THE EFFECT OF PARTICLE SIZE AND COMPOSTING PERIOD ON CHANGING OF Fe AND Mn ELEMENTS IN DATE-PALM WASTES

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INTRODUCTION:
Date palm tree is one of the important horticultural crops in economical point in Iran and its wastes can be used as growth media (Borji et al, 2010). Composting process in different particle sizes could be used for improvement of planting substrates. During the composting process, microorganisms transform organic raw materials into compost by breaking them down to simple compounds and reforming them into new complex compounds (Mohammadi et al., 2008). Micronutrients are essential for the growth and development of microorganisms (Alidadi et al., 2007). The micronutrients elements were found slightly varied during the thermophilic phase and remain unchanged in the latter stage of composting period (Baharuddin, 2009). The aim of this study was to examine the effect of particle size and composting period on changing of Fe and Mn elements in Date-Palm Wastes.

MATERIALS AND METHODS:
This study was done in the greenhouse of Islamic Azad University of Khorasgan in Iran, and the experiment was conducted in a completely randomized design. Date-palm wastes crushed by a combine and then they were sieved in three sizes (0-5, 5-10, 10-20 mm) with mesh (sieve) and three incubation times including zero (no composting and start), three and six months was considered as composting process. The levels of micronutrients in the extraction were determined by the atomic absorption spectrometry (Perkin Elmer, Model Analyst 800). Data were analyzed using Statistical Program for Social Sciences (SPSS). Statistical analysis was performed using MSTAT-C (P<0.05) with Duncan for means comparison.

RESULTS AND DISCUSSION:
The results showed that with increasing composting time, total and available iron (Fe) and manganese (Mn) was increased. The maximum rate of total iron (4405.55mg/Kg) and total manganese (156.88 mg/Kg) was related to particles with size of 0-5 mm at six months composting. The maximum rate of available Mn was related to particles sizes of 0-5 mm (43.86 mg/Kg) and 10-20 mm (42.92mg/Kg) to six months composting and the minimum rate of available Fe was related to particles size of 10-20 mm (14.32 mg/Kg) at zero time and the treatments had significant difference (p<0.05). According to Baharuddin, 2009, the concentration of iron were gradually increased during the thermophilic phase and remained stable. According to Bernal et al. (2009), as a result of the dry weight loss of the material during composting, the concentration of mineral elements increases.

Keywords: Date-palm waste, Composting, Particle size, Fe, Mn