

YUSUF SUBAGYO

**EVALUATION OF *Calliandra calothyrsus* LEAVES AS
SUPPLEMENT TO NAPIER GRASS ON INDONESIAN
ETTAWAH CROSSBRED GOATS' PERFORMANCE**



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INSTITUTE OF ANIMAL PHYSIOLOGY AND ANIMAL NUTRITION

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ETTAWAH CROSSBRED GOATS' PERFORMANCE**

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LIST OF CONTENTS

CHAPTER		PAGE
	LIST OF CONTENTS	i
	LIST OF TABLES	vii
	LIST OF FIGURES	ix
	ABBREVIATIONS	x
1.	INTRODUCTION	1
1.1.	Background of the study	1
1.2.	Objectives of the study	3
2.	LITERATURE REVIEW	4
2.1.	<i>Calliandra calothyrsus</i>	4
2.1.1.	Taxonomy	5
2.1.2.	Botanical description	5
2.1.3.	Habitat	6
2.1.4.	Variation within <i>Calliandra calothyrsus</i>	7
2.2.	Use and management of <i>C. calothyrsus</i>	7
2.2.1.	Fodder	8
2.2.2.	Chemical composition	8
2.2.2.1.	Different between <i>C. calothyrsus</i> provenance	9
2.2.2.2.	Effect of drying on chemical composition	10
2.2.3.	Nutritive value	11
2.2.4.	Animal production	12
2.2.4.1.	Use of <i>C. calothyrsus</i> as a supplement to low quality diets	12
2.2.4.2.	Use of <i>C. calothyrsus</i> as a replacement for concentrates	13
2.2.4.3.	Use of <i>C. calothyrsus</i> in-non ruminant diets	14
2.2.4.4.	Use of <i>C. calothyrsus</i> in grazing systems	14
2.2.5.	Management for fodder production	15
2.3.	Secondary plant compounds and tannins	17
2.3.1.	Occurrence of hydrolysable and condensed tannin in plants	18
2.3.2.	Occurrence of tannins in <i>Calliandra calothyrsus</i>	19
2.3.3.	Factors affecting concentration of condensed tannins in plants	21
2.3.4.	The beneficial effects of tannins	21
2.3.5.	The detrimental effects of tannins	23
2.3.5.1.	Tannins and toxicity	23
2.3.5.2.	Tannins and palatability	23
2.3.5.3.	Tannins effect on digestibility	24
2.3.5.4.	Tannins and digestive enzymes	24
2.3.6.	Physiological mechanism of adaptation to tannin	25
2.3.7.	Effects of tannins on nutritive value of ruminant feeds	25
2.3.7.1.	Nitrogen metabolism	26

2.3.7.1.1.	Protein degradation	26
2.3.7.1.2.	Nitrogen absorption and amino acid supply to the small intestine	27
2.3.7.1.3.	Nitrogen retention	28
2.3.7.2.	Effect on pH	28
2.3.7.3.	Carbohydrate metabolism	29
2.3.7.4.	Palatability and voluntary feed intake	30
2.3.7.5.	Effects of condensed tannins on animal production	31
2.4.	Detannification	31
2.4.1.	Polyethylene glycol	32
2.4.2.	Pre-treatments with chemicals	33
2.4.3.	Drying	34
2.4.4.	White rot fungi	34
2.4.5.	Nutrient supplements	35
3.	EXPERIMENT 1: PHYTOCHEMICAL ANALYSIS AND QUALITATIVE DETERMINATION OF CHEMICAL COMPOUNDS OF <i>CALLIANDRA CALOTHYRSUS</i> LEAVES USING GAS CHROMATOGRAPHY-MASS SPECTROMETRIC ANALYSIS	37
3.1.	Objectives	37
3.2.	Materials and methods	37
3.2.1.	<i>C. calothyrsus</i> harvesting	37
3.2.2.	Sample extraction	38
3.2.3.	Toxicological test	38
3.2.3.1.	Sample preparation	38
3.2.3.2.	Hatchery of cyst of <i>Artemia salina</i> (Leach)	38
3.2.3.3.	Determination of larvae mortality	39
3.2.3.4.	Statistical analysis	39
3.2.4.	Phytochemical analysis of <i>C. calothyrsus</i>	39
3.2.4.1.	Crude extract	39
3.2.4.2.	Identification of volatile oils, fat and high fatty acids, sterols and monoterpenoids	40
3.2.4.3.	Identification of alkaloids and triterpenoids	40
3.2.4.4.	Identification of flavonoids	41
3.2.4.5.	Identification of glycosids di/triterpenoids, saponins, and carbohydrates	41
3.2.5.	Gas chromatography-mass spectrometric analysis	43
3.2.5.1.	Extraction of <i>C. calothyrsus</i> leaves	43
3.2.5.2.	Gas chromatography-mass spectrometric analysis	43
3.3.	Results	45
3.3.1.	Toxicological test	45
3.3.2.	Phytochemical analysis	46
3.3.3.	GC-MS analysis of <i>C. calothyrsus</i> leaves	47
3.4.	Discussion	49

