

ABSTRACT

Pasture and fodder production during rainy season is comparatively high in coconut triangle. Therefore, excess feed can be harvested and preserved for the dry season to maintain a uniform production throughout the year. Forage can be preserved in the form of leaf meals, hay, silage and feed blocks. Leguminous leaf meals are an alternative feed/protein source for livestock during dry seasons. Leaf meals can be pressed into blocks/briquettes with/without incorporating other concentrate feed ingredients such as coconut poonac, rice polish/bran and molasses so that keeping quality can be increased and a market value can be obtained. This research was carried out with 3 main objectives; to study the performance and biomass productivity of four types of leguminous tree species in the coconut triangle; development of a leguminous leaf meal block as an animal feed and the economic viability of these different blocks under local conditions; to study the effect of *Gliricidia* leaf meal blocks on palatability and performance of dairy cows.

Seedlings of four leguminous fodder species *Acacia auriculiformis* (*Acacia*), *Gliricidia sepium* (*Gliricidia*), *Leucaena leucocephala* (*Leucaena*) and *Calliandra calothyrsus* (*Calliandra*) were established in double rows under coconut at 2m x 1m between and within row spacing in a Randomized Complete Block Design (RCBD). In order to identify the growth performances of *Acacia*, *Gliricidia*, *Leucaena* and *Calliandra*, height and girth parameters were measured in the seedlings from three months up to 15 months of age.

Leguminous leaf meals (LM) were prepared from leaves and twigs of *Acacia mangium* (Acacia), *Gliricidia sepium* (Gliricidia), *Leucaena leucocephala* (Leucaena) and *Calliandra calothyrsus* (Calliandra). Nine recipes were prepared from each legume by adding coconut (*Cocos nusifera*) poonac, rice (*Oryza sativa*) bran, salt and a preservative (Sodium Meta Bi Sulphite) in different proportions. Complete Randomized Design (CRD) was used in this experiment. These LM preparations were pressed into briquettes/blocks and these blocks were stored for three months under room temperature and nutritional status of the blocks was determined. Each month, two blocks from every recipe were used to analyze for free fatty acid content (FFA) and Total Plate Count (TPC). Cost of production of leaf meal blocks was also calculated.

According to the cost of production and availability of fodder legumes, two types of Gliricidia LM blocks namely, 75% Gliricidia leaf meal + 25% coconut poonac (B₁) or 75% Gliricidia leaf meal + 12.5% coconut poonac + 12.5% Rice bran (B₂) were selected from the previous study to carry out feeding trials. Blocks were prepared and, feeding trials were conducted according to 3x3 Latin Square Design using lactating cows. Treatments were Basal diet (T₁), Basal diet with B₁ (T₂) and Basal diet with B₂ (T₃). Basal diet was consisted with *Brachiaria brizantha*, Coimbatore 3 (*Pennisetum perpureum* x *Pennisetum americanum*) and rice straw. Data were statistically analyzed by repeated measure analysis in SPSS version 13 and SAS version 8.

According to the growth trial, Acacia had the highest basal stem girth and height ($p < 0.05$) followed by Calliandra, Gliricidia, and Leucaena.

Gliricidia and Leucaena leaf meals formed tightly packed briquettes compared to Acacia and Calliandra. Gliricidia leaf meal had the lowest ($P < 0.05$) mean FFA content after three months of storage. Cost of production of Gliricidia leaf meal blocks was lower than Leucaena leaf meal blocks. Gliricidia recipe 3 (leaf meal 75% + Coconut poonac 25%) and Gliricidia recipe 7 (leaf meal 75% + Rice bran 12.5% + Coconut poonac 12.5%) had the least FFA content (less than 5%) and cost of production (Rs 30.00 per kg) compared to other Gliricidia recipes. Thus, Gliricidia recipe 3 and recipe 7 (treatment blocks; Block 1 and Block 2 respectively) were selected as the best two recipes for the feeding trial.

Average feed dry matter intake of cows fed with both types of blocks were higher ($p < 0.05$) compared to control diet. Similarly, live weight gain of cows fed with Gliricidia leaf meal blocks (treatments) were higher compared to the control group. Average milk production of cows fed with Block 2 (leaf meal 75% + Rice bran 12.5% + Coconut poonac 12.5%) was 2.4 liters/day/cow compared to other two treatments ($p > 0.05$). Therefore, Gliricidia leaf meal block prepared with coconut poonac and rice bran (Block 2) was selected as the best block to be used with a roughage diet for indigenous cross bred cows in coconut triangle of Sri Lanka.