

J. Plant Produc., 42(1) (2019) 1-12	ISSN (P): 2538-543x
Doi:	ISSN (E): 2588-5979

Effect of Different Media Cultures on Physico-Chemical Characteristics of Pot Marigold (*Calendula officinalis* L.) Plants under Salt Stress

Marzieh Kalhor¹, Maryam Dehestani-Ardakani^{2*}, Mostafa Shirmardi³ and Jalal Gholam-Nejad⁴

- 1- M. Sc. Student, Department of Horticultural Science, Faculty of Agriculture & Natural Resources, Ardakan University, Ardakan, Iran
- 2- ***Corresponding Author:** Assistant Professor, Department of Horticultural Science, Faculty of Agriculture & Natural Resources, Ardakan University, Ardakan, Iran (mdehestani@ardakan.ac.ir)
- 3- Assistant Professor, Department of Horticultural Science, Faculty of Agriculture & Natural Resources, Ardakan University, Ardakan, Iran
- 4- Assistant Professor, Department of Horticultural Science, Faculty of Agriculture & Natural Resources, Ardakan University, Ardakan, Iran

Received: 4 July, 2017

Accepted: 7 March, 2018

Abstract

Background and Objectives

Salinity is an important environmental tension limiting growth and productivity of plants worldwide. The harmful effects of high salinity on plants can be observed in senescence, necrosis of plant organs and decreases in productivity. Major processes such as photosynthesis, protein synthesis, and energy and lipid metabolism are affected in plants during the beginning and development of salinity stress. *Calendula officinalis* L. belongs to the Asteraceae family; it is an annual with bright or yellow orange daisy-like flowers which are used for medicinal or culinary purposes. Organic fertilizers develop favorable physical, chemical and biological environment in the soil. They stimulate plant root growth, increase nutrient uptake and soil water-holding capacity, decrease evaporation from the soil and surface water runoff, facilitate drainage, regulate soil temperature and provide a rich substrate for soil microbes.

Materials and Methods

This study was conducted to determine the effects of soil salinity and organic amendments on some growth characteristics, absorption of nitrogen, phosphorus and potassium and peroxidase enzyme activity in pot marigold plant (*Calendula officinalis* L.). In a factorial experiment and completely randomized design (CRD), five levels of organic amendments (control, 0.5 and 1 g.L⁻¹ algae extract, 20% v/v of pot volume cow manure and 20% v/v of pot volume vermicompost) and three levels of salinity (3.5, 7.5 and 10.5 dS.m⁻¹) with three replications per treatments were applied. In this experiment, media without organic amendment was considered as control.

Results

Results showed that increasing soil salinity levels progressively decreased the growth characteristics and nutrients uptake. The maximum leaf number, fresh and dry weight of flowers and nitrogen, phosphorus and potassium absorption obtained in cow manure treatment and EC= 3.5 dS.m⁻¹. While, the highest flower diameter was observed in sea algae treated plants (0.5 g.l⁻¹) in media with EC= 7.5 dS.m⁻¹. Salinity causes growth reduction due to the low osmotic

potential of the medium and by a specific ion effect as a secondary cause in several vegetable crops.

Discussion

The results of present study showed that the organic media can improve leaf number, crown diameter and fresh and dry weight of flowers. This can be due to increased media moisture storage and enhanced nutrient absorption. All treatments significantly increased growth characteristics of pot marigold compare to control. The positive effect of cow manure to nutrients uptake could be because of it was rich of N, P, K compare to the others. According to the results, it is cleared that in normal condition, pot marigold plant could tolerate salt stress until 7.5 dS.m^{-1} but by suitable media culture its threshold tolerate will be increased until 10.5 dS.m^{-1} . Also it was revealed that cow manure compare to other treatments could increase plant tolerate to salt stress and growth characteristics.

Keywords: Cow manure, Culture media, Sea algae, Vermicomposting