3.5.	Conclusions	53
4	EXPERIMENT 2: EVALUATION OF NUTRITIVE VALUE, TANNIN CONTENT, TANNIN, METABOLISABLE ENERGY AND ACCEPTIBILITY OF <i>C. calothyrsus</i> LEAVES TO GOATS	54
4.1.	Objectives	54
4.2.	Materials and methods	54
4.2.1.	Determination of nutrient content	54
4.2.2.	Measurement of tannin content	55
4.2.2.1.	Sample preparation	55
4.2.2.2.	Reagents preparation	55
4.2.2.3.	Measurement of tannin content using butanol-HCl (Bu-HCl) method	56
4.2.2.3.1.	Extraction	57
4.2.2.3.2.	Determination	57
4.2.2.3.2.1.	Free tannin	57
4.2.2.3.2.2.	Protein-tannin complex	57
4.2.2.3.2.3.	Complex of fibre - tannin	58
4.2.2.4.	Measurement of tannin content using protein precipitation (P-P) method	58
4.2.2.4.1.	Extraction	60
4.2.2.4.2.	Determination	60
4.2.2.4.2.1.	Free tannin	60
4.2.2.4.2.2.	Protein – tannin complex	60
4.2.2.4.2.3.	Complex of fibre - tannin	61
4.2.3	Determination of ME content in <i>C. calothyrsus</i> and the other feedstuffs	61
4.2.3.1.	Keeping and maintenance of fistulated animals	61
4.2.3.2.	Preparation of sample	62
4.2.3.3.	Gas Test Procedures	62
4.2.3.3.1.	Preparation of solution	62
4.2.3.3.2.	Formulation of buffer medium	63
4.2.3.3.3.	Collection of rumen liquor	63
4.2.3.3.4.	Sample incubation	63
4.2.4.	Acceptability of <i>C. calothyrsus</i> leaves to goats	64
4.3.	Results	65
4.3.1.	Chemical composition	65
4.3.2.	Tannin Content	65
4.3.3.	ME content	66
4.3.4.	Acceptability	67
4.4.	Discussion	67
4.4.1.	Chemical composition of <i>C. calothyrsus</i> leaves	67
4.4.2.	Tannin content of <i>C. calothyrsus</i> leaves	69
4.4.3.	ME content of <i>C. calothyrsus</i> leaves	71

4.4.4.	Acceptability of <i>C. calothyrsus</i> leaves to goats	71
4.5.	Conclusions	72
5.	EXPERIMENT 3: EFFECT OF SUPPLEMENTING NAPIER GRASS WITH <i>C. calothyrsus</i> LEAVES, COCONUT OIL MEAL AND MAIZE MEAL ON DIET UTILISATION BY GOATS	74
5.1.	Objectives	74
5.2.	Materials and methods	74
5.2.1.	Animals	74
5.2.2.	Housing	74
5.2.3.	Diets	75
5.2.4.	Experimental procedure	75
5.2.4.1.	Experimental design	75
5.2.4.2.	Feeding and management	76
5.2.4.3.	Sample collection and analysis	76
5.2.5.	Data analysis	77
5.3.	Results	77
5.3.1.	Digestion coefficient and feed intake	77
5.3.2.	Rumen parameters	78
5.4.	Discussion	78
5.5.	Conclusions	81
6.	EXPERIMENT 4: EFFECT OF SUBSTITUTION OF DIFFERENT LEVELS OF <i>C. calothyrsus</i> LEAVES FOR COCONUT OIL MEAL AND SOYBEAN WASTE CAKE ON RUMINAL FERMENTATION AND BLOOD PARAMETERS OF LACTATING GOATS	82
6.1.	Objectives	82
6.2.	Materials and methods	82
6.2.1.	Animals	82
6.2.2.	Housing	82
6.2.3.	Diets	83
6.2.4.	Experimental procedure	83
6.2.4.1.	Experimental design	83
6.2.4.2.	Feeding and management	83
6.2.4.3.	Sample collection and analysis	84
6.2.5.	Statistical analysis	84
6.3.	Results	85
6.3.1.	Ruminal fluid parameters	85

