LIPOLYTIC ACTIVITY OF MICROFUNGI FROM COMPOST

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Sustainable technologies promote the development of green techniques and products in order to live in clean and healthy environment.

Fats and oils are among the main components of organic matter in wastewater and solid waste, especially those produced by the food, pharmaceutical and cosmetic industries and they can cause severe environmental impact (Ruggieri *et al.,* 2008). These compounds are generally believed to be biodegradable, indeed they can be degraded by microorganisms, such as fungi, bacteria and actinomycetes. However, lipids biodegradation can be limited by their hydrophobic properties. In fact in wastewater they can reduce the rates at which oxygen is transferred to biofilms, thereby depriving the microorganisms of oxygen (Chipasa & Medrzycka, 2006). They can also alter soil properties such as aggregated stability and wetting, they can adversely affect plant growth or be toxic to microorganisms: lipid accumulation inhibits the biological activity and the biodegradation processes are slowed down (Fernandes *et al.*, 1988).

Although composting of fat waste can be considered as a potential approach to enhance the lipid biodegradation, the organic waste with high fat content typically is not composted. Low water retention and solubility, lack of porosity and relatively low biodegradability of some fat constituted the main constraints. An alternative and promising method for composting could be fatty waste treatment, either in *ex situ* or *in situ*, using soluble lipase preparation or, with a more economical approach, using lipolytic microorganism strains mixes (Benjamin & Pandey, 1998; Aikaite-Stanaitiene *et al*., 2010). Selection of useful microorganisms with high degradation activity for fats, oils and greases (FOGs) for their application for the removal of pollutants in the environment is one of the way to enhance biodegradation (Čipinyte *et al*., 2009).

The aim of this study was to screen and select mesophilic microfungi with high lipolytic activity from a strains pool isolated from domestic compost.

A semiquantitative evaluation of the lipolytic ability of strains was carried out on solid media including, as predominant carbon source, synthetic and natural fatty substrates (Tween-20, Tween-80, tributyrin and olive oil). The ability to hydrolyze these compounds was estimated with the measurement of the precipitation/clearing zone around the colony. Almost all the strains tested degraded synthetic substrates and the most active were two *Penicillium* spp. isolates. Only a few strains showed lipolyitc activity on olive oil medium. Among these, *Penicillium* sp. S1, one of the most active, was chosen for biochemical characterization of lipase. Lipase was partially purified and activity measured spectrophotometrically using *p*nitrophenyl-myristate (C14) and *p*-nitrophenyl-palmitate (C16) as substrate. Preliminary results showed that *Penicillium* sp. S1 lipase has a preference for C16 over C14, maximal activity at alkaline pH, and is stable up to about 40°C.

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