Enhancement of organic waste and byproducts from fruit and vegetable processing by composting: use as organic substrate in seedbeds

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Compost from organic waste and by-products of fruit and vegetable processing industry can be used as organic suppressive substrates. In this study, we have evaluated five compost from different mixtures of organic waste and by-products from fruit and vegetable processing, within the framework of the LIFE+ project AGROWASTE to use as partial substitute of peat and their suppressiveness against *Phytophthora parasítica* in pepper crop. C1: pepper sludge (PS) (25%), garlic (25%), vine pruning (25%), almond shells (25%); C2: PS (12.5%), pepper (12.5%), vine pruning (75%); C4: LP (18%), carrots (35%), vine pruning (47%); C7: pepper (17%) artichoke (16%), vine pruning (68%); C9: Citric sludge (35%, orange (18%), vine pruning (47%).

Monitoring of piles composting process and characteristics of compost obtained were evaluated. The temperatures of composting process were within the standard profile, reaching maximum temperatures from 50 ºC-70 ºC. A high temperature indicate high microbial activity and fast organic substrate decomposition. The soluble organic matter diminished up to values < 3 g kg^{-1} indicative of compost maturity, and the ratio C/N due to the decomposition of organic matter reached values from 14-17. These values reached by the composting piles to both parameters are within the limits suggested by different authors as indicative of the state of maturity of compost (Bernal et al., 2009). Compost showed a suitable macro and micro-nutrients similar to other agro industrial compost (Blaya et al., 2014) and physical properties values accepted within values to be considered as an “ideal” organic substrate Abad et al. (2001).

The seedbed assay showed that different compost in a ratio 1:1 (peat:compost) showed a similar even higher seedling growth than peat with a suitable characteristics for transplantation into field. Also, some of them proved to be suppressive against *P. parasitica.* Compost C2 and C7 showed the lower incidence percentage (30%), while compost C4 showed the higher values similar to peat (85%). Between abiotic properties studied from different compost no significant differences between compost were observed. Concern to raw materials compost C2 and C7 were made from pepper wastes and have the highest content of vine pruning, also both compost reached temperatures of 60 ºC and it could be an important point to recolonize compost with antagonist capacity microorganisms.

These results open a hopeful way of replacing peat by other organic materials which may come from waste and by-products of fruit and vegetable processing industry. This would by one hand the rational disposal of these wastes and by-products, as demonstrated in the Life + AGROWASTE (www.agrowaste.eu) project, and by other hand to get alternative organic substrates for peat. Also, these new organic substrates can incorporate an add value in their biofertilizer, bioestimulate and / or biopesticide character, which opens a potential market consumption of these composts in a demanding as is the seedling market.

References

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