

Abstract

Today, heavy metal pollution is a great problem to the environment and is termed as “devils in disguise”. Heavy metals are included in the main category of environmental pollutants as they can remain in the environment for long periods; their accumulation is potentially hazardous to humans, animals and plants. Heavy metals have high atomic weight and density much greater (at least 5 times) than water. There are more than 20 heavy metals, but Cadmium (Cd) and Lead (Pb) are of special concern.

The present study is an endeavor to assess the impact of three heavy metals Cadmium (Cd), Lead (Pb) and Manganese (Mn) on two commonly used vegetable crops of Kerala, *Abelmoschus esculentus* (L.) Moench. and *Vigna unguiculata* (L.) Walp.

In order to evaluate the responses of different concentrations of Cd, Pb and Mn, field experiments were conducted from seed to seed and the different parameters were studied at definite intervals. The plants were analyzed for morphological characters of root, stem and leaves, flowering and yield, growth parameters (growth coefficient, tolerance Indices, relative growth rate, total phytomass and net productivity), anatomical characters of root and stem, physiological features (leaf area and stomata), biochemical parameters (protein and carbohydrate) and bioaccumulation of Mg, Fe, Cu, Zn, Mn, Cd and Pb in root, stem, leaves and fruits.

This thesis is presented in ten chapters.

Chapter 1: A general introduction, objectives of the study and review of literature with references.

Chapter 2: Describes the materials and methods adopted for conducting the study with references.

Chapter 3: Explains the observations and results of different treatments of Cadmium in Cowpea.

- Chapter 4: Reveals the consequences of diverse levels of Cadmium in Bhindi.
- Chapter 5: Analyses the impact of Lead in Cowpea.
- Chapter 6: Monitor the out come of the application of Lead in Bhindi.
- Chapter 7: Examines the after effects of Manganese in Cowpea.
- Chapter 8: Investigates the responses of Manganese in Bhindi.
- Chapter 9: Discuss each part of the results of chapters 3, 4, 5, 6, 7 and 8 with a list of literature consulted and references cited under the heading Discussion.
- Chapter 10: Summary and main conclusions of the present study.