



Daily Milk Production in Cows: The Effect on the Concentration Level of Total Cholesterol in Blood Serum



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Abstract

The modern way of cultivation, that is, the technology used for keeping and exploitation of dairy cows, is aimed at continuous increase in the intensity of milk production and maximizing the use of genetically high milk. The burden on the metabolism of high-productive cows is most evident in late gravidity and puerperium. The link between the production characteristics of high-producing dairy cows (daily milk production) and the metabolic capacity of their organism is still insufficiently clear, and so a legitimate reason for the research. The concentration of total cholesterol in the blood serum of cows in lactation varies in a wide range (1.3-9.36 mmol / L). Many internal and external factors affect the elevated or decreased level of total cholesterol concentration in blood serum of lactating cows. According to the recent studies, the amount of daily milk production of cows who lived in farm conditions of breeding and keeping, does not have a significant effect on the level of total cholesterol in the blood serum, what was determined using single linear regression analysis.

Keywords: Cow in Lactation; Milk; Daily milk production; Total cholesterol

Introduction

Maintaining dairy cows in high lactation and good health are the main priorities of modern breeding, while the control of nutritional metabolic status is of great importance. The metabolic overload of highly productive cows is most evident in late pregnancy and puerperium. Given the needs of cows in the last two months of gravity, and especially during the early lactation period during the winter, the meals are often not well and rationally balanced, both in terms of selecting nutrients and in terms of energy content, such as: proteins, dry matter and cellulose [1]. Numerous environmental factors affect the production of milk in cows, which are: ambient temperature, humidity, solar radiation and wind [2]. Different levels of feeding with and without added fat should have different repercussions on biochemical parameters of blood, as well as on the quality of milk produced [3]. Our article was intended to point out the possible correlation and possible impact of daily milk production on changing levels of total cholesterol concentration in lactating cows' blood serum.

Total Cholesterol Level in the Blood Serum of Lactating Cows

Cholesterol, together with phospholipids, is an integral part of all cell membranes; it participates in the construction of myelinating nerve wrap and presents a starting substance for the synthesis of bile acids, steroid hormones of the adrenal and sex glands, and vitamin D3. In the cow tissue, cholesterol can be found in a free and bound form as an ester with higher fatty acids. In membrane structures, it is most often found in an unesterified form [4]. The total cholesterol concentration in the cow serum varies widely and ranges from 1.3 to 6.0 mmol / L and is associated with age, physiological state, production characteristics, and nutrition [3]. According to Mukača, whose sample were 62 tested cows, and tested was the total cholesterol concentration in the blood serum of cows, the values obtained varied in the range from 2.25 to 9.36mmol / L. Other literature references correlate with the already mentioned studies, that is, confirm the variation in the

total cholesterol concentration in the cow serum and they range from 1.3 to 7.3 mmol / L [5-9]; however, keeping in mind that these studies refer to the winter period sampling of cows' blood serum.

It was also found that the value of cholesterol concentration in cows with different daily milk production varies. According to Mukača there are differences in the concentration of cholesterol between cows with different amounts of daily milk. Additional testing of the significance of these differences revealed that they are statistically significant, but only among cows with daily production of 29-34L milk and cows with daily production of 35-52L milk. Based on the same research, using single linear regression, it has been established that the amount of daily milk production does not have a significant effect on the concentration of total cholesterol in the blood serum.

Factors that Influence the Change in the level of Total Cholesterol in the Cows' Blood Serum

In the postpartum period, in cows with ketosis, a statistically lower concentration of total cholesterol was found in relation to the average values of cholesterol in the blood of healthy cows after calving [10]. Decreased blood cholesterol levels are closely correlated with energy imbalance that occurs during high gravidity and at the beginning of lactation in high-lactating cows. Every condition that leads to the negative energy balance of cows leads to the mobilization of fatty acids from body reserves and reaches its maximum in the first or second week of lactation. Hormones (growth hormone, insulin, glucagon and cortisol) have an important role in regulating the metabolism of fat as well as carbohydrates and proteins in complex conditions of high milk production and the preservation of the homeostasis of the organism. In such conditions, the relationships between hormones, their concentration in the circulation, as well as the number and sensitivity of the receptors in the target cells which they affect [11] are changing.

Conflict of Interest

The authors have no conflict of interest to declare



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