

## Sustainable Recycling of Compost Products in Plant Production

Recycling of organic matter and plant nutrients is a valuable objective in organic farming. Despite of the overall increase of sustainable development idea, the recycling of organic matter from the communities back to agricultural production has still many obstacles to overcome. The dangers of heavy metal contamination and suspicions towards the safety of source separation system and collection of municipal biowaste have caused the ban on municipal biowaste compost in the Finnish organic production. In the research project "Sustainable recycling of compost products in plant production" (2000 – 2003) we study and verify the effects of the use of biowaste and sewage sludge composts in plant production in Finnish field conditions. This project also aims to improve the quality of composts made of source-separated municipal biowaste and sewage sludge. Four of six field experiments are managed conventionally, and two field experiments are grown organically. Both the conventional and the organic parts of the project may give some valuable results to the area of recycling of plant nutrients and

organic matter from the communities back to the field.

### Field experiments on organic forage grass

The objective of the field experiments is to improve the utilisation of compost nutrients, to study soil conditioning effects of composts, to minimise nutrient leaching when using composts and to develop better recommendations for the compost use. Composts made of source-separated biowaste, sewage sludge or forest industrial sludge were provided by co-operative composting facilities, and applied at the establishment of 3-year field experiments on malt barley and forage grass (grass and red clover-grass). Red clover-grass experiments are grown organically. Compost application was based on total P fertilisation for 2 or 4 years on each experiment, with supplementary N and K if necessary on conventional experiments. After the compost application, plant nutrient content, nutrient release, humus and heavy metal contents in soil are determined and followed up for two or three years. Also nutrient uptake and yield of plants after

the compost application are determined and the changes in soil physical parameters (cation exchange capacity, water retention capacity) are measured. The results are compared to NPK fertiliser or to farmyard manure compost on organic red clover-grass experiments.

### Compost quality

The compost quality sub-project concentrates on promoting the production of good quality composts for plant production in co-operation with the composting facilities. Surveillance of selected composting processes is conducted by regular temperature and oxygen measurements in maturation piles. Compost maturation piles are structurally cured and sampled at different points of maturation, and maturity indicators, heavy metal content and general properties are analysed.

### Low heavy metal content

According to the preliminary results, the heavy metal contents in the composts made of source-separated municipal biowaste are even below the limits set by EU organic production regulations (EC 2092/91). Still, there seems to be some considerable variation in the nutrient contents and maturity of composts, and some results are yet to come. Generally, the low plant-available nutrient (N, P) contents in municipal waste composts cause the need for higher application rates or supplementary fertilisation. ■

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