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Silage Preparation Using Green Foliages Of Sorghum Maize And Dolichos.

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Abstract:

All the silage samples showed the characteristics of good silage with clean odour and without any objectionable smell. Silage was golden yellow to yellowish in colour without any mould growth, sliminess and mashy rot. Foliages of crops; Maize and sorghum (either alone or mixture of sorghum + Dolichos and maize + Dolichos) produced nutritionally better silages in comparison to the crop dolichos alone for livestock feeding. Sorghum and maize favoured silage fermentation with higher lactic acid (LA) production and lower pH value below 4.0.

Keywords: Silage, Sorghum, Maize, Dolichos.

Introduction:

Production of large amounts of foliage is possible in monsoon and winter i.e. during kharif and Rabi season respectively. during summer however, irrigation facilities are not available in several parts of the region and therefore it is difficult to raise fodder crops. For this reason there is acute shortage for fodder during summer. To overcome this situation, the surplus fodder available during favourable season may be preserved for use during scarcity. Preservation of fodder as silage is one of the methods where fresh green foliage is ensilage insitu.Silage is good method for conservation of green fodder, wherein the crop nutrients are preserved properly and offer nutritious and palatable feed to cattle/ livestock (Das , 2010 ,Venkateswarlu et. al. 2013,).

If silage is made properly, it serves as better feed to animals with greater dietary intake. Attempts were therefore made during present investigation to evaluate the potential of crops like Sorghum, Maize and Dolichos for preparation of silage as single crop or using mixture of two crops like sorghum + Dolichos and Maize + Dolichos.

Materials and methods:

In the present study Sorghum, Maize and Dolichos foliages . harvested at pre flowering stages and immediately brought into the laboratory. The vegetation was chopped into 2-3 cm pieces and used for preparation of silage.

The chopped material was placed in a plastic container (18.5 × 10cm) and pressed, making it compact and excluding air. The container was capped and sealed with wax. These containers or 'laboratory silos' were left at room temperature in the dark until used. After 45 days of ensiling the boxes were opened and physical characteristics i.e. colour, texture, odour etc. of resulting silages were examined. A sample of 40 gms, fresh silage was mixed with 40ml distilled water, placed on cotton cloth, pressed and the juice was collected in a beaker. The pH was measured using glass electrodes. To determine titratable acidity (TA), 5 gms of fresh silage was mixed in 75 ml distilled water; boiled for a few minutes, filter through cotton cloth, diluted to 100 ml and titrated against 0.1N NaOH using phenolophthelein indicator. Total volatile fatty acids (TVFA) were estimated by steam distillation method as described by Chaudhory (1970). Buffering capacity (BC) was determined following Playne and McDonald (1966). Lactic acid was estimated using the method of barker and Summerson (1941) as described by Oser (1979). Another sample of silage was dried in an electric oven, at 95±5 degree centigrade till constant weight. The dry samples were ground to a fine powder and used for subsequent analysis.

Dry matter and moisture content in the sample were measured by considering loss in weight during drying. The measurement of water soluble reducing sugar (WSRS) in terms of glucose was done using folin-Wu-tubes Oser (1979). The Nitrogen content was determined by microKjeldahl method and CP was expressed at N×6.25 (Bailey,1967). A. O. A. C. (1970) method was followed for the estimation of crude fat (Ether Extract), ash, acid insoluble ash (AIA), nitrogen free extract (NFE), total carbohydrate (TC) and calcium (Ca) along with crude fibres (CF) and phosphorus (P).

Result and discussion:

In present investigations, silages were made from foliages of Sorghum, Maize, Dolichos and the mixture of Sorghum + Dolichos and Maize + Dolichos. In mixture, the two crops were taken in equal proportion. The crop material either with single or two crops were chopped and silage were made. The moisture content in chopped material ranged from 73.5 to 79.4 %. In general, the crop with low moisture content is a desirable character for silage making (Mungikar and Joshi, 1976). Silage made from chopped material had higher value for TA (61.3 to 68.8) indicating acid fermentation, whereas silage made from mixture showed lower value for TA (37.0 to 47.2) and thus showed decreased silage fermentation. A variation in TA was observed due to the nature of the ensiled material.

The buffering capacity (BC) varied widely, however, the variation was noticeable. Silage made from Sorghum and Maize had lower BC than the leguminous crop i.e. Dolichos, the low BC in case of Sorghum and Maize may be due to low protein content in it; as also pointed out by Reddy and Mungikar (1987) and Basole (1994). In the silage sample, the pH was higher than 4.0; it was as high as 4.65 in Dolichos. McDonald and Henderson (1962) suggested that a good silage has pH within the range of 3.8 to 4.2. In view of these looking at pH values the silage sample of Dolichos was not upto the mark which might be due to low lactic acid production and high buffering capacity. There was considerable variation in the content of TVFA which ranges from 4.8 to 10.2 (table 1). In general, silage samples of Dolichos gave higher value for TVFA. The water soluble reducing sugar content ranged between 0.93 to 2.0 % depending on crop species.

The dry matter (DM) content in a Dolichos was high among all of the crops. The legumes were with higher values for protein content which ranged between 9.6 to 13.8 indicating suitability of chopped and ensiled materials in animal nutrition . The CF value within a wide limit of 27.3 to 31.9 %. All silage samples contained other nutrients except calcium (Ca) , in appreciable quantities for animal feeding.

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Table 01

Chemical compositions of silages made from chopped foliages of Sorghum,Maize and Dolichos and their mixtures

Crop	Moisture (%)	Titratable acidity m.equiv/ 100gm DM	Buffering capacity m.equiv/ 100gm DM	pH	Lactic acid (% of DM)	Total volatile fatty acid TYFA M.m/100gm	Water soluble reducing sugar(% of DM)
Sorghum	76.0	45.4	38.5	3.67	4.72	8.8	2.0
Maize	79.4	68.8	49.2	3.98	4.60	4.8	1.92
Dolichos	73.5	61.3	55.4	4.65	2.38	10.2	0.93
Sorghum + Dolichos	78.3	47.2	30.6	4.05	3.80	6.6	1.45
Maize+ Dolichos	77.0	37.0	28.3	4.10	3.64	7.4	2.0

Table 02

Proximate analysis of silage made from Sorghum, Maize and Dolichos and their mixtures.

Crop	% dry matter DM	% of dry matter (DM)								
		Crude protein (CP)	Crude Fibre (CF)	Ether Extract (EE)	Ash	ASA	NFE	TC	Ca	P
Sorghum	24.0	9.6	28.5	7.6	9.8	7.7	44.5	73.0	0.87	0.34
Maize	20.6	10.3	27.3	8.7	10.7	9.4	43.0	70.3	0.99	0.44
Dolichos	26.5	13.8	31.9	2.0	10.1	8.8	42.2	74.1	1.85	0.29
Sorghum+ Dolichos	21.7	11.4	29.6	5.4	9.4	8.1	43.6	73.2	1.22	0.33
Maize+ Dolichos	23.0	10.9	29.7	6.1	10.3	8.9	43.0	72.7	1.27	0.36