

Activity of α -amylase and data of lipids exchange in the estimation of functional state of pancreas in highly productive cows

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In the article is estimated the functional state of pancreas in clinically healthy highly productive cows of different technological groups on the indexes of carbohydrate and lipid metabolism.

Researches were made on the Holstein clinically healthy cows of different technological periods: dry period ($n=11$), early after calving period ($n=10$) and the first three months of lactation ($n=20$) with an average yield 7–10 thousands kg of milk.

The functional state of pancreas is more frequent estimated by activity of enzymes in the different biological liquids (blood, urine) in human and veterinary medicine, which are synthesized its cells and eliminated in intestine in composition of secret. One of such enzymes is an α -amylase which is secreted mainly by pancreas and salivary glands. Considerable and fast hyperamilazemiya and hyperamilazuriya develop at acute parotitis and pancreatitis.

As a result of the conducted researches was founded the considerable oscillations of activity of blood α -amylase in deep pregnant cows – from 0,93 to 18,5 g/h $\times$ l, while an average index has been $9,2\pm 1,88$ g/h $\times$ l. In 4 from 10 animals (36,4 %) the activity of enzyme was higher than 10 g/h $\times$ l. In the first days after calving activity of enzyme decreased in 1,2 times, by comparison to deep pregnant cows, that, possibly, related with decrease of energy metabolism in animals in this period. However, these changes were not reliable, as a result of considerable oscillations of enzyme activity (from 0,98 to 25,3 g/h $\times$ l). Only in two animals (20 %) of this group was founded hyperamilazemiya over 10 g/h $\times$ l. During early lactation period the activity of blood α -amylase increased to $9,5\pm 1,17$ g/h $\times$ l, thus in 45 % cows its activity was higher than 10 g/h $\times$ l, that testifies to tension of the functional state of pancreas in this period.

A pancreas, being the organ of both external and internal secretion, plays a direct role in lipid's metabolism, that is why results of determination of their separate indexes in the blood serum possible to examine as indirect indexes of its state.

The content of total lipids, which consist of free and ester cholesterol, triacylglycerols, phospholipids, nonester fat acids, had been $3,0\pm 0,32$ g/l in the blood serum of clinically healthy cows from dry period (1,4–4,9 g/l). The dynamics of content of total lipids was characterized the decrease of their amount in 1,4 times in the blood serum in the first two weeks after calving, by comparison to deep pregnant ($p<0,1$), and the increasing in early lactation period to $4,5\pm 0,38$ g/l ($p<0,001$). In 20 % from a group of early lactation cows marked a hyperlipemia –the level of total lipids in the blood serum was higher than 6 g/l and was within the limits of a 6,19–7,79 g/l, that, possibly, was related to strengthening of lipomobilisation processes with the purpose of indemnification of negative energy balance development.

The dynamic of blood content HDL in cows of different groups was similar to the changes of amount of total lipids. The level of HDL had a tendency to decrease in the first 14 days after calving on the average to $0,57\pm 0,066$ mmol/l by comparison to deep pregnant ($p<0,01$) and the early lactation cows ($p<0,001$). The difference between content of α -lipoproteins in the blood serum in lactation cows, by comparison to dry period, was also high-reliable ($p<0,001$; $1,25\pm 0,047$ mmol/l).

The results of researches testify to the presence of appropriate dynamics in relation to the changes of activity of α -amylase and indexes of lipids' metabolism, which are straight or mediated related with functioning of pancreas, depending on the technological period of highly productive cows. It was founded that the period of the first months of lactation appeared more tender in relation to functioning of pancreas, to what testify the increases of activity of α -amylase in 45 % cows over 10 g/h $\times$ l, the content of total lipids and high-density lipoprotein in the blood serum to $4,5\pm 0,38$ g/l and $1,25\pm 0,047$ mmol/l accordingly exactly in this period.

Key words: highly productive cows, pancreas, α -amylase, total lipids, high-density lipoprotein, intestinal and rumen digestions.