Manure biostabilization as a way to improve its agronomic value

D. Hidalgo*, F. Corona, J.M. Martín-Marroquín
CARTIF Technology Centre, Boecillo (Valladolid), 47151, Spain
(E-mail*: dolhid@cartif.es)

Introduction

Effective microorganisms (EM) are mixed cultures of beneficial naturally-occurring organisms (including predominant populations of lactic acid bacteria and yeasts, photosynthetic bacteria and other types of organisms) that can be applied as inoculants to increase the microbial diversity of an ecosystem.

The traditional logic behind effective microorganism is based on a media inoculation with mixed cultures of beneficial microorganisms to create a more favourable environment for plant growth and health when the media is the soil.

Confirmed EM effects

- EM have a positive effect on growth of plants because EM interact with the soil-plant ecosystem:
  . suppressing plant pathogens and agents of disease;
  . solubilising minerals;
  . conserving energy;
  . maintaining the microbial-ecological balance of the soil;
  . increasing photosynthetic efficiency, and;
  . fixing biological nitrogen.
- EM included in animal diets improve production and economic parameters in farms.

Other potential uses for EM: Manure bioestabilization

The purpose of this research is to go one step further in the study of potential uses for EM and evaluate the influence of effective microorganisms on the biostabilisation of manure before its use as a fertiliser.

- The study is carried out in three Spanish farms (pig, poultry and cattle farms) as selected demo cases:
- EM species used include:
  . Phototrophic bacteria (e.g., Rhodopseudomonas palustris, Rhodobacter sphaeroides);
  . Lactobacilli (e.g., Lactobacillus plantarum, L. casei, and Streptococcus lactis) and;
  . yeasts (e.g. Saccharomyces spp.) presented as a liquid suspension in a natural environment based on sugar cane molasses.

First results

- Lactic bacteria transform part of the carbohydrates of the manure into lactic acid with a resulting effect that is the lowering of the pH with great control of pathogenic microorganisms and GHG emissions.
- Phototrophic bacteria carry out incomplete anaerobic photosynthesis, being very useful because they are capable of detoxifying the manure of toxic substances for the plant that are formed during fermentation. They are also able to conserve nitrogen during the transformation of the manure.

The biostabilised manure, when applied to the soil, it is expected that progressively inhibit the attack of other bacteria and microorganisms that cause pathologies by having a colonizing effect on the ground due to the displacement produced by the space they occupy and by reducing their power supply.

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