Reduced Burden of *Salmonella enterica* in Bovine Subiliac Lymph Nodes Associated with Administration of a Direct-fed Microbial


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Abstract

Despite effective food safety interventions within abattoirs, *Salmonella enterica* remains a common contaminant of raw ground beef. Research has recently implicated peripheral lymph nodes (PLNs) as a potential route by which *Salmonella* contaminates ground beef. This study examined the efficacy of using *Lactobacillus animalis* (formerly designated *Lactobacillus acidophilus*; NP51) and *Propionibacterium freudenreichii* (NP24), at $10^9$ cfu/head/day, as a direct-fed microbial (DFM) in feedlot cattle diets to control *Salmonella* within PLNs. Two studies were conducted in which cattle were randomly allocated into either control or DFM treatment groups. Diets of treated cattle were supplemented with $10^9$ cfu/head/day of the DFM, while control groups received no DFM supplementation. During slaughter at abattoirs, one subiliac lymph node (SLN) per carcass was collected from 627 carcasses from one study and 99 carcasses from the second study. Lymph nodes were cultured to estimate the presence and concentration of *Salmonella*. In the first study, effects of DFM supplementation varied across slaughter days. On the first and second slaughter days, prevalence was reduced by 50% ($P = 0.0072$) and 31% ($P = 0.0093$), respectively. No significant difference was observed on slaughter day three ($P = 0.1766$). In the second study, *Salmonella* was 82% less likely ($P = 0.008$) to be recovered from SLNs of treatment cattle. A greater relative risk reduction was observed in the latter study, absolute risk reductions were similar across studies. A significant reduction in the concentration of *Salmonella* in SLNs ($P < 0.0001$) on a cfu/g and cfu/node basis was also observed in cattle administered NP51 and NP24 in the first study; in the second study, too few quantifiable SLNs were observed to facilitate meaningful comparisons. The results indicate that NP51 and NP24 supplementation may aid in reducing the prevalence and concentration of *Salmonella* in SLNs and, therefore, serve as an effective control measure to reduce *Salmonella* in ground beef products.


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