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OPTIMIZATION OF HEAVY POLLUTED SOIL FROM OLIVE MILL WASTE THROUGH THE IMPLEMENTATION OF ZEOLITES

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Abstract

Clinoptilolite (Clin), the most widely used natural zeolite in environmental applications, was used as soil additive to investigate its effectiveness in protecting and improving the quality of soils that received surface disposal of OMW, as well as in limiting nutrients leaching from the degraded soils. Clin was added in a batch experiment of 18 months, where OMW were added in evaporation ponds and on soil for a period of more than 12 years. The zeolite was added as dust (particle diameter < 0.8 mm) and granules (particle diameter range from 0.8 - 2.5 mm). Several soil parameters such as pH, electrical conductivity, organic matter, polyphenols, N, P, K, Na, Ca, Mg, Cu, Mn, Zn and Fe were controlled bimonthly. The addition of Clin in a soil that received OMW for 12 decreased excess leaching of K, Fe, Mn and Cu in accepted level. The total organic matter and nitrogen contents of soil were controlled at almost constant values ($p<0.05$) in contrast with polyphenols that were not significantly ($p<0.05$) decreased after the addition of zeolite. Na leaching from Clin was measured and found to be high, but only during the first two months after Clin addition on soil. Therefore, Clin could be an effective soil additive for areas where OMW surface disposal degrades soil quality.

Key words: Bio-solid management, clinoptilolite, olive mill wastes, soil additive, soil degradation, soil rehabilitation, soil remediation

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