

Abstract

Context: Sugarcane is widely used as a forage source for dairy production in tropical areas worldwide. However, due to its low fibre degradability, large amounts of concentrates are needed to meet the energy requirements of high-producing cows, increasing production costs.

Aims: To evaluate how partially replacing sugarcane with cactus (*Opuntia stricta* [Haw.] Haw) cladodes affects nutrient intake and digestibility, feeding behaviour, protein efficiency, milk yield, and milk composition of Holstein dairy cows.

Methods: Ten lactating Holstein cows producing 22.04 kg/day (s.d. \pm 1.94) were assigned to one of five diets in a duplicated 5 \times 5 Latin square design. The diets were a control diet of sorghum silage and concentrates and four dietary treatments containing different proportions of cactus cladodes as a substitute for sugarcane (replacement levels of 0%, 17%, 34%, 52% on a DM basis). Diets were formulated to be isonitrogenous, and the roughage:concentrate ratio was 64:36 on a DM basis.

Key results: Milk yield and energy-corrected milk yield increased quadratically with an increasing amount of cactus cladodes in the diet. Maximum yields of 23.7 kg milk/day and 26.1 kg energy-corrected milk/day were achieved when 34.6% and 37.6% of sugarcane was replaced with cactus cladodes respectively. Milk protein and solids contents increased linearly, and there was no impact on fat and lactose content. Feed intake changed in a quadratic manner in response to an increased cactus cladode content, with maximum intakes being observed when cactus cladodes replaced 30% of sugarcane in the diet. Nutrient digestibility was unaffected by dietary treatments. Time spent on feeding was reduced and idling time was increased as the concentration of cactus cladodes increased in the diet.

Conclusion: Partial replacement of sugarcane with cactus cladodes can increase dairy cows' milk yield without causing any detrimental effects on milk composition or other production-related variables.

Implications: Cactus cladodes can be an important forage source for dairy cows and other ruminants in the semiarid region of Brazil and other drylands across the globe.

Keywords: agribusiness, energy, indigestible NDF, livestock, milk fat, performance, roughage:concentrate ratio, semiarid.