine collections conducted belong / within 7 days at the finals research. Feces each of tail was carried as many as 200 g per day, afterward sunbathed under of sunshine until dry, equaled his weight afterward. After all of the collected feces, feces were mixed and milled and were taken 200 g for analyzed at the laboratory. Rations stool sample and proximate analysis conducted about the dry matter, organic matter, crude protein, crude fiber, and gross energy. The remain of ration dry matter conducted only sample analysis. All data obtained in this study were analyzed using analysis of variance and treatment whenever significanly are different ($P < 0.05$), the analysis were continued using Duncan test at level 5% (Steel and Torrie, 1989). Quadratic regression analysis (polynomial) used for supplemented determine optimal Lannea that coromandelica boiled, in other to gain body weight can be Bali cattle that optimal.

3. Results and Discussions

3.1 Dry Matter and Nutrient Intake

Consumption of dry matter, crude protein, organic matter, gross energy, crude fiber, are presented in Table 3. The results showed supplementation of *feed additive* bark Lannea *coromandelica* boiled water were significantly

different (P<0.05) increases dry matter intake compared with treatment without *feed additive* (A). The highest dry matter intake in treatment D (6.9 kg / e / h). Consumption of crude protein in treatment B, C and D were statistically significantly different (P <0.05) increase compared to treatment A. crude protein consumption is the highest in treatment C and D. Consumption of organic materials at treatments that given *feed additive* were statistically significantly different (P<0, 05) compared with treatment A. consumption of organic matter is the highest in treatment D. Energy consumption at treatment that given feed additive is highest compared to treatment A, but were statistically not significantly different (P>0,05). Energy consumption highest in treatment D. consumption of crude fiber treatment getting feed additive bark decoction *Lannea coromandelica* significantly different (P<0.05) increased in comparison with treatment A. consumption of crude fiber highest in treatment D (table 3). Dry matter intake and nutrient rations at its core are to meet the energy needs of cattle, so cattle stop eating if their energy needs have been met. This is in line with the (Putra, 2006) that it will continue to consume livestock rumen dry ingredients and nutrients to energy needs are met and at the same time, the animal will stop eating even though rumen capacity can still be filled. The level of feed intake is influenced by several factors such as capacity digestibility crane fermentative (rumen), composition and ration nutrient, pallabilitable and feed digestibility. Dry matter and nutrient intake at this research are high, this thing caused by something that as (1) composition and ration nutrien. Formulation of ration (Table 2) on a chemistry have a composition and nutrien content is high and complete for rumen microba and cow cattle as a nursemaid. Feed chemistry composition is one of a factor that effected to dry matter intake. Feed protein content that low will decreasing dry matter intake (Bowker *et al.*, 1978). (2) *Feed additif* of *Lannea coromandelica* bark boiled. *Lannea coromandelica* boiled contain flavanoid, saponin and fenol compound. Flavanoid compound function increasing cattle pallatable, see because ration intake is increase, in othre to dry matter and nutrien intake is rise. Saponin and fenol compound function as defaunase agent, see increasing metabolism and feed digestibility (Table 5). Most hight feed digestibility fermentive and hydrolitic, mean acceleration of ingesta and nutrient absorption, see because of many more space that onhand to feed increment. Dry matter intake at this research larger compared with the result of research Mariani (2013) that as dry matter intake as big as 4,90 kg/e/h – 5,40 kg/e/h, at protein and energy needs of growth bali cattle be based on feed experiment and body composition. Energy intake at this research higher compared with reserach of result Suryani (2012) that is as big as 23090 Kcal, whereas dry matter and organic matter intake lower compared with Suryani (2012) that is dry matter intake as big as 7003,52 g/e/h and organic matter intake as big as 5991,69 g/e/h at bali cattle that given green feed with species and composition that different. Crude protein intake at this research lower compared with research of result Mariani (2013) that as 0,52 kg/e/h – 0,80 kg/e/h at protein and energy needs of growth bali cattle be based on feed experiment and body composition.

Table 3
Average of Nutrient Intake during Observations

Variable	Treatment				SEM
	A	B	C	D	
Dry Matter Intake (kg)	5.32^{b}	6.21^{ab}	6.54^{a}	6.62^{a}	0.11
Crude Protein Intake (kg)	0.48^{b}	0.58^{a}	0.63^{a}	0.63^{a}	0.02
Organic Matter Intake (kg)	4.65^{b}	5.44^{ab}	5.74^{a}	5.81^{a}	0.10
Energy Intake (Kcal)	23543,6^{a}	24371,67^{a}	24960,53^{a}	25923,99^{a}	791,97
Crude Fiber (kg)	0,90^{b}	1,03^{a}	1.07^{a}	1.09^{a}	0.02

Explanations: Number with different superscript in the same row are significantly different (P<0.05)
SEM: Standard Error of the Treatment Means

