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Short Commiuncation

Azotobacter Chroococcum's Potential for Use in Crop Production and the Impact of Air Pollution on Leaf Chlorophyll Content

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Abstract

Comparative investigations have been conducted in the current inquiry to determine the impact of air pollutants produced by industry and automotive exhaust on the chrorophyll content of leaves. Azadirachta indica, Nerium oleander, Mangifera indica, and Dalbergia sissoo leaf samples were gathered from locations that may have greater and lower air pollution levels. Chlorophyll a, Chlorophyll b, and carotenoids were measured as photosynthetic pigments. leaves of plants growing in more polluted areas have less photosynthetic pigments than those growing in unpolluted or less polluted areas. The importance of Azotobacter chroococcum spp. in crop production has emerged via research, as has its role in plant nutrition and soil fertility. A significant increase in crop output has been seen in agriculture due to the potential use of Azotobacter chroococcum in research studies as a microbial inoculant through production of growth compounds and their effects on the plant. Because they are soil bacteria, Azotobacteria produce auxins, cytokinins, and GA-like compounds, which are the main factors regulating the accelerated growth. The closely related higher plants are impacted by these hormonal chemicals, which come from the rhizosphere or root surface. Finding appropriate partners, such as a specific plant genotype and a specific Azotobacter strain, is required to ensure the high efficacy of inoculants and microbiological fertilisers (Piccardi M et al., 2004).

Keywords: Azotobacter chroococcum, Inoculant, Microbiological fertilizer, Plant chlorophyll, Carotenoids, Air pollution, Quantification, Photosynthetic pigments

INTRODUCTION

The organic preparations containing microorganisms known as biofertilizers, often referred to as bio inoculants, are advantageous to agricultural productivity in terms of nutrient delivery, particularly with respect to N and P. They quickly grow and form a dense population in the rhizosphere when treated as a soil application, seed treatment, seedling root dip, or other soil application. In uncultivated soils and the rhizosphere of crop plants, Azotobacter populations are often low (Kimes DS et al., 1980). This organism's presence in the rhizosphere of several crop plants, including rice, maize, sugarcane, bajra, vegetables, and plantation crops, has been documented (Arun, 2007). They obtain sustenance from the soil's organic matter and root exudates, and they fix atmospheric nitrogen (Maryenko, 1964). Through the use of biofertilizers, atmospheric N can be The process of biological nitrogen fixation (BNF) solubilizes plant nutrients like phosphates and promotes plant development by synthesising chemicals that encourage plant growth. The C: N ratio of the BNF process is 20:1, showing the stability of the biofertilizer. Under in vitro circumstances, the isolated Azotobacter culture fixes about 10 mg nitrogen g-1 of carbon source. They are also environmentally friendly and less expensive. In 1901, soil samples from Holland were used to create the first species of the genus Azotobacter, known as Azotobacter chroococcum family Azotobacteriaceae. The majority of heterotrophic free-living nitrogen-fixing bacteria, such as Azotobacter, are found in neutral or alkaline soils (Chen JM et al., 1996).

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Production of growth agents and the effects they have

Growth agents, often known as plant hormones, are organic compounds that both plants and microbes create. Certain physiological-biochemical processes in plants and microbes are stimulated or inhibited by them. When tryptophan was added to the medium, Azotobacter formed indol-3-acetic acid (IAA), as demonstrated by Brakel and Hilger. Only trace levels of IAA were discovered by Hennequin and Blachere in ancient cultures of Azotobacter that had not been given tryptophan. Auxins, cytokinins, and GA-like compounds are produced by bacteria of the genus Azotobacter, and they are the main factors regulating tomato growth enhancement (Myneni RB et al., 1994).

DISCUSSION

Changes in photosynthetic pigment

physiological traits of specific plant species exposed to cement dust pollution . Comparisons were made between the outcomes from contaminated and unpolluted Azadirachta indica, Nerium oleander, Mangifera indica, and Dalbergia sissoo. Due to air pollution, plants often displayed a decrease in photosynthetic pigments. Chlorophyll 'a' and 'b' content in Azadirachta indica, Nerium oleander, Mangifera indica, and Dalbergia sissoo significantly decreased over the course of the study. But the total carotenoids of the chosen plant species have not changed significantly.

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