



COMPOST: THERMOPHILIC COMPOST

This factsheet contains complementary information to the Best4Soil video on Compost: Thermophilic Compost



INTRODUCTION

Compost is part of the natural cycle. It is the result of microbial decomposition of dead organic matter in the presence of oxygen (aerobe conditions). Thermophilic compost, also known as hot rotting compost or windrow compost, is the most common compost, which is produced in medium to large quantities worldwide. Thermophilic compost has to be actively managed mostly by turning the material to extend the temperature over all parts of the compost heap. It does reach 65°C or greater, which ensures weed seeds as well as plant and human pathogens are killed or deactivated.

PRODUCTION

Regulations and location

Producing compost from different resources or feedstock needs a location or site, which is suitable in regard to local regulations (e.g. environmental protection); but is also appropriate to the composting process. In most countries composting, from a regulation perspective, is split into two different types of operation. Either (1) only resources from the farm may be used or (2) input material from waste processing are utilised. More rigorous legislation can be expected for composts and processes involving collected waste. Accessibility during bad weather conditions, collection of run-off water and other characteristics have to be foreseen, before making a decision on the location of a composting area. A central location for reduced transport costs, anyway from neighboring dwellings reducing any potential issues with smell, noise or vermin, should be selected.

Resources and mixtures

While some manures, especially if mixed with bedding, can be composted alone, most waste has to be mixed with other resources to balance the carbon (C) to nitrogen (N) ratio (C/N). Good starting mixes tend to have a

C/N ratio of 25-35 to 1. If the amount of carbon is too little, resources for the microbial community can be a limiting factor. When carbon is lacking, the excess nitrogen will result in problems with bad odours and anaerobic conditions within the compost heap. This will ultimately reduce the quality of the final material. If nitrogen is missing, the bacteria cannot compete with fungi to utilize the carbon and therefore the compost heap may fail to attain the temperatures necessary to produce a good compost. Apart from the correct C/N ratio, the starting mixes need to have a good structure to guarantee sufficient air flow in the entire heap and the appropriate moisture level is also important. The water or moisture level can be easily checked with a 'fist test'. A handful of homogenized material is squeezed in the hand. A few drops of water should appear. When the hand is opened the material should stay compacted. If there is no water visible and the material falls apart, it is too dry. If water is readily running out from the material when squeezed, the moisture content is too high (see also in the Best4Soil factsheet on compost quality).

Technology

Composting is, by definition, an aerobic process, therefore airflow and the availability of oxygen is critical. These conditions have to be achieved through a loose structure on one side, but also through frequent turning on the other side. Front end loaders alone are not appropriate to provide proper homogenization of the heap, therefore tractor/PTO driven compost turners (fig. 1) or self-propelled large compost turners (fig. 2) have to be used for good quality composts. A failure to turn a compost heap or windrow will likely result in a poor quality, poorly homogenized and insufficiently heated compost. Covering a compost with a fleece prevents leaching of mineral nutrients as well as preventing the material drying out and is a good procedure to achieve a high quality compost (fig. 3).



Fig. 1: tractor/PTO (power take-off) driven compost turner.



Fig. 2: Self-propelled, commercial compost turner.



Fig. 3: Compost fleece prevents leaching and drying out.

Regulations

Compost does contain nitrogen and other nutrients. For this reason, environmental protection regulations are in force in each country within Europe.

Technology

Compost application requires heavy equipment (fig. 4), which is not always available on farm. Therefore, contractors can be hired to apply compost to the field. Often, they offer not only to spread the compost, but also to turn the heaps frequently with professional equipment.



Fig. 4: Spreading big volumes of thermophilic compost needs expensive equipment. If this is lacking on the farm, contractors can do the work.

Quality control

Either self-produced or purchased, all compost should go through quality control. Depending on the input material, this should include lab analysis for nutrients, heavy metal, pathogens as well as maturity and or stability. More information on compost quality assessment can be found in the Best4Soil video and factsheet on compost quality.

