

2453V Bioavailability of 2 different rumen-protected choline products for dairy cattle measured with the area under the curve method.

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Rumen-protected choline has shown to improve dairy cow performance. The AUC method allows to compare the relative bioavailability of different rumen-protected choline sources. Six rumen-cannulated multiparous Holstein cows (32 kg/d of milk) were used in a switch back design to evaluate the plasma kinetics and relative bioavailability of 2 commercial sources of rumen-protected choline, CholiGEM (Kemin Animal Nutrition and Health, Belgium) and Reashure (Balchem corporation, US) (n = 6 per treatment). Treatments were dosed the first day of each period at 36g of choline-equivalent as a single dose before the morning feeding directly into the rumen close to the esophageal orifice using a rigid polyvinyl chloride (PVC) tube. Blood samples were collected from the jugular vein at 0, 1, 2, 3, 4, 6, 9, 12, 24, 30, and 48 h after treatment administration and analyzed for free choline and betaine as bioavailability markers. Results were used to determine the basal concentration (C_{bas}, 0 h), the maximum concentration (C_{max}), the time to reach the C_{max} (T_{max}), and the area under the curve (AUC) of choline and betaine. Results were analyzed with GLIMMIX procedure of SAS (SAS Inst. Inc., Cary, NC). For choline plasma concentration, no differences were observed in C_{max} (227 vs. 155 ± 10.1 µM, P = 0.22) and the T_{max} (5.4 vs. 10.9 ± 0.87 h, P = 0.26) between CholiGEM and Reashure, respectively. The C_{bas} tended to be higher in CholiGEM compared with Reashure (96.8 vs. 90.7 ± 0.57 µM, respectively, P < 0.10), and the AUC was higher in CholiGEM compared with Reashure (1279 vs. 503 ± 33.1 units, respectively, P < 0.05). For betaine plasma concentration, no differences were observed in C_{bas} (900 vs. 1006 ± 20.4 µM, P = 0.14), C_{max} (1246 vs. 1126 ± 17.4 µM, P = 0.23), T_{max} (10.9 vs. 13.7 ± 1.3 h, P = 0.48) and the AUC (8725 vs. 2740 ± 370.6 units, P = 0.13) between CholiGEM and Reashure, respectively. Results of AUC values suggest that the bioavailability of CholiGEM was higher than that of Reashure.

Key Words: choline bioavailability, betaine, area under the curve