The effect of municipal waste composts on grass nutrient yields

Tiina Tontti[1)] and Keijo Lehtonen[2)]
[1)]MTT Agrifood Research Finland, Environmental Research, Ecological Production, Mikkeli, Finland
[2)]MTT Agrifood Research Finland, Environmental Research, Jokioinen, Finland
Correspondence to: tiina.tontti[a]mtt.fi

Municipal waste composts, although not widely used, form a valuable and potential source of organic matter and nutrients in agriculture. Major problems connected to waste composts include heavy metal contamination and risk of spreading human and animal diseases. Concerning the latter, supplementary regulations are being prepared under the EU directive concerning waste by-products from animals. Another problem from the agricultural productivity point of view is the fertilizing effect of waste composts; they tend to include large amounts of total nutrients, but only small amounts of soluble nutrients with a low mineralization rate. Field experiments with grass mixtures (*Phleum pratense*, *Festuca pratensis*) were established with a cereal cover crop (*Hordeum vulgare*) and fertilized with municipal waste composts on medium fine sand in Mikkeli in 2000. Composts were applied according to their phosphorus (P) content to meet the P requirement of two (P2) or four years (P4) but the limits of total nitrogen (N) applicable according to the Finnish implementation of the nitrate directive were exceeded. The experimental design was split plot with P fertilization level within the main plot and fertilizer quality (chemical fertilizer (NPK)/biowaste compost (BC) /biowaste+sewage sludge compost (BSC)) within the subplot. A zero control treatment with no fertilizer applications (Ctrl) was also included. Results concerning N and P fertilizing effects of municipal waste composts during the compost application year are presented.

The cereal cover crop was poorly established and hence the grass sward was cut twice during the compost application year. The summer was rainy in June-July, but otherwise drier than average. The first cut took place at the end of July and the second cut in early September. No significant differences were found between the fertilizer qualities NPK, BC and BSC. However, in the first cut the grass dry matter (DM) yield, N yield and P yield were significantly higher on the P4 level than on the P2 level ($p<0.05$). Although the total DM yield, N yield or P yield showed no significant main effects during the compost application year (Table), significant interactions were found both in the total N yield and total P yield, with waste composts increasing the nutrient yields on the P4 level but decreasing them on the P2 level compared to NPK ($p<0.05$). All fertilizer treatments produced considerably higher yields than the zero-control treatment.

Table. Total dry matter yield, N yield and P yield of grass in Mikkeli in 2000.

	Dry matter yield (DMY) and nitrogen yield (NY)						Phosphorus yield (PY)			
	P for 2 years			P for 4 years			P for 2 years		P for 4 years	
	Applied total N	DMY	NY	Applied total N	DMY	NY	Applied total P	PY	Applied total P	PY
Ctrl		4253	87					16		
NPK	60	6617	141	60	5937	122	68	26	135	23
BC	277	5736	120	544	6409	139	68	23	134	26
BSC	413	5512	112	820	6233	131	248	21	493	24

During the first summer, following the compost applications, the fertilizing effect of waste composts was no different from that of NPK. The P yield appeared to comply with the DM and N yields, and the large amounts of total nutrients applied had no significant effect on nutrient yields.