Fishmeal supplementation to high-producing Jersey cows grazing kikuyu pasture

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Abstract

An experiment examined the benefit of feeding fishmeal to high-producing Jersey cows receiving a maize-based supplement (6 kg/d), while grazing kikuyu pasture in late summer. Three groups of 14 cows received no additional supplement (control), a low fishmeal or a high fishmeal supplement (4 or 8% fishmeal replacing some of the maize). All supplements were iso-energetic. Milk yield increased with the level of fishmeal fed but the response was significant (P<0.05) only for the higher level (19.5 *vs* 18.2 kg/d). Milk fat percentage was higher (P<0.05) for the low fishmeal treatment (4.18%) than for the control (3.71%), so that yields of 4% fat-corrected milk were higher for both fishmeal treatments than for the control (19.4 and 19.2 *vs* 17.3 kg/d). Milk urea N was higher for the high fishmeal treatment (10.8 mg/dl) than for the control and low fishmeal treatments (9.1 and 9.4 mg/dl). In a simultaneous study, 8 rumen-cannulated cows, grazing with those in the main study, were fed the control and high fishmeal treatments in a crossover design. Ruminal ammonia-N concentration was higher in the cows on the high fishmeal treatment than in the controls (6.52 *vs* 4.74 mg/dl) as was acetate:propionate ratio. While fishmeal supplementation to cows on kikuyu increased milk yields, the economics of this practice will depend on the magnitude of responses as well as relative prices for supplements and milk and the basis for payment. Development of alternative methods of increasing milk production seems worthy of further research.

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Introduction

When only high-quality pasture is fed to dairy cows, milk production is usually limited by the supply of metabolisable energy (ME), but when high levels of grain are fed as supplements and milk production is high, specific amino acids (AA), particularly methionine and lysine, might be the primary limiting factors for milk production (Muller and Fales 1998; Kolver 2003). Hence, on pasture-based dairy farms in the Southern Cape region of South Africa, where only maize and mineral supplements are fed to grazing dairy cows, it is possible that production benefits could be achieved by adding a quality protein source to the supplement.

Responses in milk production or composition from increasing rumen-undegradable protein (RUP) or replacing rumen-degradable protein (RDP) sources with RUP sources in concentrates have been inconsistent (Carruthers *et al.* 1997; Santos *et al.* 1998; Bargo *et al.* 2003). In several studies, RDP sources such as soybean meal, sunflower meal, urea or rapeseed meal have been replaced with RUP sources such as animal protein blend, fishmeal (FM), maize gluten meal, expeller soybean meal, blood meal, feather meal or heat-treated rapeseed meal (Bargo *et al.* 2003). Of these, increases in milk production on pasture were reported by Schroeder and Gagliostro (2000) and Schor and Gagliostro (2001), where the milk response was 6 and 18%, respectively, above the control. The cows in these two studies received 5 and 6 kg concentrate a day, respectively. Fishmeal was the RUP source that most frequently increased milk yield above that achieved with soybean meal and also ranked highest in essential amino acid (EAA) index, indicating that the type of RUP supplement (AA profile) was more