

FQS-030 Comparisons of Ensiled Maize, Sorghum and Pearl Millet Forages Fed to Sheep

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MINI ABSTRACT

Water-use efficient sorghum (7) and pearl millet (5) forages were compared with reference maize forage as silage tested with Nellore Brown sheep. Mean silage organic matter intake was 352, 297 and 137g/d in maize, sorghum and pearl millet silage, respectively. Current pearl millet forage cultivars do not match maize forage in terms of fodder quality. Of the 7 sorghum cultivars several were on par with maize though the cultivar dependent variation in intake was huge (254 to 343g/d). Anti-nutritive factors associated with sorghum like dhurrin were undetectable in the silages, although present in the fresh forage. A routine laboratory trait does not seem to describe sorghum and pearl millet forages adequately. More research is required to understand the true nutritional potential of sorghum and in particular pearl millet forages. Dissemination of these forages based on only biomass yield should be discouraged.

Key words: Maize, Sorghum, Pearl millet, Silage, Sheep, Intake

INTRODUCTION

Intensifying dairy producers in India prefer maize as green forage for silage production, but high water requirements of the crop is an increasing concern. Dryland crops like sorghum and pearl millet are inherently more water-use efficient. Single and multi-cut sorghum and pearl millet forages have become recently more available but few data about animal performance on those forages exist. Furthermore, some nutritional laboratory studies suggested that these forages had been bred predominately for biomass yield traits, perhaps neglecting fodder quality. Additionally, sorghum and pearl millet forages can contain anti-nutritive factors such as dhurrin and oxalates. However, these anti-nutritive factors may

disappear with ensilaging which also makes forage available over longer periods. Thus a study was conducted to compare 7 sorghum and 5 pearl millet forages with one popular maize cultivar as reference, in a feeding experiment with sheep.

MATERIALS AND METHODS

The maize (1), sorghum (7) and pearl millet (5) forage cultivars were harvested around milking stage, wilted overnight, chopped into 15-25mm pieces and ensiled in plastic drums (35^h × 11.5^w) without additives for 94 days. Nitrogen and ME were analyzed by routine analytical procedures. Dhurrin extraction was performed in 750 μ l of 50% methanol and detected at 232nm (Nicola *et al.*, 2011). For the *in vivo* experiment Nellore Brown ram lambs were allocated into 13 groups of 6 lambs each. Silages were offered *ad lib* and supplemented with 200 g concentrate mixture. The sheep were kept in metabolic cages facilitating measurement of feed intake, digestibility and nitrogen balance. The sheep were adapted to a treatment for 2 weeks, followed by a 26-day trial period. Feces and urine were collected during the last 10 days

of the experiment.

RESULTS

Mean nitrogen were 1.4, 1.6 and 1.3% in maize, sorghum and pearl millet silages and mean ME were 9.3, 8.7 and 8.9 MJ/kg in maize, sorghum and pearl millet silages. In fresh forage materials dhurrin was detected to an extent only in sorghum forage (95ppm) but was not recovered from sorghum silages (1.6ppm).

Table 1. Effect on sheep of feeding 13 silage lines from the *in vivo* experiment

Crop	Variety	OMD (%)	Intake (g/d)			Nbalance (g/d)	
			Silage OM	Total OM	Total DOM		
Maize	P 3576	63.5	352	517	327	3.28	
Sorghum	CSH 20 MF	57.3	254	420	241	2.52	
	CSH 24 MF	62.9	303	453	285	2.82	
	GK 909	58.2	343	514	298	3.24	
	GK 917	64.0	319	492	315	3.68	
	HC 308	59.0	278	447	263	2.95	
	SPSSV 30	63.7	306	481	306	3.05	
	SSG Priya 5000	60.3	274	444	268	2.37	
	Pearl millet	AVKB 19	62.6	113	288	180	0.03
		ICMA 0044 × IP 6202	60.8	130	305	185	0.22
		Milkon	62.3	131	302	188	0.79
PAC 931		62.2	172	346	215	1.46	
Poshan		63.0	137	312	197	0.61	
Mean		61.5	239	409	251	2.08	
LSD		3.0	55.9	59.3	33.9	1.01	
P	<0.001	<0.001	<0.001	<0.001	<0.001		

The average silage intake in sorghum groups was 297g/d compared to 137g/d in the pearl millet groups and 352 in the maize silage fed control group (Table 1). Organic matter digestibility (OMD), intake of OM and digestible OM and N-balance reflect silage and concentrate intake and are

difficult to interpret, since in the case of pearl millet treatment concentrate intake could be higher than silage intake (Table 1).

REFERENCE

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