

BIOMASS YIELD AND CHEMICAL COMPOSITION OF *SESBANIA GRANDIFLORA* AND *MORINGA OLEIFERA*

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Abstract: The main moto of this research was to find out the biomass yield and chemical composition of two commonly used tree fodders i.e. *Sesbania grandiflora* and *Moringa oleifera* grown in veterinary college hebbal, Bengaluru, Karnataka. The tree fodders were grown and samples were collected and analyzed for DM (Dry Matter), CP (Crude Protein), Ash, EE (Ether extract), NDF (Neutral Detergent Fibre), ADF (Acid Detergent Fibre), ME (Metabolizable energy) and protein yield as well as biomass yield from these tree fodders over a period of one year.

Keywords: Nutritive evaluation, biomassyield, tree fodders.

Introduction

Fodder production forms a major component of dairy cattle and sheep production management. The quality and quantity of fodder are influenced by the type of soil and stage of growth (Yar and Waheed, 1991; Kim *et al.*, 2001). The current status of the deficit of green and dryf odder were 63.50 and 23.56 percent, respectively in India and the projected deficit of CP and TDN were 45.76 and 33.71million tones analyzed at 2015 (IGFRI, 2013). To overcome this deficit dairy farmers resort to the enhanced use of costly concentrate feeds, which ultimately increase the cost of production. To control the cost of feeding one has to go towards feeding of different fodder sources like tree fodders which contain high levels of crude protein, ether extract, gross energy minerals and many show high levels of digestibility. Fodder legume tree leaves and shrubsal ways a role in the animal production system. However, antinutritive factors (tannins, mimosine) can be a problem in some species (Paterson *et al.*, 1998). Fodders available for feeding livestock differ in their chemical composition depending on factors such as the variety of fodder, composition of soil, type of fertilizer, irrigation pattern, harvesting pattern and stage of maturity at the time of harvest.

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Materials and Methods Location and climate

The study area is Bengaluru which is located in the eastern dry zone region at an elevation of 900 m above mean sea level with an annual rainfall of about 679 to 889 mm. The type of soil is been red loamy in major areas with lateritic in remaining areas. The main crops cultivated being Ragi, Rice, Pulses, Maize and Oil seeds.



Study area and sample collection

The study was conducted in the fodder museum maintained under department of livestock production and management, Veterinary College, Hebbal, Bengaluru. Representative samples been taken, grounded passing in the mesh size of 1mm and stored in plastic bottles for laboratory analysis.



Fig 2. *Sesbania grandiflora* and *Moringa oleifera*

Biomass yield

The biomass yields of *Sesbania grandiflora* and *Moringa oleifera* were recorded for the period of one year in a growing area of 450 sq.ft. which is then extrapolated to per hectare by doing simple multiplication.

Chemical analysis

Proximate principles

The Samples of different fodders grown in the Fodder Museum, Veterinary College, Hebbal was analyzed for proximate/chemical composition. The dry matter content of feed samples was analyzed by drying the samples to a constant weight in a forced hot air oven at 105°C. The ash content in the samples will be estimated as residue obtained after incineration of samples at 600°C for 3 hours. Crude protein ($N \times 6.25$) was analyzed using Gerhardt digestion and distillation unit that agrees with Kjeldahl standards (A.O.A.C, 1995). The ether extract (EE) content in the feed samples was analyzed after extraction with petroleum ether using the procedure of A.O.A.C. (1995).

Fibre fractions

The neutral detergent fiber (NDF) and acid detergent fiber (ADF) was determined according to the methods described by Van Soest *et al.* (1991).

***In vitro* evaluation**

All the fodder varieties were subjected to rumen *in vitro* incubation for gas production (RIVIGP) and the ME (MJ/kg DM) was estimated by using procedures of Menke and Steingass (1988) as follows.

Results and Discussion

Biomass yield

In this study biomass yield of *Sesbania grandiflora* and *Moringa oleifera* was observed to be 299.62 and 290.04 t/ha/yr, respectively. The present values are double compared to study carried out by Sanchez *et al.* (2006) with 100.7t/ha/yr for *Moringa oleifera*. The difference in biomass yields for fodders varieties might be due to change in soil moisture, fertilizer application and harvesting patterns (Reddy *et al.*, 2003).

Proximate composition

The results are presented in Table1. The crude protein concentration of *Sesbania grandiflora* and *Moringa oleifera* were 23.65 and 12.27 per cent, respectively which were in agreement with studies carried out by Devendra (1991) and Nouman *et al.* (2013) for *Sesbania grandiflora* and *Moringa oleifera* with values of 22.61 and 15.31per cent, respectively.

The study also revealed that *Sesbania grandiflora* and *Moringa oleifera* showed ether extract value of 3.68 and 4.63 respectively which was in agreement with studies of Devendra (1991) and Nouman *et al.*(2013), respectively.

Fibre fractions

The study revealed NDF value of 33.01 and 45.72 per cent for fodder *Sesbania grandiflora* and *Moringa oleifera*, respectively. The present study value for *Sesbania grandiflora* are comparable with Hang *et al.* (2005) with value of 37.8 per cent whereas *Moringa oleifera* showed higher value of 45.72 compared to 21.99 per cent compared to Sanchez *et al.* (2006). The ADF content of 28.44 and 37.73 per cent for fodder *Sesbania grandiflora* and *Moringa oleifera*, respectively. The present study value for *Sesbania grandiflora* are comparable with Hang *et al.* (2005).

Metabolizable energy and protein yield

Metabolizable energy for *Sesbania grandiflora* and *Moringa oleifera* were 9.49 and 9.01 MJ/kg DM, respectively. The *Sesbania grandiflora* showed higher protein yield of 15.52 t/ha/yr compared to 7.36 t/ha/yr by *Moringa oleifera*.

Table 1: Average concentration of nutrients in tree and shrub leaves, % DMB

	Nutrient	<i>Sesbania grandiflora</i>	<i>Moringa oleifera</i>
1. Proximate principles (% DMB)	Dry matter	93.90	92.51
	Organic matter	91.48	91.03
	Crude protein	23.65	12.27
	Ether extract	3.68	4.63
	Total ash	8.51	8.96
	NDF	33.01	45.72
	ADF	28.44	37.73
2. Honhenhiem gas test (ml/hr)	RIVGP@24hr	40.91	40.52
3. Energy (MJ/kg DM)	ME	9.49	9.01
4. (t/ha/yr)	Protein yield	15.52	7.36

Conclusion

From the present study it can be concluded that *Sesbania grandiflora* which showed highest crude protein, ME and protein yield can be recommended over *Moringa oleifera* as tree fodder suitable for increasing animal productivity.

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