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ORIGINAL PAPER

Meat and bone meal (MBM) as a source of phosphorus for crop plants

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Abstract

In the era of sustainable economy and the European Green Deal, a strong emphasis is placed on a better balance between nature, food systems, and biodiversity. Bio-based fertilizers are recovered from various by-products and biomass types to close nutrient cycles and reuse nutrients in food systems. Meat and bone meal (MBM) can be a viable alternative to organic fertilizers because it is a relatively rich source of nitrogen, phosphorus and calcium. A four-year pot experiment was conducted in Poland. The aim of this study was to evaluate the effect of meat and bone meal (MBM) on the yields of four crops, the content of nitrogen (N) and phosphorus (P) in plants, and selected chemical properties of soil. Four fertilization treatments were established: 1) NPK (mineral N, P, K fertilization); 2) 0.2% MBM; 3) 0.4% MBM, and 4) 0.8% MBM per 10 kg of soil per pot. Each year, MBM was applied before sowing as a substitute for NP fertilizer. Intensive MBM fertilization (0.8% MBM) contributed to increased crop yields, N and P concentrations and uptake by plants relative to the lowest MBM dose. The values of the analyzed parameters were comparable in the treatments fertilized with higher doses of MBM and with mineral NPK. The only exception was the highest total P content in the seeds of oilseed rape fertilized with the lowest dose of MBM. Soil mineral N and plant-available P concentrations increased with increasing MBM doses. The results of the study indicate that MBM can completely replace mineral P fertilizers and partially replace mineral N fertilizers, and its dose should be adjusted to meet the nutrient requirements of crops.

Keywords: triticale, oilseed rape, wheat, maize, mineral nitrogen, available P, soil pH, animal meal

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