Aerobic stability of rations containing cassava fodder silage and mesquite pod meal

B. S. Cerqueira[1], D. R. S. Loures[1], S. A. Moraes[2], A. P. D. Oliveira[1],
[1]*Federal University of Bahia Recôncavo*
[2]*Embrapa Semiárido, Petrolina-PE , Brazil*
E-mail: brunosc18@gmail.com

Introduction Silage making is an excellent alternative for times of drought in semiarid regions mainly for small producers. Cassava (*Manihot esculenta* Crantz) is adapted to these regions and its fodder portion can be stored as silage. Aerobic stability of silage can be described as the resistance of the deterioration in forage mass after silo opening and the speed which the mass deteriorates after exposed to air and how it is affected by weather, where the daytime increases temperature and decreases in nocturnal activity and control the growth of microorganisms (Jobim et al. 2007). This study aimed to determine the aerobic stability of cassava fodder silage (CFS) and the addition of mesquite pod meal (MPM).

Materials and Methods Cassava fodder silage (CFS) was stored in plastic buckets and mesquite pod meal (MPM) was obtained from Riocon Company. The rations, calculated according to NRC (2007) presented forage:concentrate ratios of 100:0, 80:20, 60:40 and 40:60. The aerobic stability was determined by simulating the environment trough plastic buckets without lids with digital thermometers placed on the mass. Measures were recorded daily for environment temperature and mass temperature in the buckets at 10:00am and 4:00pm during ten days. Samples were collected every three days (1, 4, 7 and 10-day) to determine the chemical composition, according to Silva and Queiroz (2002). The variables of aerobic stability were evaluated according to Jobim et al. (2007) that are expressed as: number of days to rise 2°C in temperature, number of days to reach the maximum temperature, the sum of daily mean temperature accumulated from day-0 to day-5 and from day-0 to day-10 days and maximum temperature reached by the mass. The determination of total dry matter losses (DML) during the aerobic stability were calculated according to Schmidt (2006). This assay was distributed with four treatments and four replications in a completely randomized design, and means compared by Tukey test at 5% probability.

Results and Discussion The forage:concentrate ratio 60:40 and 80:20 presented 1.9°C above environment temperature on the fourth day and sixth day, and forage:concentrate ratio 100:0 and 40:60 revealed 1.6°C difference in the sixth and eighth days, respectively. The maximum temperatures were recorded on the tenth day except for the ratio 60:40, which occurred on the ninth day (Table 1). The presence of cyanogenic compounds in cassava shoots may indicate maintenance of the likely silage stability during use. Despite of the lower stability of CFS plus MPM, the time to rise (four days) maximum temperature (10 days) was higher regarding research using grasses as found by Loures (2004) and Schmidt (2006) who reported 2 to 4 days to maximum elevation and temperature, respectively.

Conclusion Cassava fodder silage showed greater stability in relation to the association with meal mesquite pods. The DM losses are directly proportional to stability loss of the evaluated diets. The feed can be evaluated for longer feeding than grass silages, without losing its nutritional value, allowing use of suitable forage. Diets based on CFS and MPM diets are viable and have satisfactory term degradation.

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Table 1. Temperature and total dry matter losses in Cassava fodder silage (CFS) and mesquite pod meal (MPM) at different forage:concentrate ratio.

Treatment	Mean temperature			Days to increase			Accumulated Temperature		T. Max.	DML (%)
	D-1	D-4	D-7	D-10	Start	Max	0–5 days	0–10 days		
100:0 CFS/MPM	23.0	20.8	22.5	24.5	8	10	- 2.5	1.5	24.5	1.92^{D}
80:20 CFS/MPM	23.0	21.1	23.5	24.4	6	9	- 2.0	1.4	24.6	10.28^{B}
60:40 CFS/MPM	23.0	21.4	23.3	25.3	4	10	- 1.6	2.3	25.3	17.74^{A}
40:60 CFS/MPM	23.0	21.1	22.8	24.6	6	10	- 2.3	1.6	24.6	3.24^{C}

* Means followed by same letter in columns do not differ by Tukey test at 5% probability