

Effect of Rumen Protected Choline Supplementation on Milk Production and Composition of Lactating Friesian Cows

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Rumen-protected choline (RPC) products have been fed to periparturient dairy cows to increase the supply of choline to the small intestine with the goal of increasing milk or component yields or alleviating the development of fatty liver syndrome (Hartwell *et al.*, 2000; Piepenbrink and Overton, 2003; Pinotti *et al.*, 2003; Overton and Waldron, 2004). Increasing the postruminal supply of choline by an infusion of choline into the abomasum has increased milk production and milk fat yield (Erdman and Sharma 1991).

Twelve lactating Friesian cows were used in a complete switch-back design (Lucas, 1956). The cows were fed a basal ration consisting of 40% concentrate feed mixture + 40% fresh berseem + 20% rice straw (DM) without supplement (G₁) or supplemented with 15g and 30g choline chloride/head/day for G₂ and G₃, respectively.

The digestibility coefficients of all nutrients and nutritive values increased significantly (P<0.05) with rumen protected choline supplementation. Rumen protected choline supplementation also increased significantly (P<0.05) the intake of TDN and DCP. The pH values and NH₃-N concentration decreased significantly (P<0.05) and TVFA's concentration increased significantly (P<0.05) in rumen liquor with rumen protected choline supplementation (Table 1). Rumen protected choline supplementation significantly increase (P<0.05) actual milk and 4% FCM yield. The contents of fat and total solids (TS) and the yield of all milk constituents except ash increased significantly (P<0.05) with rumen protected choline supplementation (Table 1). Rumen protected choline supplementation improved feed conversion, significantly increasing (P<0.05) the quantities of DM, TDN and DCP per kg 4% FCM. Average daily feed cost were similar for the different groups, while the feed cost per kg 4% FCM decreased significantly (P<0.05) and the average income of milk yield increased significantly (P<0.05) with rumen protected choline supplementation.

Table 1. Effect of rumen protected choline supplementation on rumen parameters, milk yield and composition

Item	Rumen parameters			Milk yield kg/day		Milk composition %					
	pH	NH ₃ -N	TVFA's	Actual	FCM	Fat	Protein	Lactose	SNF	TS	Ash
control	6.95 ^a	14.81 ^b	18.95 ^a	15.22 ^b	14.22 ^b	3.56 ^b	3.12	4.39	8.21	11.78 ^b	0.71
15 g RPC	6.72 ^b	17.14 ^a	16.63 ^b	16.54 ^a	15.77 ^a	3.69 ^a	3.15	4.39	8.25	11.94 ^a	0.71
30 g RPC	6.67 ^b	17.43 ^a	16.25 ^b	17.46 ^a	16.82 ^a	3.75 ^a	3.16	4.43	8.30	12.05 ^a	0.71

a, b: Values and means in the same row with different superscripts differ significantly at 5% level.

It is concluded that rumen protected choline supplementation to lactating Friesian cows improved nutrient digestibility, milk yield and composition, feed conversion and economic efficiency.

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