

## **Organic wastes as alternative to inorganic fertilizers in crop cultivation**

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### **Abstract**

**The use of organic wastes (OW) as alternative to chemical fertilizers not only results in an economic benefit to the small-scale farmer but it also reduces pollution due to reduced nutrient run-off, and N leaching. Almond and pistachio N, P and K requirements can be satisfied by adding OW. With trees, as is the case of almond and pistachio, it is better to fertilize smaller doses more frequently. This increases percentage of fertilizer uptake while reducing the risk of nutrient leaching. Accordingly, the use of OW as alternative to inorganic fertilizers is very convenient since they slowly release significant amounts of N and P. In this work, the effect on crop yield and soil quality of two OW at three N rates in comparison with the use of inorganic fertilization was evaluated. For practical reasons barley and ryegrass were used as test plants but obtained results can be extended to almond and pistachio tree cultivation or any other crop. OW increased crop yields with respect to the control at the three assayed rates, and led to similar ryegrass yields and slightly lower barley yields than inorganically fertilized soils, indicating that the use of OW can be a suitable alternative to inorganic fertilizers. Both OW enriched soil in available K, Mg, Mn, S and ammonium and had a stimulant effect on microbial growth and activity, OW treated soils showing higher microbial biomass C and basal respiration than control after crops. Results showed that land application of OW as fertilizers not only provides essential nutrients to plants but also improves soil quality.**

**Keywords:** organic waste, inorganic fertilization, crop yield, soil quality

### **INTRODUCTION**

Among the practices recommended for the improvement of soil quality and fertility in Mediterranean regions is the application of composted organic wastes, which slowly release significant amounts of nitrogen and phosphorus (Eghball, 2000). As reported by Nyamangara et. al. (2003), management of soil organic matter by using composted organic waste (OW) is the key for sustainable agriculture. In addition to its slow release nutrient capability, organic matter is largely responsible for aggregation, soil moisture holding capacity and other improved physical properties of the soil (Tejada et al., 2006). Therefore, increasing soil organic matter content must be the first step in any farming practice in the Mediterranean region. If productivity is to be maintained, an agricultural system able to preserve a satisfactory physical condition in the soil must also be developed. Organic matter additions are the only means of making some soils economically productive (Cook and Ellis, 1987).

Almond and pistachio N, P and K requirements can be satisfied by adding organic wastes. OW provide organic matter macronutrients (N, P and K) and also micronutrients which can contribute significantly to higher crop yields. With trees, as is the case of almond and pistachio, it is better to fertilize smaller doses more frequently. This, increases percentage of fertilizer uptake while reducing the risk of nutrient leaching. Following this principle, the use of OW as alternative to inorganic fertilizers is very convenient since they slowly release significant amounts of N and P. In addition, OW