

**THE EFFECT OF PARTICLE SIZE AND COMPOSTING PERIOD OF DATE PALM WASTES ON CHANGING OF CEC AND C/N RATIO**Mina Mortazavi<sup>1\*</sup>, Ahmad Mohammadi Ghehsareh<sup>2</sup>*1\*. Young Researchers and Elite Club, Khorasgan (Isfahan) Branch, Islamic Azad University, Isfahan, Iran.**2. Department of Soil Science, Faculty Of Agriculture, Isfahan (Khorasgan) Branch, Islamic Azad University, Isfahan, Iran.*[m.mortazavi1390@yahoo.com](mailto:m.mortazavi1390@yahoo.com)**INTRODUCTION**

Today date palm is cultivated in many areas of world. Date palm waste can be used as a growth media. For improving conditions of planting substrate could be used from composting process. Compost maturity and stability are the key factors during composting. C/N ratio is always used as an indicator of compost maturation and should be stable with time (Baharaddin, 2009) and increase in CEC is correlated with increased compost age (Grebus et al., 1994). It is positively correlated with percent humic substances found in compost. Humic content is a function of the degree of organic matter degradation (Henry and Harrison, 1996) stated that the ratio of CEC to total organic matter correlates well with other chemical measures of compost maturity. The aim of this study was to examine the effect of particle size and composting period of date palm wastes on changing of CEC and C/N ratio.

**MATERIALS AND METHODS:**

This research was carried out in a research greenhouse of Islamic Azad University, khorasgan branch 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 and three incubation times including zero (no composting and start), three and six months was considered as composting process. Every two weeks samples took up from treatments and analyzed for determination of C/N ratio. Organic C was determined according to the combustion method (McKeague, 1976). Total nitrogen was determined using kjedahl, and then C/N ratio was calculated. CEC was determined by Rhoades 1982 method. 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, C/N was reduced and Cation exchange capacity (CEC) was increased in all particle sizes. Maximum rate of CEC was related to particle size of 0-5 mm (48.5 cmol/kg) with six months composting. Maximum rate of C/N was related to particle size of 5-10 mm (40.82) in zero time and minimum rate of C/N was related to particle size of 10-20 mm (23.79) with six months composting. Nitrogen content in this study was gradually increased throughout the composting process. In addition, carbon content of the composting materials was gradually decreased throughout the treatment. This phenomenon may be attributed from the microbial activity on the cellulosic substrate and nitrogen, which increased the microbial protein and humic substance. The amount of CEC had well correlation with the degree of organic matter decomposition. It was increased with the progression of humification of the compost organic fraction.

**Keywords:** Date-palm waste, Composting, Particle size, C/N, CEC.

**REFERENCES:**

1. Baharaddin AS, Wakisaka M, Shirai Y, Abd-AZIZ S, Rahman AA, Hassan MA. 2009. Co-composting of Empty Fruit Bunches and Partially Treated Palm Oil Mill Effluents in Pilot Scale. *International Journal of Agriculture Reserch.*, 4: 69-78.
2. Henry CL, Harrison RB. 1996. Carbon fractions in compost and compost maturity tests. pp. 51-67. In: F.R. Magdoff, M.A. Tabatabal and J.E.A. Hanlon (eds.) *Soil organic matter: analysis and interpretation.* SSSA Spec. Publ. 46. Soil Science Society of America, Madison, WI.
3. Grebus ME, Watson ME, Hoitink HAJ. 1994. Biological, chemical and physical properties of composted yard trimmings as indicators of maturity and plant disease suppression. *Compost Science and Utilization*, 2(1):57-71.



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