

Effect of dietary rumen-protected choline on milk production of dairy cows: A meta-analysis

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Abstract: Research studies presented inconsistent results on the effects and action of choline in dairy cow diets. A meta-analysis was conducted to quantify the effects of dietary rumen-protected choline on production characteristics of dairy cows. Dry matter intake (kg/d), milk yield (kg/d), milk fat (% and kg/d), and milk protein (% and kg/d) were evaluated as dependent variables in models. The number of treatment means varied from 20 obtained in 7 studies for milk fat and protein contents to 34 from 11 studies (12 experiments) for milk yield. Accounting for experiment as a random effect, DMI, milk yield, milk protein content, and milk protein yield could adequately be related to levels of dietary rumen-protected choline chloride by a logistic model. Marginal responses in milk yield decreased from 131.5 to 0.037g of milk/g of dietary rumen-protected choline chloride when supplementation increased from 6 to 50 g/d. From estimated values for the metabolizable Met supplied by diets, it appears that dietary rumen-protected choline chloride functions as a methyl donor to spare Met for milk protein synthesis. However, more accurate input data on Met status of diets are needed to confirm this. Within the range of 6 to 50 g/d of rumen-protected choline chloride, milk fat content decreased linearly at a rate of 0.00339% for a 1 g/d increase in dietary rumen-protected choline chloride. This illustrates that dietary rumen-protected choline chloride has no effect on milk fat content. Numerous physiological and dietary factors probably related to responses obtained with dietary rumen-protected choline supplementation, and the precise mechanism of choline action in the lactating dairy cow warrants further investigation.

Key words: rumen-protected choline , milk production, milk composition, meta-analysis