

## **Triticale silage replacing sorghum silage on the zootechnical performance of feedlot heifers**

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**Introduction** The use of silage is common in the confinement of beef cattle. Among the forage plants that have the capacity to be ensiled, sorghum (*Sorghum bicolor* (L.) Moench.) presents prominence in the national production, however, this crop has problems with the seasonality of production. The winter cereals are an alternative to mitigate the seasonality of forage production and reduce production costs, among them, triticale (*Triticosecale Wittmack*) stands out for its hardiness and productivity, and has good nutritional characteristics. Therefore, the objective of the present study was to evaluate triticale silage as a substitute for sorghum silage on the performance of confined heifers.

**Materials and methods** The experiment was carried out at the State University of Londrina School Farm under the approval of the Ethics and Animal Use Committee n° 2184.2016.97. Whole plant silages were made in september 2016 for triticale (cv. BRS Harmonia) and in january 2017 for sorghum (cv. Volumax). The silages were stored in 2 trench silos with a capacity of 20 tons each, until the opening that took place in june 2017, where weekly samples were collected. Triticale silage samples (dry matter (DM) = 30.79%, crude protein (CP) = 12.01%, mineral matter (MM) = 7.73%, ether extract (EE) = 2.84% , neutral detergent fiber (NDF) = 53.85% and acid detergent fiber (ADF) = 36.08%, pH = 4.24, ammonia nitrogen (N-NH<sub>3</sub>) = 5.82%), and sorghum (DM = 32.73%, CP = 7.83%, MM = 5.36%, EE = 2.63%, NDF = 48.91% and ADF = 31.26%, pH = 4.22, N-NH<sub>3</sub> = 6.69%) were characterized according methodology to AOAC (2000), Van Soest et al. (1991) for the fibers and for pH and N-NH<sub>3</sub> according to Playne and McDonald (1966). 24 heifers were used Braford, with an initial average body weight of 346 ± 11.7 kg were allotted to 3 pens collective animals and subjected to treatments: T0 = 100% sorghum silage; T30 = 30% triticale silage + 70% sorghum silage; T60 = 60% triticale silage + 40% sorghum silage; T100 = 100% triticale silage. The total ration was offered twice a day in a 40:60 forage:concentrate. The concentrate was composed of corn, soybean meal and vitamin-mineral. The rations were formulated to meet the nutritional requirements according to NRC (2016). After 93 days the animals were weighed and calculated dry matter intake (DMI), feed conversion (FC) and the average daily gain (ADG). The variables were subjected to analysis of variance for a completely randomized experimental design in split-time plots, analyzing 4 treatments, with 2 replications per treatment totaling 6 animals per treatment, in 3 evaluation periods and the means compared by Tukey's test 5% significance by the R statistical program.

**Results and discussion** The DMI was significant (P <0.05) only for the evaluation period (Table 1), a fact that may be justified by the factors related to animal development. The fermentation of the ensiled green mass of both cultures presented adequate fermentation quality with a pH of 4.2% and N-NH<sub>3</sub>/NT lower than 10%.

**Table 1.** Performance of triticale silage-fed heifers replacing sorghum silage

Periods	Treatments				$\mu$	P-value			CV
	T0	T30	T60	T100		Treatments	Period	TreatxPer	
DMI (kg)									
$\mu$	30,91	30,76	31,40	29,67		0,9838	<0,0001	0,4397	18,7
P1	26,41	25,78	26,26	24,61	25,77 <sup>A</sup>				
P2	33,91	34,91	36,09	34,86	34,94 <sup>C</sup>				
P3	32,39	31,57	31,85	29,53	31,33 <sup>B</sup>				
ADG (kg/day/animal)									
$\mu$	1,43	1,35	1,28	1,27		0,8234	0,5292	0,9975	33,4
P1	1,44	1,42	1,41	1,35	1,40				
P2	1,39	1,32	1,22	1,17	1,31				
P3	1,46	1,32	1,26	1,22	1,27				
FC									
$\mu$	7,32 <sup>b</sup>	7,53 <sup>b</sup>	8,41 <sup>a</sup>	8,59 <sup>a</sup>		<0,0001	<0,0001	<0,0001	28,6
P1	6,23 <sup>B</sup>	5,99 <sup>B</sup>	6,40 <sup>C</sup>	5,81 <sup>B</sup>	6,11 <sup>C</sup>				
P2	8,30 <sup>bA</sup>	8,69 <sup>bA</sup>	10,24 <sup>aB</sup>	10,18 <sup>aA</sup>	9,35 <sup>A</sup>				
P3	7,43 <sup>cA</sup>	7,90 <sup>bcA</sup>	8,60 <sup>bA</sup>	9,78 <sup>aA</sup>	8,43 <sup>B</sup>				

Means followed by lowercase letters indicate statistical difference at the 5% probability level between the columns. Means followed by capital letters indicate statistical difference at 5% probability level between lines.

P1: period 1; P2: period 2; P3: period 3;  $\mu$ : overall mean; CV: coefficient of variation.

The ADG was not affected by the substitution of sorghum silage by triticale silage ( $P > 0.05$ ), performance was similar. The FC was significant ( $p < 0.05$ ) in relation to the periods, between treatments and interaction period and treatment. The heifers that received minor proportions triticale silage in replacement of sorghum silage showed better conversion than for heifers receiving over 60% silage triticale replacing sorghum silage, which can be attributed to their chemical differences of the silages. The FC observed in animals that received higher proportions of triticale silage may be associated with the higher fill effect provided by this forage.

**Conclusions** The replacement in increasing proportions of triticale silage to sorghum silage has no limitations in relation to animal performance, especially in relation to daily average weight gain, making this forage a possible nutritional alternative for finishing confined beef heifers.

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