6.3.2.	Blood parameters	85
6.4.	Discussion	86
6.4.1.	Ruminal parameters	86
6.4.2.	Blood parameters	88
6.5.	Conclusion	90
7.	EXPERIMENT 5: EFFECT OF SUBSTITUTION OF DIFFERENT LEVELS OF <i>C. calothyrsus</i> LEAVES FOR COCONUT OIL MEAL AND SOYBEAN WASTE CAKE ON GOATS PERFORMANCE	91
7.1.	Objectives	91
7.2.	Materials and methods	91
7.2.1.	Animals	91
7.2.2.	Housing	91
7.2.3.	Diets	92
7.2.4.	Experimental procedure	92
7.2.4.1.	Experimental design	92
7.2.4.2.	Feeding and management	92
7.2.5.	Measurement of research parameter	92
7.2.5.1.	Reproductive performance	93
7.2.5.2.	Productive performance	93
7.2.5.2.1.	Measurement of milk yield	93
7.2.5.2.2.	Measurement of milk quality	94
7.2.5.2.2.1	Sample collection of milk goats	94
7.2.5.2.2.2.	Procedures of milk quality test	94
7.2.5.3.	Economic calculation of lactating goat	95
7.2.6.	Statistical analysis	95
7.3.	Results	96
7.3.1.	Reproductive performance	96
7.3.2.	Productive performance	97
7.3.3.	Economic calculation	98
7.4.	Discussion	98
7.4.1.	Reproductive performance	98
7.4.2.	Productive performance	101
7.4.3.	Economic calculation of lactating goats	104
7.5.	Conclusions	106
8.	GENERAL DISCUSSION	108

9.	CONCLUSIONS	114
	SUMMARY	116
	REFERENCES	120

LIST OF TABLES

Table 2.1.	Range of values for the chemical composition (g/kg dry matter) and in vivo digestibilities (%) of oven dried <i>C. calothyrsus</i> and <i>Leucaena leucocephala</i>	9
Table 2.2.	Total phenolic, hydrolysable and condensed tannin in <i>C. calothyrsus</i> measured in different studies	20
Table 3.1.	Mortality rate of <i>Artemia salina</i> using Brine Shrimp Lethality Test (BSLT) method	45
Table 3.2.	Statistical analysis of the LC ₅₀ value of the different fractions of <i>C. calothyrsus</i>	46
Table 3.3.	Phytochemical analysis of the hexane, CHCl ₃ , Ethyl alcohol, and 50 % Alcohol extract fractions of <i>C. calothyrsus</i> leaves	47
Table 3.4.	Gas chromatography-mass spectrometric analysis of the different extract fractions of alcohol, hexane and chloroform of <i>C. calothyrsus</i> leaves	47
Table 4.1.	Solutions for use in the in vitro gas test	62
Table 4.2.	Chemical composition of <i>C. calothyrsus</i> leaves	65
Table 4.3.	Recovery test of the protein-precipitation method of <i>C. calothyrsus</i>	66
Table 4.4.	Free and bound tannin content (% dry matter) in <i>C. calothyrsus</i> measured by P-P and Bu-HCl methods	66
Table 4.5.	Metabolisable Energy (ME) of <i>C. calothyrsus</i> and the other feedstuff	67
Table 4.6.	Average of feed intake and health condition of Indonesian Ettawah crossbred goats fed fresh <i>C. calothyrsus</i> leaves as a sole diet during 21 days	67
Table 5.1.	The diet composition on dry matter basis	75
Table 5.2.	Mean and standard deviation of digestion coefficient (%) and feed intake in goats fed Napier grass diets with various supplements	77
Table 5.3.	Mean and standard deviation of NH ₃ -N concentration and total VFA in rumen of goats fed Napier grass diets with various supplements	78
Table 6.1.	Feed ingredients and nutrient composition of the diets (100 %DM)	83
Table 6.2.	Ruminal volatile fatty acid (VFA) and ammonia nitrogen (NH ₃ -N) of Indonesian Ettawah crossbred lactating goats fed diets containing different levels of dried <i>C. calothyrsus</i> leaves (0 – 30 %)	85

