

EFFECT OF DIETARY PROPYLENE GLYCOL, VITAMIN E, METHIONINE AND CARNITINE SEPARATELY AND AS COMPLEX SUPPLEMENT ON PERFORMANCE OF TRANSITION DAIRY COWS

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Despite the significant range of drugs and supplements regulating rumen metabolism, glucose synthesis and fatty acids utilization in the liver, approximately 40 % of high-yielding cows exhibit subclinical form of ketosis and fatty liver syndrome. Propylene glycol is widely used as glucose precursor for the prevention and treatment of ketosis. Inadequate intake of methionine reduces the synthesis of phospholipids and lipoproteins in the liver. As a result, the elimination from the liver to the bloodstream of triacylglycerols by the very low-density lipoproteins slowed down. The addition of high-dose vitamins E to the diets of transition cows reduces the somatic cells count in milk, lower the frequency occurrence of mastitis and placenta retention. Furthermore, some researchers suggest increasing the content of vitamin E in diets of cows, since rumen bacteria respond positively to high doses of this vitamin. Carnitine transports fatty acids into the mitochondria for oxidation, and therefore contributes to less accumulation of lipids in the liver. The purpose of our work was to investigate the effect of adding to the diet of cows at the end of the dry period and after calving, the complex feed supplement to prevent ketosis and steatosis and stimulate next milk yielding.

Six groups of cows were used for the experiment, 5 animals each. The 1st group received a standard balanced diet. To the diet of the 2nd, 3rd, 4th, 5th and 6th groups cows added (per animal per day): dry propylene glycol — 200 g, 50 % vitamin E (*Rovimix-50*) — 5 g, of rumen protected methionine (MHA 86 %) — 20 g, rumen protected carnitine — 1.0 g (5 g of *Carnipass*), and all these additives in the complex. The trial lasted three weeks before and the three weeks after calving. The milk yields of cows were monitored during the first three months of lactation.

Propylene glycol increased amylolytic, vitamin E — cellulolytic, and methionine — proteolytic activities in the rumen. As a result, in the rumen of cows receiving propylene glycol the concentration of propionate and lactate, and in rumen of cows receiving vitamin E the total volatile fatty acids concentration were higher ($P < 0.05$). Propylene glycol, vitamin E and methionine reduced the blood concentration of acetoacetate and beta-hydroxybutyrate. The total amount of ketone bodies in the cows received propylene glycol, vitamin E or methionine were 2.49; 1.64 and 1.23 times less than in control group ($P < 0.01$). The addition of propylene glycol increased glucose concentration ($P < 0.05$) and reduced the concentration of triacylglycerols ($P < 0.01$); methionine increased urea concentration ($P < 0.05$); higher amount of vitamin E reduced the concentration of lipid peroxidation products ($P < 0.01$) in blood plasma of cows.

All studied feed additives have reduced the concentration of un-esterified fatty acids in plasma, what is important for the prevention of ketosis. Propylene glycol and complex feed supplement with the same effectiveness reduce the concentration of ketone bodies in the blood of cows. Propylene glycol increased milk yield, but decreased milk fat content. Vitamin E did not increase milk yields, but elevated the fat content in milk. Methionine and carnitine did not affect milk productivity. Adding to the diet of cows the complex supplement did not affect milk yield, but increased milk fat.

Keywords: COWS, PROPYLENE GLYCOL, VITAMIN E, METHIONINE, CARNITINE