

Preliminary Results on the Effect of Feeding Heat-treated Colostrum on Health and Growth in Pre-weaned Dairy Calves

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Introduction

Previous research showed that heat-treatment of colostrum at 140°F (60°C) for 60 minutes results in a significant reduction in colostrum bacteria counts without affecting colostrum immunoglobulin concentrations. Moreover, calves fed heat-treated colostrum have improved serum IgG levels when compared to calves fed raw colostrum.¹ It is unclear whether feeding heat-treated colostrum will improve growth or health in pre-weaned calves. The objective of this study was to describe the effect of feeding heat-treated colostrum on average daily gain (ADG), risk for morbidity, and mortality in pre-weaned calves.

Materials and Methods

Newborn calves from six commercial dairy farms in Wisconsin and Minnesota, ranging from 1,200 to 2,500 cows, were enrolled between June and August, 2007. First milking colostrum was collected from fresh cows and refrigerated. Daily, or every other day, the refrigerated colostrum was pooled to create a new batch, mixed, and then split into two equal portions. One half was kept raw, while the other half was heat-treated at 140°F (60°C) for 60 minutes using a commercial on farm batch pasteurizer (DairyTech, Inc., Windsor, CO).

Newborn heifer calves (n = 1,101) were removed from the dam within one hour of birth and alternately assigned either 3.8 L of raw or heat-treated colostrum. All colostrum was fed within two hours of birth. Records for calves included calf ID, birthdate, birth time, the type of colostrum fed (raw or heat-treated), and the individual batch of colostrum fed. Calves were individually housed in barns or hutches. Calf treatment and mortality events until weaning were recorded by farm personnel. For a subset of animals in three farms, ADG was calculated using birth and weaning weights obtained using an electronic scale at birth and measuring tape at weaning.

Analysis of the treatment effect on average daily gain, used linear regression while controlling for farm as a fixed effect (Proc MIXED, SAS version 9.1). Logistic regression, controlling for herd as a fixed effect, was used to estimate the effect of treatment on risk for a

sick event and for a death event in the first 60 days of life (Proc GENMOD, SAS version 9.1).

Results

Treatment had no effect on growth in the pre-weaning period. The mean ADG for calves fed heat-treated colostrum (n = 183) was 1.37 lb/day (0.62 kg) (standard error of the mean (SEM) = 0.027 lb (0.01 kg)) and 1.37 lb/day (0.62 kg) (SEM = 0.026 lb (0.01 kg)) for calves fed raw colostrum (n = 182). For calves fed heat-treated colostrum, 32.5% (187 of 576) had at least one sick event before weaning compared to 36.3% (190 of 523) for calves fed raw colostrum. This difference was not significant ($P = 0.20$). Pre-weaning mortality was 2.6% (15 of 576) and 1.7% (9 of 523) for calves fed heat-treated and raw colostrum, respectively. This difference was not significant ($P = 0.33$). Kaplan-Meier and Cox regression analysis of time to sick or death event is forthcoming.

Significance

Preliminary analysis suggests that feeding heat-treated colostrum had no effect on growth or mortality risk in the first 60 days of life. Feeding heat-treated colostrum tended to reduce the risk for treatment in the first 60 days of life, but this effect was not significant. Final analysis is ongoing. Long term follow-up of these calves is planned to describe longevity, milk production, and risk for infection with *Mycobacterium avium* subsp *paratuberculosis* in the adult animal.

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Reference

Donahue M, Godden S, Bey R, Wells S, Fetrow J, Stabel J: Effect of feeding raw versus heat-treated colostrum on colostrum characteristics and passive transfer of immunoglobulin G in newborn dairy calves, *Proc Am Assoc Bov Pract Conf* 41:249, 2008.