Table 6.3.	The concentration of blood glucose and plasma urea of Indonesian Ettawah crossbred lactating goats fed diets containing different levels of dried <i>C. calothyrsus</i> (0 – 30 %)	86
Table 7.1.	The reproductive performance of Indonesian Ettawah crossbred lactating goats fed diets containing different levels of dried <i>C. calothyrsus</i> leaves (0 – 30 %) during 10 weeks of experiment	96
Table 7.2.	Average milk yields (ml), pH and specific gravity of Indonesian Ettawah crossbred lactating goats fed diets containing different levels of dried <i>C. calothyrsus</i> (0 – 30 %) during 10 weeks of experiment	97
Table 7.3.	Average milk composition of Indonesian Ettawah crossbred lactating goats fed diets containing different levels of dried <i>C. calothyrsus</i> (0 – 30 %) during 10 weeks of experiment	98
Table 7.4.	The economic calculation of Indonesian Ettawah crossbred lactating goats fed different diets containing different levels of <i>C. calothyrsus</i> (0 – 30 %) during 10 weeks of experiment	98

LIST OF FIGURES

Figure 2.1.	<i>Calliandra calothyrsus</i> plant	6
Figure 3.1.	Flowchart of phytochemical analysis of <i>C. calothyrsus</i> leaves	42
Figure 4.1.	Flowchart of the Bu-HCl method for the determination of tannins	56
Figure 4.2.	Flowchart of the protein precipitation method for the determination of tannins	59

LIST OF ABBREVIATIONS

ADF	Acid detergent fibre
BSA	Bovine serum albumin
Bu-HCl	Butanol-HCl
BW	Body weight
<i>C. calothyrsus</i>	<i>Calliandra calothyrsus</i>
CF	Crude fibre
CL	Crude lipid
CT	Condensed tannin
D1-D4	Diet 1 – Diet 4
DM	Dry matter
DMD	Dry matter digestibility
DMI	Dry matter intake
EE	Ether extract
FT	Free tannin
g	gram
GC-MS	Gas chromatography-mass spectrometry
HT	Hydrolysable tannin
IVDMD	In vitro dry matter digestibility
Kg	Kilogram
LC ₅₀	Lethal concentration of 50 ppm
ME	Metabolisable energy
Mg/dl	Milligram per decilitre
MJ	Mega joule
MW	Molecular weight
N	Nitrogen
NDF	Neutral detergent fibre
NFE	Nitrogen free extract
NIST	National Institute of Standard Technology
OM	Organic matter
OMD	Organic matter digestibility
P	Probability
PAC	Proanthocyanidins

PEG	Polyethylene glycol
P-P method	Protein-precipitation method
ppm	Part per million
R1 – R4	Ration 1 – Ration 4
R ²	Correlation coefficient
SDS	Sodium dodecyl sulphate
SPC	Secondary plant compounds
TDN	Total digestible nutrient
TI	Tannin isolate
TF	Tannin bound to fibre
TP	Tannin bound to protein
VFA	Volatile fatty acid

1. INTRODUCTION

1.1. Background of the study

In Indonesia inadequate year-round feed supply is probably the most important factor contributing to low animal output. This constraint is not peculiar to Southeast Asia but is common in most tropical and subtropical countries. The supply of animal protein is commonly restricted by an insufficient supply of high-quality forage. Tropical grasses are generally low in quality and they do not sustain high levels of animal productivity. Their deficiencies lead to an increase in the time the animals take to reach marketable weight, resulting in the production of lower quality products (Palmer and Ibrahim, 1996).

Inadequate nutrition in ruminant animals has often been associated with heavy economic losses to the farmers because of animal weight and condition losses, reduction in reproductive capacity and increased mortality rates (Simbaya, 2001). The gap between the availability and requirement of energy (TDN) is not wide (21 %), but the deficiency of protein sources is critical (54 %) (Pradhan 1995). Further, the traditional protein sources available are used mainly for the feeding of dairy animals (cattle and buffalo). This has resulted in low productivity of small ruminants.

To obtain optimum production of sheep and goats, attention has been given to exploiting alternative protein sources (Singhi *et al.*, 2000). Commercial concentrates have been used as supplements to basal diets of goats. However, the cost of traditional concentrates are escalating due to low availability and high demand from non-ruminant livestock industries, which are also growing rapidly in Indonesia. Therefore, development of non-traditional feed resources to replace the commercial concentrate in the country is important.

In order to improve the productive and reproductive capacity of smallholder ruminant animals, there is a need to look at ways of producing these feeds on the farms. One potential way of increasing the feed supply under smallholder conditions may be through the use of fodder trees and shrub legumes (Simbaya, 2001). Tree legume forages supply relatively cheap sources of protein for livestock. Due to their high nitrogen content, they could be satisfactory substitutes for the more expensive protein supplements in ruminant feeds. Feeding tree legumes to cattle has resulted in increased intake and live weight gains