

Triticale silage to replace sorghum silage on carcass and meat characteristics of confined heifers

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Introduction Triticale (*X Triticosecale Wittmack*) has been presented as an important alternative food source in winter and can be used as an energy substitute in grain form in monogastric and ruminant rations and enable conservation in the form of whole plant silage considered viable to ensure food supply throughout the year. The study of new crops for the production of silages, with the objective of reducing production costs and reducing seasonality of forage production, is managed in order to offer viable alternatives to producers. Thus, the objective of the present work was to evaluate triticale silage in substitution of sorghum silage on carcass characteristics and meat quality of heifers.

Materials and methods The experiment was conducted at the State University of Londrina School Farm under the approval of the Ethics and Animal Use Committee nº 2184.2016.97. The whole plant silages were made in September 2016 for triticale (cv. BRS Harmonia) and in January 2017 for sorghum (*Sorghum bicolor* L., cv. Volumax), both harvested with 45% DM. Stored in trench silo with capacity of 20 tonne until opening in June 2017. Triticale silage samples (dry matter (DM) = 30.79%, crude protein (CP) = 12.01%, mineral matter (Ash) = 7.73%, ether extract (EE) = 2.84%, neutral detergent fiber (NDF) = 53.85% and acid detergent fiber (ADF) = 36.08% in DM), and sorghum (DM = 32.73%, CP = 7.83%, Ash = 5.36%, EE = 2.63%, NDF = 48.91% and ADF = 31.26% in DM) were characterized according to AOAC (2000), Van Soest et al. (1991) methodology for the fibers. Twenty-four Braford heifers with initial weight of 346 ± 11.7 kg were used, distributed in collective pens with 3 animals each and submitted to the following 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 forage:concentrate ratio of 40:60. 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 the 63 day experimental period, the animals were slaughtered and the carcasses weighed before cooling for hot carcass weight (HCW). The carcass yield (CY) was obtained by the ratio of the weight amount of HCW before weight before shipment (WBS) and multiplied by 100. The carcasses were classified according to the degree of conformation and finishing by photographic patterns, according to Cañeque and Sañudo (2005). In the 12th rib section, the fat thickness was read using a caliper and the rib eye area was measured, the pH was read with a portable potentiometer and the degree of marbling by comparison of photographic pattern (AMSA, 2001). These variables were subjected to analysis of variance for a completely randomized design with four treatments and six replications, and the means compared by Tukey test at 5% significance by the R statistical program.

Results and discussion The same nutritional condition in which heifers with variation only the roughage source was submitted was not sufficient to influence the carcass characteristics. The carcass degree of finishing predominated in the median category (3), which was satisfactory to prevent the deleterious effects of the cold, while the predominant carcass conformation was called rectilinear (3), in agreement with the animal category. The CY was satisfactory for the animal category with average yield of 55.64%.

Table 1. Carcass and meat characteristics of heifers fed triticale silage and sorghum silage

Variables ¹	Substitution levels				<i>P-Value</i>	<i>CV (%)</i>
	T0	T30	T60	T100		
BWS (kg)	452.1	437.1	431.5	423.1	0.93	17.5
Conformation	3.5	3.2	3.3	3.3	0.86	20.1
Finish	3.3	2.7	3.0	3.0	0.40	21.9
CY (%)	55.16	56.15	54.90	56.33	0.42	3.14
pH	5.44	5.56	5.48	5.45	0.83	4.42
REA (cm ²)	60.68	60.86	63.97	62.63	0.93	15.7
FT (mm)	8.8	8.9	7.7	7.1	0.41	48.7
Marbling	2.5	3.0	2.3	1.8	0.41	48.7

¹BWS= body weight at slaughter; CY= Carcass yield; REA= Rib eye area; FT= Fat thickness. *P* value= 0.05; CV= Coefficient of variation

The REA is a measure that expresses carcass muscularity, the average value obtained for REA of 62 cm² corroborates the carcass rectilinear shape. The carcasses presented FT characteristics of 8.7 mm and marbling 2.1, these variables are related to meat tenderness, since the subcutaneous fat thickness protects the carcass from muscle fiber shortening, carcass dehydration and browning of the flesh (Luchiari Filho, 2000). On the other hand, marbling promotes the feeling of juiciness and softness to the taste, which is a desirable feature by consumers (Scollan et al., 2014).

Conclusions The replacement in increasing proportions of triticale silage to sorghum silage does not influence carcass and meat characteristics, making this forage a possible nutritional alternative for finishing confined beef heifers.

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