Calf maintenance energy requirements are approximately 1.6 Mcal metabolizable energy (ME)/d. Historically milk replacer feeding regimens (e.g. 2 quarts of reconstituted solids twice per day) provide approximately 2.2 Mcal ME/d. Considering the environmental challenges faced by calves, these feeding programs provide little energy for immune function and growth. *Cryptosporidium* is an infectious stressor of dairy calves which is difficult to prevent and treat. Few oocysts may infect and cause disease in naive people, and are a severe health risk in the immunocompromised. The objective of this study was to evaluate the effect of conventional nutritional plane versus a higher nutritional plane on the health and performance of dairy calves after experimental infection with *C. parvum*.

A randomized, controlled trial was performed using Holstein bull calves. All births were attended by study personnel, calves fed 4L of heat-treated colostrum prior to transportation to an isolation facility. Calves were randomly assigned to a higher plane of nutrition (HPN) or
conventional nutrition (CN) group and maintained for a 21 day study period. Twenty-nine calves were enrolled with 9 lost to follow up. HPN was defined as 0.30 Mcal per kg of metabolic body weight (MBW) using a 28% protein, 20% fat milk replacer, n=11. CN was defined as 0.13 Mcal per kg MBW using a 20% protein, 20% fat milk replacer, n=9. All calves were inoculated with $1 \times 10^6$ C. parvum oocysts at feeding 5. Fecal and health scores, oocyst counts by immunofluorescent assay, weight gain, dry matter intake, and hydration status were measured throughout study period. Data were analyzed by non-parametric means.

Measures of passive transfer of antibodies, initial body weight and packed cell volume at feeding 5 were not different between treatment groups (P>0.1). Oocyst shedding patterns, including onset, duration, total, and peak shedding, were not significantly different between treatment groups (P>0.7). CN calves were dehydrated (PCV=40%) at the end of the study, whereas HPN calves were not (PCV=32%) (P=0.04). Fecal scores (FS) improved faster in the HPN group (median = 0.1 FS/day) compared to the CN group (median = 0.01FS/day) (P= 0.03). HPN calves had better average daily gain than CN calves (median 433g v. -48g, respectively, P<0.001). Feed efficiency (average daily gain: dry matter intake) was much better for the HPN group than the CN group (median 131.9g/kg v. -31.4g/kg, respectively P<0.0001).

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