

Physico-Chemical and Microbial Changes of Organic Fertilizers after Compositing Processes under Arid Conditions

Authors : Oustani Mabrouka, Halilat Med Tahar

Abstract : The physico-chemical properties of poultry droppings indicate that this waste can be an excellent way to enrich the soil with low fertility that is the case in arid soils (low organic matter content), but its concentrations in some microbial and chemical components make them potentially dangerous and toxic contaminants if they are used directly in fresh state. On other hand, the accumulation of plant residues in the crop areas can become a source of plant disease and affects the quality of the environment. The biotechnological processes that we have identified appear to alleviate these problems. It leads to the stabilization and processing of wastes into a product of good hygienic quality and high fertilizer value by the composting test. In this context, a trial was conducted in composting operations in the region of Ouargla located in southern Algeria. Composing test was conducted in a completely randomized design experiment. Three mixtures were prepared, in pits of 1 m³ volume for each mixture. Each pit is composed by mixture of poultry droppings and crushed plant residues in amount of 40 and 60% respectively: C1: Droppings + Straw (P.D +S) , C2: Poultry Droppings + Olive Wastes (P.D+O.W) , C3: Poultry Droppings + Date palm residues (P.D+D.P). Before and after the composting process, physico-chemical parameters (temperature, moisture, pH, electrical conductivity, total carbon and total nitrogen) were studied. The stability of the biological system was noticed after 90 days. The results of physico-chemical and microbiological compost obtained from three mixtures: C1: (P.D +S) , C2: (P.D+O.W) and C3: (P.D +D.P) shows at the end of composting process, three composts characterized by the final products were characterized by their high agronomic and environmental interest with a good physico chemical characteristics in particularly a low C/N ratio with 15.15, 10.01 and 15.36 % for (P.D + S), (P.D. + O.W) and (P.D. +D.P), respectively, reflecting a stabilization and maturity of the composts. On the other hand, a significant increase of temperature was recorded at the first days of composting for all treatments, which is correlated with a strong reduction of the pathogenic micro flora contained in poultry droppings.

Keywords : Arid environment, Composting, Date palm residues, Olive wastes, pH, Pathogenic microorganisms, Poultry Droppings, Straw

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