

Cucumber seedlings production using compost by municipal solid wastes as growing medium component

A. Chrysargyris¹, A. Stamatakis², N. Tzortzakis^{1*}

¹Department of Agricultural Sciences, Biotechnology and Food Science, Cyprus University of Technology, Limassol, 3603 Cyprus.

²Department of Sustainable Agriculture, Mediterranean Agronomic Institute of Chania, 73100, Chania, Greece.

Abstract

Municipal solid waste compost (MSWC) in different content was evaluated in cucumber (*Cucumis sativus* L.) seed germination and seedling production in nurseries study. MSWC extracts (10^0 up to 10^{-6} dilutions) were evaluated for seed priming/germination in Petri dishes. The MSWC extracts at 10^{-1} – 10^{-6} showed similar seedling germination as well as shoot and root radicle length compared to the control treatment. However, pure extracts (at 10^0) delayed 4 days the seed germination which was less than 25%. Under nursery conditions, six medium [(% v/v): peat:MSWC (100:0) as control; peat:MSWC (85:15); peat:MSWC (70:30); peat:MSWC (55:45); peat:MSWC (40:60) and peat:MSWC (0:100)] prepared from commercial peat and MSWC. Seedling growth/development parameters were assessed. Seed emergence accelerated when low MSWC content (< 30%) used while increased MSWC content (>60%) reduced (up to 44%) emergence. Under nursery conditions, addition of MSWC (especially in content ranged from 15% to 45%) increased plant height, stem thickness and seedling fresh weight. Increased MSWC content into the substrate affected positively the leaf nitrogen and sodium mineral accumulation but negatively the potassium content. Plants grown in pure MSWC (100%) had the lowest height, fresh weight and leaf fluoresces and the greater nitrogen and sodium accumulation as well as Chlorophyll b content. The greatest photosynthetic rate, leaf stomatal conductance and leaf internal CO₂ concentration were found in plants grown in 60% MSWC. No differences were found in plant dry matter content, phosphorus content, Chlorophyll a and total carotenoids leaf content in plants grown in different MSWC content. No visual phytotoxicity obtained macroscopically. Thus, low to middle content (up to 30%) of MSWC may act as alternative substitute of peat in cucumber seedling production.

Keywords: compost; municipal solid waste; peat; growth; cucumber; seed emergence

* **Author of correspondence: Dr Nikos Tzortzakis.**

Mailing address: Department of Agricultural Science, Biotechnology and Food Science, Faculty of Geotechnical Sciences and Environmental Management, Cyprus University of Technology, 3603, Limassol, Cyprus. E-mail: nikolaos.tzortzakis@cut.ac.cy