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# Influence of prepartum and postpartum supplementation of a yeast culture and monensin, or both, on ruminal fermentation and performance of multiparous dairy cows

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**Abstract**

Sixty multiparous Holstein-Friesian cows were utilized in a randomized complete block design experiment to evaluate effects of feeding a yeast culture (*Saccharomyces cerevisiae*), monensin, or both, on their rumen fermentation patterns and performance. The basal diet was a total mixed ration (TMR) containing 383 g/kg alfalfa hay and 617 g/kg concentrates (dry matter (DM) basis). Treatments were: (1) control diet (C), (2) control diet plus 2550 ppm (DM basis) of a yeast culture (YC), (3) control plus 10 ppm (DM basis) of monensin (M) and (4) control plus 2550 ppm (DM basis) of a YC plus 10 ppm (DM basis) of monensin. Cows were fed their TMR twice daily at 07:00 and 16:00 h from 3 weeks prepartum until 8 weeks postpartum. Cows were milked twice daily at 06:00 and 17:00 h.

*Abbreviations:* A:P, rumen acetate to propionate ratio; ADF, acid detergent fibre; BCS, body condition score; BW, body weight; C, control diet; CP, crude protein; M, monensin; MUN, milk urea N; NDF, neutral detergent fibre; NDICP, neutral detergent insoluble CP; NFC, non-fibre carbohydrate; OM, organic matter; RAN, rumen ammonia N; TMR, total mixed ration; VFA, volatile fatty acids; YC, yeast culture

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Compared to C, all treatments increased mean postpartum ruminal propionate concentration and decreased the ratio of acetate:propionate. Mean postpartum rumen pH and ammonia N concentrations were not affected by treatment, although pH and ammonia N progressively decreased with either YC or M as the level of pH or ammonia N in the cows increased. Mean milk yield, milk composition and body weight change of treatment groups did not differ from those of the C group, although milk crude protein (CP) yield progressively increased with YC, and decreased with M, as the level of milk CP production of the cows increased. Mean DM intake (DMI) varied between 20.8 kg/day (M) and 22.2 kg/day (C), with DMI progressively increased with YC, and decreased with M, as the DMI level of the cows increased. Results suggest a modest complimentary effect between YC and M, as YC tended to alleviate the depression in mean DMI caused by M. However, results can also be interpreted to suggest that YC may be a better choice than M in cows with high DMI potential, and/or inherent milk production capability, whereas M may be a better choice than YC in cows with lower DMI potential, and/or inherent milk protein production potential.


*Keywords:* Yeast culture; Monensin; Dairy cows; Additive effects; Milk yield; Intake

## 1. Introduction

Fungal direct fed microbials have been popular additions to ruminant diets for many years. Some of the benefits associated with feeding yeast cultures (YC) include increased dry matter (DM) and neutral detergent fibre (NDF) digestion (Carro et al., 1992), increased initial rates of fibre digestion (Williams and Newbold, 1990), reduced rumen accumulation of lactic acid (Chaucheyras et al., 1995) and increased milk production (Williams et al., 1991; Kung et al., 1997).

However, supplemental YC may be most beneficial to dairy cows if it is fed before parturition, a period characterized by decreasing DM intake (DMI). Wohlt et al. (1991) observed that primiparous Holstein cows fed YC, starting 30 days prepartum and continuing through week 18 of lactation, had higher DMI around parturition and higher milk yield through week 18 of lactation versus unsupplemented cows. Robinson and Garrett (1999) observed trends to increased DMI and milk yield during early lactation for cows fed YC prepartum and postpartum. In a study with Jersey cows, Dann et al. (2000) reported YC supplementation increased DMI during the transition period around calving.

Ionophores are used extensively in many segments of the cattle and poultry industries, and the ionophores lasalocid and monensin are also approved for use in lactating dairy cows in many countries including Brazil, Mexico, New Zealand, Australia and South Africa. In Canada, a monensin controlled release capsule is now approved for use in dairy cattle as an aid in prevention of sub-clinical ketosis. Ionophores have similar ruminal effects in dairy and beef cattle. Apparent benefits from ionophore feeding during the transition period of dairy cattle have been linked to improved glucose status, due to increased propionate production, and from improved N retention (Bergen and Bates, 1984). Improvement in nutrient balance during the transition period may lessen the incidence of rumen and metabolic abnormalities (McGuffey et al., 2001).

Most growth studies with ionophores have been with beef cattle. Feeding an ionophore typically increases efficiency of feed utilization and, when high concentrate diets were