3.2 The Performance of Bali Cattle

The average daily weight gain of Bali cattle during the study are presented in Table 4. The results showed that treatment get supplemental *feed additive of Lannea coromandelica* of 1000 ml (B) weight of body gain highest compared with treatment A, but statistically not significantly different (P>0.05), whereas at treatment C and D statistically significantly different (P<0,05) increase daily weight gain compared with treatment without supplementation *feed additive Lannea coromandelica boiled* (A). The highest weight gain in treatment D (0.69 kg / e

/ h). The weight of livestock is the result obtained from an animal to consume the ration on the size of a particular time. The weight of livestock affected by the type, quality, and continuity of feed. Sukardi *et al*., (2005) say the weight of body gain affected by protein and calorie that consumption. Nuriyasa (2012) say ration consumption is highest can be body weight highest resulting.

The weight of body cattle is the result of feed intake by a cattle at certain time dimension. Cattle weight of the body is affected by feed species, quality and quantitative. The weight of body gain at this research is high, this thing related to with supplementation feed *additives* of *Lannea coromandelica* boiled. Flavanoid, saponin, and phenol compound that be found at *Lannea coromandelica* boiled, able increasing ration intake that position correlation to increasing dry matter and ration nutrient intake (Table 3). And dry matter and ration nutrient digestibility (Table 5). Dry matter and ration nutrient intake are high, have interest meaning for microbe rumen growth, see the fermentable process in the rumen are maximally resulting rumen metabolite (VFA and N-NH_3). VFA and N-NH_3 is rumen fermentation product, used as energy source for cattle growth. More hight VFA and N-NH_3 absorption by cattle will positive contribution to cattle growth that indicated with his hight weight of body gain.

Yaghoubi *et al*., (2008) reported that the calf is given a dose of medium and high flavanoid respectively 7.3 x 10-4 g / kg of body weight and 3.6 x 10 -3 g / kg body weight at both doses of flavonoids have resulted in increased response humoral immune at the age of 4-5 weeks in calves followed by an increase in body weight at week 5 and 6.

Supplementation *feed additive* of *Lannea coromandelica* boiled as big as 1500 ml, is efficient in changes rations become body weight. It is can be seen at a number of FCR treatment C, that lower that means is most efficient (Table 4). Supplementation feed additive of *Lannea coromandelica* boiled at treatment C significantly different (P<0,05) increasing rations using efficiency that showed with lower FCR. The weight of body gain at this research higher compared with research of result Mariani (2013) that as 0,56 kg/e/h at rations with protein and energy different. Suryani (2012) obtain the weight of body gain is highest that as 0,88 kg/e/h at Bali cattle that given green feeds with different species and composition.

Table 4
Performance of Bali Cattle

Variable	Treatment				SEM
	A	B	C	D	
Initial Weight (kg)	177,5[a]	175,5[a]	177,3[a]	181,7[a]	9,72
Final Weight (kg)	213,3[a]	225[a]	236,7[a]	243,7[a]	13,21
Total Weight Gain (kg)	35,8[b]	49,5[b]	59,33[a]	62[a]	2,83
Weight Gain (kg/day)	0.40[b]	0.55[ab]	0.66[a]	0.69[a]	0,03
Feed Conversion Ratio	13,78[b]	11,58[b]	9,92[ab]	9,6[ab]	0,87

Explanations: Number with different superscript in the same row are significantly different (P<0,05)
SEM: Standard Error of the Treatment Means

Table 5
Nutrient Digestibility During of Observations

Variable	Treatment				SEM
	A	B	C	D	
Dry Matter (%)	53,34[b]	62,73[a]	71,54[a]	69,55[a]	1,62
Crude Protein (%)	56,14[ab]	65,93[a]	71[a]	71,93[a]	2,99
Crude Fiber (%)	57,05[b]	66,83[a]	71,1[a]	71,43[a]	1,39
Organic Matter (%)	56,64[b]	65,43[b]	73,49[a]	71,58[a]	1,53

Explanations: Number with different superscript in the same row are significantly different (P<0,05)
SEM: Standard Error of the Treatment Means

4. Conclusion

Based the results and discussion of this study, it can be concluded that: Present feed additives of Lannea coromandelica bark boiled water significantly different ($P<0.05$) increasing dry matter intake, crude protein intake, organic matter intake, crude fiber intake and positive contribution to body weight increases. Present 2000 ml feed additives of Lannea coromandelica boiled water, able increasing body weight gain of male Bali cattle 0,69 kg/tail/daily.

Conflict of interest statement and funding sources

The author(s) declared that (s)he/they have no competing interest. The study was financed by the author.

Statement of authorship

The author(s) have a responsibility for the conception and design of the study. The author(s) have approved the final article.

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