

Master thesis topic

Meat and Bone Meals as Fertilizer for Organic Farming – Improving P Solubility

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Background

Stockless organic farms are often characterized by an imbalanced nutrient supply of phosphorus (P) resulting in P mining and low amounts of extractable P in the soil. This imbalance has to be offset by using external fertilizers to compensate for the nutrients lost with the sold products. Meat and bone meals are permitted as fertilizers for organic farming and occur in large quantities from slaughtering processes. Due to their high phosphorus contents and low concentration of potentially toxic elements, such fertilizers could be an interesting option to reduce the problem of P mining. So far, due to the low plant availability of P from these sources at pH > 5.5-6.0 in soils, meat and bone meals are rarely used in organic farming in Germany. Adding (acid) additives that induce a faster P mobilization might improve the acceptance of meat and bone meal as fertilizers. However, no acidifying agents that are compatible with organic farming principles have been tested yet.

Aim of the MSc. thesis research work

- To assess the influence of different compositions of the bone – meat meal mixture on the availability of P to plants
- To assess the effects on the P fertilizer value of additives (e.g. sulphuric acid, organic acids) added with the aim to increase plant availability of P from meat and bone meals and that are compatible with organic farming principles

Approach: In your M.Sc. thesis, you will test the influence of different shares of meat and bones on the plant P availability of the mixtures, and the effect of different additives added to meat and bone meals of different composition. For this purpose, you will conduct a pot trial in the greenhouse in order to assess plant and soil P and calculate P use efficiency and to gain a better understanding if the additives resulted in an increased P availability from bone and meat meals.

During your thesis work you will have the possibility to visit the lab that is fractioning meat and bones for the pot trial. In addition, a short term stay with a producer of meal and bone meals can be organized.

Type of Work: Pot trial with different meat and bone meals which are treated with different additives and which have different compositions, lab analyses, data assessment

Start: as soon as possible

Language: German or English

Prerequisites: Lab experience and basic knowledge of statistics would be helpful

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