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Chemical evaluation of unripen jackfruit silage and jackfruit residue silage as unconventional feed resource for livestock production

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Abstract

A study was conducted to assess the nutritional values of unripen jackfruit silage (UJFS) as well as jackfruit residue silage (JFRS). Silages were prepared from unripen jackfruit as well as jackfruit residue, procured locally and were subjected for their characteristics and chemical analysis. Study revealed that DM content of UJFS was 35.05% and pH was 3.92. On DM basis, UJFS contained 94.55, 9.52, 2.07, 5.45, 36.11, 25.58, 3.37, 1.91, 1.46 and 1.25 per cent of OM, CP, EE, TA, NDF, ADF, total silica, biogenic silica, sand silica and ADL, respectively. Similarly, JFRS on DM basis, showed 93.54, 8.77, 1.91, 6.46, 34.08, 27.88 and 1.06 per cent of OM, CP, EE, TA, NDF, ADF and ADL contents, respectively. From the present study, it was concluded that unripen jackfruit/Jackfruit residue can be ensiled successfully and they have a potential nutritive value for feeding livestock.

Keywords: Unripen jackfruit silage, jackfruit residue silage, chemical analysis and nutritive value

Introduction

Background

Due to lack of sufficient grazing lands, farmers are mainly dependent on crop residues and small quantity of concentrate mixture to fulfill the nutrient requirement of the ruminants. This necessitates the animal nutritionists to look for alternative feed resources which can fulfill the energy and protein requirement of the animal as well as availability throughout the year. There are many known and underutilized crops, many of which are significantly valuable as human and animal foods have been the emphasis for research in recent ages. Jack (*Artocarpus heterophyllus*) fruit is native of the rain-forests of the Western Ghats regions of Karnataka and is available in plenty during the season from March to June every year. Ensiling these might be a suitable technique to ensure “year-round” availability of the feed resources for livestock.

Methodology

Study was aimed to standardize the process of silage making from unripe jackfruit and jackfruit residue. Jackfruit is available in plenty in South Western rain forest region of India. Unripen jackfruit (UJF) was procured locally and chopped into 1-3 inches size. Core portion containing viscous sticky juice was separated from rind and rags before chopping. This was subjected to drying under the sun for 2 days to achieve 65-70% moisture content. Sun wilted unripen jackfruit was later compactly filled along with 1 per cent maize grain powder in a 5 liter capacity plastic bottle manually in the laboratory. The plastic bottle was sealed properly with cap and cello tape for storage at room temperature. Same procedure of procurement and silage making was applied for jackfruit residue (JFR). But jackfruit residue silage (JFRS) was prepared in 200-liter capacity plastic carboy. Both the containers were opened after 2 months of ensiling and subjected for physical evaluation (pH, colour, smell and consistency) as well as chemical analysis. Chemical analysis includes proximate analysis as per AOAC (2005) [1] and detergent system of fibre analysis as per the methods described by Van Soest *et al.* (1991) [5].

Results and Discussion

Prepared UJFS contained zero mould growth, pleasant fruity odour with off-white colored non-sticky texture. Same results hold good for the JFRS except for its brown colour. Further, the study revealed that the DM content of the UJRS was 35.05% and pH 3.92. On DM basis, it contained 94.55, 9.52,

2.07, 5.45, 36.11, 25.58, 3.37, 1.91, 1.46 and 1.25 per cent of OM, CP, EE, TA, NDF, ADF, total silica, biogenic silica, sand silica and ADL, respectively. While JFRS on DM basis, showed 93.54, 8.77, 1.91, 6.46, 34.08, 27.88 and 1.06 per cent of OM, CP, EE, TA, NDF, ADF and ADL contents, respectively.

Table 1: Physical and chemical analysis of Unripen Jackfruit silage and Jackfruit residue silage

Parameters		Unripen Jackfruit silage	Jackfruit residue silage
Physical analysis	pH	3.92	3.96
	Colour	Off-white	Brown
	Odour	Pleasant fruity smell	Pleasant fruity smell
	Texture	Non-sticky	Non-sticky
Chemical analysis (% on DMB)	Dry matter	35.05	32.52
	Organic matter	94.55	93.54
	Crude protein	9.52	8.77
	Ether extract	2.07	1.91
	Total ash	5.45	6.46
	Neutral detergent fibre	36.11	34.08
	Acid detergent fibre	25.58	27.88
	Acid detergent lignin	1.25	1.06
	Total silica	3.37	3.47
	Biogenic silica	1.91	1.85
Sand silica	1.46	1.62	

Quality results of UJFS as well as JFRS are comparable physically with that of any other standard silage and also among themselves. Similarly, proximate composition and fiber fractionations of UJFS are comparable with that of jackfruit residue silage.

Similar results were also quoted by Arun *et al.* (2020). Their chemical analyses (%) revealed that the jackfruit residue silage has higher CP (8.77 v/s 3.35) and EE (1.91 v/s 0.79) and lower TA (6.46 v/s 8.51), NDF (34.08 v/s 71.84), ADF (27.88 v/s 46.46) and ADL (1.06 v/s 3.83) contents as compared to finger millet straw. CP Results were also in comparison to Subburamu *et al.* (1992) ^[4] but higher than Kusmartono (2001) ^[3].

Conclusion

From the current study, it was concluded that the unripen jackfruit and jackfruit residue can be ensiled successfully with good silage characteristics and utilized as an alternative feed resources for livestock production especially during scarcity conditions.

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