

Three experiments were conducted. Experiment 1: *Leucaena leucocephala* leaves (LL) were ensiled by mixing with 20% rice bran and 20% water (fresh weight basis). The material was kept for 21, 51, 81 and 111 days in vacuumed double layer plastic bags. Five bags were randomized at each interval for quality evaluation by organoleptic test, organic acid and chemical analysis. It was found that the ensiling period did not have much influence on most of the chemical compositions. All samples had pH 4.4-4.5, DM 35.22-35.65 % and good smell of lactic acid. The composition on DM basis were 21.49-22.29% CP, 7.76-8.22% EE, 31.18-33.68% NDF, 2.0-2.9% acetate, 6.9-9.7% lactate and DM loss was 10.35-12.32%. The most interesting points were the increment of β -carotene after ensiling from 88.50 to 99.92-120.28 mg/kg DM while the mimosine content decreased over 90% (from 1.79 to 0.12-0.16 % of DM). It was superior to the sundrying or the oven drying (60°C) in which their mimosine content were 1.14 and 0.96 % of DM, respectively.

Experiment 2: Digestibility of *Leucaena leucocephala* leaves silage (LS) which had pH 4.34 and 35.22% DM was determined. Chemical compositions of the LS on DM basis were 22.23% CP, 7.71% EE, 30.92% NDF, 30.84% NFC and 5.06kcal/g GE. Digestibility trial was conducted in 4 nonpregnant dry crossbred HF dry cows. The cows consumed LS plus 1% NaHCO₃ (fresh weight basis) as a sole diet at least 1.47% of BW (DMI) without showing any toxic sign. The digestibilities of DM, OM and CP were 56.49%, 60.20% and 52.46% while those of EE,

NFC and NDF were 70.18%, 98.56% and 25.91% respectively. LS contained 62.27% TDN and 2.86 Mcal/kg DE. Average nitrogen balance of the cows fed LS as a sole diet was 60.58 g/d.

Degradability, determined by nylon bag technique, was quick in the first 12 h. After that the rate was slow down and the curve seemed to be plateau. Dry matter degradation rate (c) was 0.100 %/h and the asymptote (A+B) was only 78.2%. This pattern was similar to the gas production determined by *in vitro* gas test. OMD, ME and NEL values (62.30%, 2.67 and 1.55 Mcal/kgDM) were similar to that calculated from *in vivo* digestibility. The average values of LS from the 3 mentioned methods were 61.25% OMD, 2.49 Mcal/kgDM ME and 1.52 Mcal/kgDM NEL. Rumen pH of dry cows consumed LS plus 1% NaHCO₃ (fresh weight basis) as a sole diet was nearly constant (6.7-6.9) the whole day.

Experiment 3: The potential use of LS, on DM basis at 25 and 50% of concentrate mixture was investigated. The substitution levels of LS to concentrate mixture were 30 and 60%. The ration of the control group was calculated as the total mixed (TMR). Ruzi silage plus 10% ruzi hay (fresh weight basis) was used as a based roughage. Fifteen heads of crossbred 87.5% HF blood with average 17 ± 5 kg/day of milk production were allotted into 3 groups as mentioned. The result showed that the control group has total DMI less than the other groups (14.20 vs 15.10 and 15.04 kg/head/day). No significant different in milk production and milk composition was observed among groups. The 50% LS group had the lowest feed cost for milk production. The level of β -carotene in serum of the 50% LS group was higher than the 25% and the control (1033.8, 662.8 and 596.8 μ g/100ml respectively, $p < 0.05$).

Therefore it could be summarized that *Leucaena leucocephala* leaf (LL), being ensiled for at least 21 days, is a good quality silage of long shelf-life. The cows consumed LS as a sole diet without showing any toxic sign. LS has an appreciably high amount of nutrients and energy. The ensiling remarkably decreased mimosine but increased β -carotene contents. The LS could be incorporated at 50% of concentrate mixture (DM basis) which was equal to the substitution for concentrate at 60% of the ration. In addition this group also gave higher income over feed and higher β -carotene in serum. The additional advantage of ensiling is to increase the potential preservation of LL which is plenty available in wet season. Thus enhances the efficient use of local available feed resources.