The effect of vermocompost enriched with salt tolerant strains of streptomyces on the growth and nutrition of cucumber under salinity stress

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Abstract

This study was aimed to evaluate the possibility of using enriched vermicompost with salt-tolerant strains of Streptomyces as a bio-fertilizer in growth and nutrition of cucumber under salinty stress. For this purpose, a pot experiment was set up in a completely randomized factorial design with three replications. Treatments included different salinity levels (0, 30, 60 and 90 mM sodium chloride) and vermicompost (control, unenriched vermicompost and enriched vermicompost with S. rimosus and S. griseus). Results showed that salinity stress caused a significant reduction in the root and shoot dry matter yield, nitrogen, potassium, iron and zinc concentration and potassium: sodium ratio, but increased sodium concentration and cell membrane permeability. Under these conditions, application of vermicompost maintained the structure of cell membranes, improved balance of nutrients and thus reduced the adverse effect of salinity on the plant yield. The effect of vermicomposts enriched with S. griseus and S. rimosus on maintaining root membrane permeability, improving plant nutrition and increasing salt tolerance of plants was more than unenriched vermicompost. So that the highest root and shoot dry weight in salinity of 90 mM NaCl was observed in vermicompost treatment enriched with S. rimosus. According to the results of this study, vermicompost enriched with salt-tolerant strains of Streptomyces, in addition to maintaining the balance of nutrients in saline conditions, improves morphological and physiological characteristics of cucumber plant and thereby can alleviate the damage induced by salinity stress.

Keywords: Vermicompost, Streptomyces, Enrichment, Salinity stress, Cucumber growth.

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