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Czech Journal of Animal Science

Fermentation pattern of the rumen and hindgut inocula of sheep grazing in an area polluted from the non-ferrous metal industry

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In vitro study of the rumen fluid (RF) and hindgut content (HC) fermentation by microbiota taken from sheep grazing in an area atmospherically polluted from the non-ferrous metal industry was conducted

and compared with controls from an uncontaminated area (UA). The experimental sheep were exposed to the prolonged intake of heavy metals by grazing in the contaminated area (CA) for one year. Soil and grass from that area and the rumen content of sheep were analyzed for heavy metal levels. Based on the levels of mercury (4.752 mg/kg), copper (232.9 mg/kg), cadmium (1.167 mg/kg), lead (92.509 mg/kg) and arsenic (74.59 mg/kg) the soil was categorized as profusely contaminated. Meadow hay (MH) from UA was used as a tested substrate of fermentation activity; it was incubated with buffered RF and HC inocula from CA and UA for 24 h. The gas volume in CA was significantly decreased by 50 and 36% in RF and HC, respectively. The methane production in CA was significantly decreased by 77 and 71% in RF and HC, respectively. The significantly decreased values of the fermentation parameters in CA in comparison with UA were accompanied by the reduced ($P < 0.01$) total concentration of rumen ciliate protozoa.

Keywords:

heavy metals; *in vitro* fermentation; rumen fluid; hindgut content; volatile fatty acids; rumen ciliates

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