GREEN REVOLUTION: AN INNOVATION FOR ENVIRONMENTAL POLLUTION IN CHANGING CLIMATE OF WORLD

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ABSTRACT

Urbanization, agriculture, industrial work and greenhouse effect are the leading causes of the climatic changes all over the world. The impacts of climatic change include losses of biodiversity, rise of sea level, shifts in weather pattern, changes in fresh water supply and an increase in harsh / extreme weather conditions such as floods and droughts as well as glaciers melting and various health impacts on living organisms. It is a key concern that has been impacting human health, plants as well as animals. The concept of green revolution is based on plantation activities, increasing afforestation, decreasing deforestation, overgrazing etc. and such processes enable to protect and benefit the economy, habitat, people and planet. Plants use CO₂ and other toxic materials which can persist in the environment. The findings of this study showed that plantation activities should be considered on large scale for monitoring of environmental quality. As plants act as natural lungs of Universe and release oxygen providing good quality of air. In order to mitigate problems regarding climatic changes, we need to minimize the different types of environmental pollutants and to maximize the plantation activities to overcome the climatic changes all over the world.

Keywords: *Green Revolution, Environmental Pollution, Climatic Changes, Global Warming, Consequences*

RESEARCH HIGHLIGHTS

We use resources extensively and than are not responsible for the consequences.

1. Man is continuously uses the natural resources and is not responsible for the consequences. Man is so selfish that he doesn't think for other species like plants and animals (1). Man is destroying to all these living organisms by destroying their habitat.
 2. Plant a tree and get oxygen for free. So, it is our duty to save the environment's beauty by plantation activities.
 3. *Cassia fistula* L. commonly known as golden shower tree belongs to family fabaceae (Legume family). From spring to summer, it produces attractive golden flowers (2).
 4. Green revolution is the best solution to arrest the pollution in chnaging climate of world. It is necessary that plant species which are reported as phytoremediator for different environmental pollutants must be selected to grow in affected areas to reduce environmental pollution.
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GRAPHICAL ABSTRACT

Fig. 1. Diagrammatic uptake and transport of heavy metal pollutants in a plant (3).

Research Objectives

This research was carried out to test the hypothesis that plant growth influenced by soil types. *Cassia fistula* L. was selected due to its promising cultivation capabilities as multipurpose in semiarid regions and preferred to grow in harsh climatic conditions of Pakistan. The aim of this work was the quantitative estimation of the vegetation along with soil analysis to find out the impact of environmental pollutants on nature, structure and composition of vegetation. Attention has been given in developed countries about the effects of industrial area soil on tree species and little has been done on this aspect in our country on tree species. Therefore the present investigations was carried out with the aim & objectives to determine the effects of five different soil types collected from industrial areas on seedling growth parameters of an economic important legume tree species, *C. fistula* of Pakistan. Such investigations will be helpful in choosing the tolerant plant species to pollutants which are able to survive the environmental stress and they should be introduced in the polluted areas. These are helpful for environmental scientists, arboriculturists, and town organizers who are working on plantation activities in their selected areas.

Methodology

The seedling growth experiments of *Cassia fistula* L. were done in normal field environment at the Botany Department, University of Karachi, Karachi, Pakistan. The similar size seeds of *C. fistula*. were gathered and planted in nursery soil at 1.0 cm depth in earth pots and watered every day. Following fourteen days equal size seedlings were relocated in plastic pots of 20.00 cm width and 9.80 cm top to bottom containing soil of Karachi University Campus as control and 4-industrial contaminated soils.

During development pots were rearranged each week. After eight weeks, seedlings were taken out from plastic pots, their roots washed with normal water and other growth parameters were measured. The shoot, leaves and root were dehydrated in an oven at eighty (80°C) for twenty four (24) hours and their oven dried weights were recorded. The root/shoot ratio, specific leaf area, leaf area ratio and leaf weight ratio were also determined as described by (4).

The soil samples were obtained from different industrial sites and University Campus at 30 cm depth. After air drying soil was passed through 2 mm sieve. Mechanical analysis of soils were carried out by different tests (5 & 6). Data of different recorded growth factors were analyzed statistically by Analysis of Variance (ANOVA).

Results

The effects of different industrial pollutants on the seedling growth performance and biomass production of *Cassia fistula* L. was recorded. Results of present study revealed that *C. fistula* was adjusted for its different growth parameters in National Foods Ltd. factory soil as compared to others soils of industrial areas as well as control. Root, shoot and seedling length was significantly ($p < 0.05$) high for seedlings elevated from the soil of National Foods Ltd. factory. Principally, Indus battery soil exhibited great reduction in most of growth parameters comparative to other industrial soil and control.

The effects of industrial pollutants on biomass production of *C. fistula* were also observed. Seedling fresh weight showed that healthy seedlings were grown in National Foods Ltd. factory soil comparatively to seedlings raised from the soils of other industries in addition to control. For National Foods Ltd. factory high fresh weight was recorded which was reduced for control while, other industrial soil showed reduction in this parameter. Fresh weight decrease was extra prominent for seedling elevated from Indus battery soil.

Soil analysis of University Campus and industrial areas showed that soil of industrial area reduced growth of *C. fistula* except the National Foods Ltd. Factory.

Findings

The key finding which was drawn from this study is that the growth of *C. fistula* was high in National Foods Ltd. factory soil comparatively to other industrial and University Campus soils. Therefore, this species should be planted around the foods processing industries due to its tolerance against the pollutants. It is recommended that other plant species showing

their tolerance for other environmental pollutants must be selected to reduce it. We should try to find the processes, techniques, tools and the reactions which may possibly convert the pollutants into useful substances, which are imposing less ill effects on the environment.

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Author's Biography

Dr. Muhammad Kabir, is an Assistant Professor (BPS-19) of Botany and Incharge, Department of Biological Sciences at Sub-Campus Bhakkar, University of Sargodha, Punjab, Pakistan. He is HEC approved Ph.D. Supervisor.

He has published 55 research papers, 2-book chapters, a book and presented his research work in national and international reputed journals & magazines, conferences and workshops. He was awarded Research Productivity Award (RPA) in 2011 and 2012 from Ministry of Science and Technology, Government of Pakistan and Incentive Award-2019 by University of Sargodha. Primary aim of his research is to clean and green the world especially Pakistan by control of pollution through plantation.

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