COMPOST
Let's break it down!
ENRICH ORGANIC COMPOST

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"In nature nothing is lost, nothing is created, everything is transformed" (Lavoisier, 1760). For centuries composting has been used to transform dead and decaying organic materials into a beneficial soil improver – compost. The natural cycling of soil organic matter is powered by aerobic microorganisms which degrade dead organic materials releasing minerals back into the soil and producing stable organic matter, often referred to as humus.

Composting in its simplest term is a process which accelerates the natural degradation of organic material. This is achieved by providing optimum conditions for the aerobic microbiology to function – you could call it "microbe farming"! Compost plays a fundamental role in improving soil fertility and agricultural productivity, in particular in organic farming systems. Compost is an environmentally safe and agronomically advantageous source of macro and micronutrients, organic matter and beneficial microbes. Enrich Organic Compost is manufactured without peat and is pathogen and weed free.

Composting, a natural biological process

The composting process relies on the population of microorganisms carried in the organic materials. Enrich Compost is manufactured in accordance with the IS441 2011 standard, in an open windrow system using source segregated green materials such as garden clippings and landscaping materials.

The process starts by shredding the material to increase the surface area available for microbial activity. The shredded material is then placed in windrows *(see FIGURE 1 below)*.

FIGURE 1 - Windrow composting at Enrich Environmental Ltd.

To fully understand and optimise our composting processes Enrich have undertaken numerous research projects in collaboration with academic institutes such as Dublin City University and Queens University Belfast. These projects investigated the chemical, physical and biological characteristic that give rise to optimum composting.

The initial phase of composting is known as the mesophilic phase, with temperatures ranging between 20-40°C. As they work, the microbes respire, producing heat as a bi-product. In the mesophilic phase the microbial population decomposes readily available compounds such as sugars, other carbohydrates and fats. Mesophilic bacteria, such *Lactobacillus* and *Pseudomonas* dominate as well as a healthy fungal population *(see FIGURE 2 below)*.

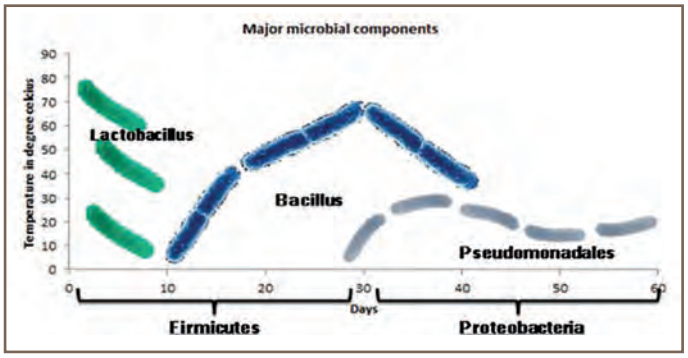

Figure 2 Metagenomic research conducted by Enrich Environmental Ltd. elucidates the major microbial groups with distinct decomposition oles in the composting process.

Increased microbial activity induces the temperature to rise and the microbiome of the compost pile starts to gradually transform in response to higher temperatures.

At these increased temperatures thermophilic microbes will develop such as Bacillus bacteria, actinomycetes and fungi that tolerate temperatures between 40-70°C. In this phase the fastest decomposition of more resistant compounds such as proteins, cellulose and hemi cellulose occurs. To ensure suppression of weed seeds and pathogens the windrows are processed at a temperature above 55°C for a minimum of 15 days. Actinomycete bacteria activity has also been revealed to greatly contribute to "clean compost" production, through the release of antibiotic compounds. As the active composting phase subsides, temperature gradually declines to around 38°C. Mesophilic organisms recolonize and the curing phase begins. During curing, organic materials continue to decompose and are converted to biologically stable organic matter, producing humus/recalcitrant organic matter and a nutrient rich compost. Enrich Organic Compost is then finely screened *(see FIGURE 3 bottom of page)*.

Compost boosts life in your soil

Mature compost contains a wide range of beneficial microorganisms. Enrich have confirmed this through metagenomic analysis of microbial DNA extracted from finished compost. Bacteria with nitrogen fixing abilities such as Rhizobium and other microorganisms with abilities to degrade organically bound nutrients have been identified. When compost is applied to soil and/or used in a growing media these microbes are enhanced.

Microbes that form root symbiotic relationships with plants were also identified in Enrich compost. The introduction of beneficial microbes through the compost helps to suppress other harmful soil-borne pathogens. Microbial activity in the soil maintains a healthy nutrient cycle.

Enhancing plant available nutrients and soil organic matter

Compost contains a full spectrum of macro and micro nutrients including nitrogen, phosphorus, sulphur, potassium, calcium, magnesium and trace nutrients essential for plant growth.

Compost manufactured from green material is rich in lignin which decomposes slowly, lasting longer in the soil. Compost nutrients are released slowly when compared with artificial fertilizers, manures or slurries. This slow release characteristic means that Enrich organic Compost builds a longterm sustainable soil. As an organic soil improver, compost can help achieve higher yields and crop quality.

Compost contains 30-60% organic matter and its use will help to build up soil organic matter content. The quality of soil organic matter is also improved by the use of compost since it increases the amount of stable/recalcitrant carbon.

FIGURE 3 - Enrich organic compost being screened.

The depletion of soil organic matter was identified by the European Union in the Soil Thematic Strategy as one of the five threats to soil and its functions.

Although organic farming systems minimize the depletion of soil organic matter, maintaining and improving its level is crucial in a healthy soil.

Benefits of compost in the soil physical properties

Soil structure is defined by the size and spatial distributions of particles, aggregates and pores in soils, thus influencing soils air filled porosity, root penetration and drainage characteristics. Compost use significantly improves soil structure, aggregate stability, nutrient holding capacity and porosity. The addition of low-density organic material to soil often improves soil porosity through soil mineral interactions.

The positive impact of compost in aggregate stability is due to its high cation exchange capacity. This draws other soil particles and nutrients together to form aggregates, giving structure and improved drainage to the soil. The effects are best seen in clay heavy soils or very sandy soils, characterized by inherent poor structure. Soil water retention ability is mainly driven by texture, although increases of organic matter in coarser textured soils improves water holding capacity.

Recently, Enrich have demonstrated the benefits of compost as a multipurpose soil amendment in the arid, sandy soils of the United Arab Emirates (UAE) where Enrich produce and sell green compost. The water holding and nutrient holding capacity of the compost when incorporated into sandy desert soils is leads to reduced water and fertilizer use on intensive vegetable farms. This is feeding into a move towards more sustainable soil management practices in the UAE (see FIGURE 4).

Why use Enrich Organic Compost?

Enrich Compost is suitable for agricultural, horticultural and landscaping applications (see FIGURE 5). Along with organic compost, Enrich also provide customised soil blends and a complete range of soil solutions including analysis and advice. At Enrich, our products are regularly tested by accredited laboratories and evaluated through R&D.

For more information visit us at **www.enrich.ie**
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FIGURE 4 - Tomato trials using compost conducted by Enrich & growers in United Arab Emirates aim to improve farm sustainability and water use.

FIGURE 5 - Enrich Organic Compost being used in a certified organic market garden.