



## COMPOST: ADVANTAGES AND DISADVANTAGES



This factsheet contains complementary information to the Best4Soil video on Compost: Advantages and Disadvantages

### INTRODUCTION

Compost is part of the natural cycle. It is a result of microbial decomposition of dead organic matter under the influence of oxygen (aerobic conditions). With the use of compost comes a broad range of benefits, but also some disadvantages, which should be considered beforehand. Factors such as the input material or feedstock, composting method, compost storage and application, will all influence the characteristics of the material.

### ADVANTAGES

#### Soil organic matter

Compost has a high content of organic matter and can easily raise the organic matter level in soils. This leads to better soil aggregate stability, higher water holding capacity and infiltration rate as well as higher cation exchange capacity. Further information can be found in the Best4Soil video and the factsheet on Soil Organic Matter.

#### Microbial diversity and abundance

One of the unique characteristics of compost is its microbial diversity and microbial abundance. Since microbes are the main player in the composting process, a huge range of bacteria, archaea, fungi and protozoa is found in compost. This boosts the microbial activity of soils amended with compost (fig. 1). Vermicompost has even higher biodiversity, as there is no heat phase in the process and therefore no microbes are lost due to high temperatures.

#### Suppression of soil-borne diseases

Microbes play a very critical role in supporting and providing plants with nutrients; but also to suppress soil-borne diseases. Lots of composts have the ability to suppress the activity of pathogens. Direct effects include microbial competition for nutrients, humic substances,

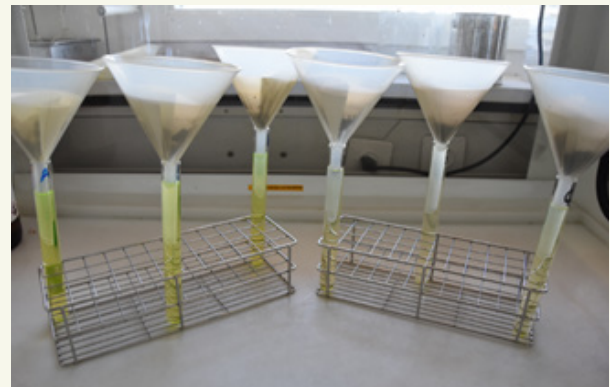


Fig. 1: Soil microbial activity of compost (left side) and soil (right side), measured with the FDA method. The more intense the yellow color of the extract, the higher the soil microbial activity.

toxic volatiles or direct parasitism effects. Indirect effects of composts are vigorous or healthy plant growth, reduced stress, induced resistance and improved soil structure. In general, while compost is not a plant protection agent as such, it can be of great help in reducing pressure from soil-borne diseases.

#### Nutrient availability

Nutrient availability in compost is also due to microbial activity. Not only are some of the nutrients delivered with compost already plant available, but when incorporated into the soil, compost microbes start to mobilize nutrients from the soil, making them plant available. Plants can control these effects through their root exudates.

#### Resilience of Soil

In general, all of these positive effects of compost on soil and plants increase the resilience of the plant-soil system. Therefore, negative impacts from outside (severe weather, contamination, compaction, etc.) are better managed and are less stressful for the plants.

## DISADVANTAGES

### Availability

Compost is not always available, and availability throughout Europe varies. Farmers and growers are often looking for specific qualities from compost. Because of its weight and volume, compost cannot be transported over long distances either, as this is cost prohibitive.

### Quality and contamination

If compost does not have the right quality for a specific application, it is better to reconsider its use, rather than incorporate poor quality compost in the field. Quality can be measured in a range of different ways, taking different characteristics into consideration. This can include unbalanced nutrient content, humic acids, organic and inorganic contamination. A simple test using cress as bioindicator to measure if a compost is plant compatible with the target crop (fig. 2) is presented in the Best4Soil video and factsheet on compost quality tests ([link to video 8](#)). Solid debris (plastic, glass, metal, etc.) and especially small debris like micro-plastic, are a specific problem of composts coming from separate waste collection sites (fig. 3). For organic farmers the input material is critical e.g., sewage sludge is not allowed in compost for organic fields. Another quality problem of composts not produced correctly are viable spores of fungal and bacterial pathogens, weed seeds and pathogenic viruses. In such cases, the application of compost will decrease the health of soils by contaminating them with pathogenic microorganisms and weeds.



Fig. 2: Plant compatibility of compost measured with the "open cress test". The second compost from the left is not suitable for growing plants. More information in the Best4Soil video on compost quality tests.



Fig. 3: Solid debris are an important quality problem of a compost.

### Costs, equipment

Composting meanwhile is a technology driven process. Heavy equipment is used to process the input material and transport the compost to the fields (fig. 4), which is costly. Often it is cheaper to hire contractors for input preparation (shredding of material), turning, sieving, transport and application.



Fig. 4: For a rational transport and distribution of compost, heavy equipment is needed.