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У збірнику матеріалів конференції подано результати сучасних наукових досліджень за секціями: фундаментальні питання ветеринарної медицини; актуальні питання незаразної патології тварин; актуальні питання заразної патології тварин; студентська наука.

Розраховано на науково-педагогічних працівників, представників науково-дослідних установ, хімічних лабораторій, науковців, спеціалістів установ та компаній ветеринарного напрямку, аспірантів, студентів.

У разі повного або часткового використання матеріалів збірника посилання обов'язкове. Відповідальність за зміст поданих матеріалів, точність наведених даних та відповідність принципам академічної доброчесності несуть автори.

Відповідальний за випуск: В.А. Томчук

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TOTAL CALCIUM METABOLISM AND ITS FRACTIONS IN THE BLOOD SERUM OF CLINICALLY HEALTHY PREGNANT GOATS

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Goat farming plays an important role in the development of modern livestock farming, particularly in regions with limited resources, by supporting food security, sources of income and the economic resilience of farming households. According to the Food and Agriculture Organisation of the United Nations (FAO), in 2022 the global goat population exceeded 1.1 billion head, of which more than 200 million were dairy goats, whilst global goat milk production stood at around 20.7 million tonnes per year [1–4].

The increase in milk yield in goats leads to greater demands on the regulation of the metabolism of key minerals, amongst which calcium plays a key role. This essential macromineral is involved in the formation and remodelling of bone tissue, muscle contraction, neuromuscular transmission, haemostasis and the regulation of many intracellular mechanisms, amongst other processes. Hormonal homeostasis of calcium in the blood is a complex and multifactorial process, maintained by the coordinated interaction of bone tissue, the gut and the kidneys [5, 6]. The concentration of total calcium in the blood serum of animals reflects not only its biologically active ionised fraction (Ca^{2+}), but also calcium bound to proteins (albumins) and low-molecular-weight anions (citrate, phosphate and bicarbonate), which highlights the need for a comprehensive assessment of its fractional composition when studying calcium homeostasis in goats [7].

The aim of this study was to investigate the metabolism of total calcium and its fractions in the blood serum of clinically healthy pregnant goats.

The study was conducted on dairy goats. The physiological reference ranges for total calcium and ionised calcium concentrations in goat serum were taken as 2.20–2.90 mmol/L and 0.47–1.20 mmol/L, respectively [7]. Statistical analysis was performed using the software programmes Statistica 12.0 (StatSoft Inc., USA, 2014) and MedCalc 22.017 (MedCalc Software Ltd., Belgium, 2024) [8].

We investigated the metabolism of total calcium and its individual fractions in 146 clinically healthy pregnant goats at 75–90 and 120–140 days of gestation. It was found that the concentration of this macromineral in the blood serum of pregnant goats ranged from 2.20 to 2.80 mmol/L. In particular, on days 75–90 of pregnancy, its concentration ranged from 2.20 to 2.74 mmol/L. As parturition approached (120–140 days of gestation), the level of this macromineral fluctuated between 2.20 and 2.80 mmol/L and did not differ statistically from that observed in animals at 2.5–3 months of gestation.

The concentration of ultrafiltrated calcium in the blood serum of clinically healthy pregnant animals fell within a wide range – from 0.91 to 2.02 mmol/L (65.0% of total Ca). For example, on days 75–90 of pregnancy, the concentration of this form of calcium in the blood serum of goats ranged from 0.91 to 1.97 mmol/L, whilst on days 120–140 of pregnancy it showed a slight downward trend compared with the previous study period ($p < 0.2$).

The concentration of ionised calcium in the blood serum of clinically healthy pregnant goats ranged from 0.47 to 1.29 mmol/L (55.8%/ultrafiltrated Ca; 35.6%/total Ca). On days 120–140 of pregnancy, the concentration of this calcium fraction was significantly higher than that recorded on days 75–90 ($p < 0.001$).

The concentration of neutral calcium in the blood serum of clinically healthy pregnant animals ranged from 0.17 to 1.18 mmol/L (42.9% of ultrafiltrate Ca; 27.9% of total Ca). For example, the concentration of this form of calcium in pregnant goats on days 75–90 of gestation ranged from 0.21 to 1.08 mmol/L, whilst on days 120–140 of gestation, the concentration of this calcium fraction was slightly lower (by 8.5%) compared with the previous study period.

The level of the protein-bound fraction of calcium in pregnant goats ranged from 0.41 to 1.38 mmol/L, and its proportion in the total calcium composition was 35.0%. For example, on days 75–90 of gestation, the concentration of this macroelement fraction in the goats' blood serum ranged from 0.41 to 1.29 mmol/L, whilst on days 120–140, the content of this calcium isoform showed a slight upward trend compared with animals in the earlier stages of pregnancy, and ranged from 0.41 to 1.38 mmol/L (36.3% of total Ca).

Thus, in the blood serum of clinically healthy pregnant goats, the concentration of total calcium ranged from 2.20 to 2.80 mmol/L; ultrafiltrated calcium – 0.91 to 2.02 mmol/L; ionised calcium – 0.47–1.29 mmol/L; neutral calcium – 0.17–1.18 mmol/L; protein-bound calcium – 0.41–1.38 mmol/L.

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СОНОГРАФІЧНІ МАРКЕРИ ТРІАДИТУ У КОТІВ

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