

SELECTION OF *PROPIONIBACTERIUM* STRAINS CAPABLE OF UTILIZING LACTIC ACID FROM *IN VITRO* MODELS

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ABSTRACT

Forty-four strains representing four species of *Propionibacterium* were screened for lactic acid utilization to examine their potential for use in a direct-fed microbial to prevent lactic acidosis in feedlot cattle. Strains were tested for utilization of lactic acid and growth in a nutrient broth supplemented with 80 mM lactic acid at two different pH values - one representing the pH of an acidic rumen (5.0) and the other that of a forage-fed ruminant (7.0). No differences in growth and lactic acid utilization were detected among strains at pH 7.0. Data from pH 5.0 experiments showed one strain of *P. freudenreichii* (#2) utilized up to 78.59 mM of lactic acid, which was significantly more compared to other strains. Compared with strains of *P. acidipropionici*, *P. jensenii* and *P. thoenii*, *P. freudenreichii* strains reached significantly higher cell densities and utilized more lactic acid at pH 5.0. Rumen fluid simulation models were used to examine the ability of fourteen selected propionibacteria strains to survive and utilize lactic acid produced by native ruminal microorganisms. Eleven of the fourteen propionibacteria strains tested utilized lactic acid in the rumen model. Gompertz non-linear curve fitting equation was used to determine which strains significantly increased the lag time for lactic acid accumulation and suppressed the rate of H⁺ concentration.