

# **Comparative studies on bone structure in dairy cows with different feeding conditions**

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## **Abstract**

The bone belongs to the dynamic tissues and its structure in domestic cows is still not completely understood in correlation to the impact of different food components. The aim of our work was a histomorphometrical and immunohistochemical research on bone morphology and factors influencing it in healthy dairy cows fed with self-produced grain and with rapeseed cakes.

The bone of self-produced grain-fed cows demonstrated statistically significant difference in the number of osteocytes from the bone of rapeseed cakes-fed cows. The rapeseed cakes-fed cows didn't show any bone cell positive for BMP2/4, while FGFR1 increased significantly in their supportive tissues. The number of bFGF- and apoptosis-containing structures varied in cows of both groups. MMP2 expression showed statistically significant difference between both animals' groups with domination in bone of cows fed with self-produced grain. Defensin-, osteopontin- and osteocalcin-containing cells showed tendency to increase in bone of cows on rapeseed cakes diet.

Conclusions. The rapeseed-fed cow's long bones demonstrate significant decrease of osteocytes per mm<sup>2</sup> and selective increase of FGFR1, suggesting the (compensatory) growth stimulation in supportive tissue.

The statistically significant selective absence of MMP2 with a slight tendency of increase in osteopontin and osteocalcin in rapeseed-fed cow's long bones indicates the persistence of seemingly still compensated qualitative changes in bone (beginning of disturbances in mineralization, metabolism etc.) proved also by a slight increase of the bone antimicrobial peptide.

**Key words:** histomorphometry, immunohistochemistry, bone, rapeseed diet, cows