

DOI : <http://doi.org/10.22438/jeb40/2/MRN-698>

Effects of applied cadmium on its accumulation, dry matter production and net photosynthesis in okra and amelioration of cadmium toxicity through lime application

Paper received: 20.07.2017

Revised received: 25.11.2017

Re-revised received: 07.05.2018

Accepted: 02.07.2018

Authors Info

S. Raychaudhuri*,
M. Raychaudhuri, S.K. Rautaray
and S.R. Chowdhury

ICAR – Indian Institute of Water
Management, Chandrasekharpur,
Bhubaneswar, Odisha - 751 023,
India

*Corresponding Author Email :
sachidulalraychaudhuri@yahoo.in

Edited by

Dr. R. B. Raizada

Reviewed by

Dr. Anbunani Sadasivam
Dr. Praveen Prakash

Abstract

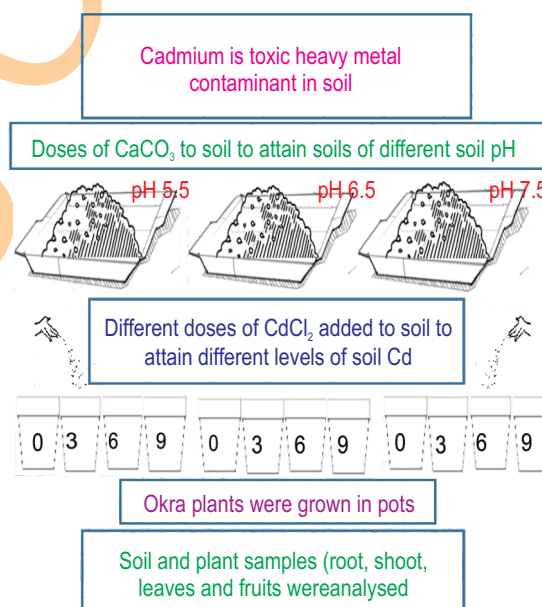
Aim: Vegetables grown in cadmium contaminated soils accumulate cadmium in their tissues and are risky for consumption. The aim of the study was to get an insight into the effect of different levels of cadmium in soil, on accumulation in different plant parts of okra and its effect on overall growth, biomass production and photosynthesis rate so that suitable management option is explored to produce safe vegetable in cadmium contaminated soils.

Methodology: The study was conducted in replicated pots with three soil pH (5.46, 6.54 and 7.45) attained through addition of CaCO_3 as main treatment and four Cd levels viz., 0, 3, 6 and 9 mg kg^{-1} of soil as sub-treatment. Okra (*Abelmoschus esculentus*) was taken as the test crop. The experiment was conducted in a net house.

Results: The Cd concentrations were minimum in fruits (0.54, 0.31 and 0.14 mg kg^{-1}) and higher in leaves at acidic pH (5.5), while in soil limed to slightly acidic (6.5) and alkaline pH (7.5) roots retained maximum Cd among plant parts. Net photosynthesis and biomass production decreased significantly with higher Cd doses at acidic pH (5.5). The rate of decline in net photosynthesis was lesser at higher soil pH. The transfer factors decreased with increase in soil pH. The DTPA extractable soil Cd decreased from 8.5 to 2% when soil pH increased rendering the Cd less available for plant uptake.

Interpretation: Liming can be an effective ameliorative measure to mitigate Cd toxicity in acidic soils and can ensure safe consumption. Lowest accumulation of cadmium in fruit part suggests okra to be a potential vegetable crop for Cd polluted soils.

Key words: Metal contaminant, Net photosynthesis, Soil pH, Transfer factor, Translocation factor



How to cite : Raychaudhuri, S., M. Raychaudhuri, S.K. Rautaray and S.R. Chowdhury : Effects of applied cadmium on its accumulation, dry matter production and net photosynthesis in okra and amelioration of cadmium toxicity through lime application. *J. Environ. Biol.*, **40**, 143-150 (2019).