

# The effect of intestinal Ca-gluconate and Ca-butyrate on ruminal short-chain fatty acid (SCFA) absorption and SCFA concentrations in the gastrointestinal tract of heifers

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The objective of this study was to evaluate ruminal short-chain fatty acid (SCFA) absorption and short-chain fatty acid concentrations within the gastrointestinal tract (**GIT**) of heifers infused either with Ca-gluconate or Ca-butyrate. Thirty-two ruminally cannulated heifers, fed a common diet, were provided a ruminal infusion of water (**CON**), ruminal infusion of Ca-gluconate embedded in a fat matrix (0.0192% BW; **RGluc**), an abomasal infusion of Ca-gluconate (0.0077% BW; **AGluc**), or an abomasal infusion of Ca-butyrate (0.0029% BW; **ABut**). Treatments were designed to provide the same amount of butyrate to the small intestine. DMI was restricted to 95% of voluntary intake and the temporarily isolated and washed reticulum-rumen (WRR) technique was used to measure SCFA absorption. Samples of the rumen, jejunum, and colon were collected. Data were analyzed to determine the effect of the CON vs. ABut, CON vs. treatments with Ca-gluconate, and for ABut vs. treatments with Ca-gluconate. DMI was not affected by treatment averaging 7.7 kg/d ( $P = 0.77$ ). Ruminal concentrations of major SCFA were not affected. The concentration of SCFA in the colon was greater for ABut than for treatments with Ca-gluconate (29.5 vs. 22.6 mM;  $P = 0.026$ ) and the molar proportion of acetate was greater for CON than ABut (76.2 vs. 73.5%;  $P = 0.036$ ) and CON than Ca-gluconate (73.0%;  $P = 0.046$ ). The molar proportion of colonic propionate was greater for ABut than CON (17.8 vs. 16.6%;  $P = 0.049$ ) and greater for treatments with Ca-gluconate than CON (17.9%;  $P = 0.020$ ). The rate of ruminal SCFA disappearance was greater for ABut compared to CON (678 mmol/h vs. 486 mmol/h;  $P = 0.014$ ), and greater for ABut than Ca-gluconate treatments (535.31 mmol/h;  $P = 0.039$ ). **Take Home Message:** These data indicate that supplying Ca-butyrate or Ca-gluconate to the intestine affect SCFA in the colon and stimulate SCFA absorption across the rumen.