

Improvement of soil fertility and reduction of plant diseases by controlled bio-conversion of organic wastes

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Continuous losses of soil fertility is observed in industrialized countries as well as in the third world, whereas problems with higher amounts of wastes are increasing. Most of these wastes are of organic origin. Due to lacking concepts most of these materials are not recycled by the state of the art and drop out of the natural cycle. Because of inefficient waste management practices a high potential for a long term increasing and maintaining soil fertility gets lost unused.

IMPROVING SOIL FERTILITY WITH CONTROLLED BIO-CONVERTED ORGANIC WASTES

The positive effects of high quality composts are manifold:

- improving **soil structure**,
- increasing the **humus content** of soil,
- supply of **macro- and micro nutrients**,
- etc.

A special and interesting effect of such composts is their facility to activate and stabilize the soil microflora, which:

- **prevents crops actively from disease attacks,**
- **increases and stabilizes soil fertility.**



Figure 1: A high quality compost with an active microflora protects plants from diseases (compost 2), whereas a compost of low microbial activity shows almost no effect (compost 1). If the active compost is heat treated, its active microflora is destroyed and loses its potential to suppress pathogens. In this case the disease develops better compared to the untreated control. The pathogen fungus can develop easy in such a medium.

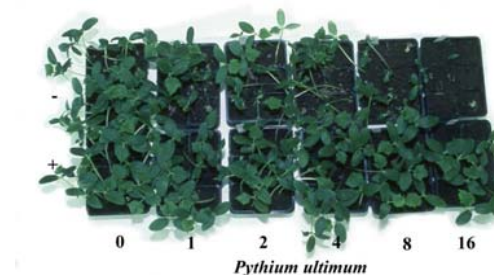


Figure 2: Effect of regular compost application on plant disease status of a soil. Last compost application one year before soil sampling. On top: soil from the field part without compost. Below: soil with compost application. Test crop: cucumber, disease: the root rot *Pythium ultimum*. From left to right: inoculation of 0, 1, 2, 4, 8 and 16 units of *P. ultimum* per litre soil.

HIGH QUALITY COMPOSTS ENABLE AN ENVIRONMENTALLY SOUND, SUSTAINABLE CROP PRODUCTION

The concept of **compost production** determinate the **quality of the final product**. Such a concept starts with the **collection of the fresh materials**, the **mixing** of the components and the **control of the fermentation process**, including the **storage** of the final products and their **adequate application**.

Biologically active high quality composts will play a central role in **sustainable crop production**. Its positive effects on crop growth and health status of plants, we have shown several times on practical application level:

- on field crops
- in horticulture and with ornamentals
- for growing media (substrates)
- on seedling production
- in reforestation
- on soil detoxification and recultivation
- in reactivating soil micro-organisms after steaming
- etc.

High quality composts with an active soil microflora will become in future more important all over the world to maintain a long lasting high soil fertility.

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