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CHANGES IN THE CHEMICAL PROPERTIES OF GROUNDWATER IN SOILS UNDER MEAT AND BONE MEAL, NATURAL AND MINERAL FERTILIZATION REGIMES

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Abstract

The objective of this study was to evaluate the effect of different doses of meat and bone meal (MBM) applied as organic fertilizer on the quality of groundwater in arable fields. The effect of meat and bone meal fertilizer applied at rates of 1.0, 1.5, 2.0 and 2.5 t ha⁻¹ was compared with no fertilization, mineral fertilization, and manure fertilization (10 t ha⁻¹). Groundwater samples for chemical analyses were collected every month during the growing season using piezometers installed in the experimental plots. Groundwater samples were analyzed to determine the concentrations of mineral nitrogen – NO₃⁻, NO₂⁻ and NH₄⁺, total phosphorus, phosphate and potassium. The application of meat and bone meal at the rate of 1.0 to 2.0 t ha⁻¹ with supplemental potassium fertilization does not lead to higher contamination of groundwater than mineral (NPK) fertilization. The use of meat and bone meal fertilizers at a rate of 2.5 t ha⁻¹ significantly increased mineral nitrogen and phosphate concentrations in groundwater samples. The results of our analyses suggest that meat and bone meal can be successfully used at a rate of 2.0 t ha⁻¹ to fertilize crops grown in a five-year crop rotation sequence on lessive soils. The application of higher doses of meat and bone meal intensifies the flow of biogenic elements into groundwater.

Key words: groundwater contamination, meat and bone meal, organic waste

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