

## BIOASSAY TEST FOR DETECTION OF PLANT GROWTH PROMOTING SUBSTANCE IN *BACILLUS POLYMYXA* ISOLATED FROM RHIZOSPHERE OF BRINJAL

Jenifer Lolita C<sup>1</sup> & Keshamma E<sup>2</sup>

<sup>1</sup>Research Scholar, Department of Botany, Maharani Cluster University, Palace Road, Bengaluru, Karnataka, India

<sup>2</sup>Research Scholar, Department of Biochemistry, Maharani Cluster University, Palace Road, Bengaluru, Karnataka, India

### ABSTRACT

**Background:** Rhizosphere, phylloplane and caulosphere is the region where a complex community of microbes, mainly bacteria and fungi are present. The microbe plant interaction in these regions can be beneficial, neutral, variable, or deleterious for plant growth. Among the possible mechanisms, proposed to explain the growth promotion by rhizobacteria are the enhancement of mineral availability and uptake and production of phytohormones, which stimulate plant growth. Many rhizobacteria produce phytohormones, this evidence has been primarily from analysis by bioassay, usually on chemically defined media, always in a system containing a single microorganism.

**Objectives:** To test the presence of plant growth promoting substance by *Bacillus polymyxa*.

**Materials and Methods:** 24 hr bacterial culture of *Bacillus polymyxa* in liquid nitrogen free Burk's media incubated at 37 °C was used to test for the presence of growth promoting substances. The seeds of brinjal used in these bioassays were obtained from Division of vegetable crops IIHR. Bioassays were conducted to test for the presence of growth promoting substances produced by the bacteria. Bioassays were carried out using ragi (*Eleusine coracana*) seeds. Sterilized ragi seeds were germinated in sterile petriplates with filter paper (Wattmann No 1) containing either 24 hr bacterial culture filtrate or nitrogen free Burk's media or distilled water. Growth parameters such as germination count, radicle length and plumule length of 72 hr old seedlings were recorded. Brinjal (*Solanum melongena* L.) seeds were similarly tested for the germination and growth stimulation properties of the culture filtrate.

**Results:** Bioassays were conducted to test for the presence of growth promoting substances using ragi (*Eleusine coracma*) and brinjal (*Solanum melongena* L.) seeds. The results of the bioassays proved that inoculation with *Bacillus polymyxa* produced growth-promotion. Among the possible mechanisms, proposed to explain the growth promotion by rhizo bacteria, is the production of phytohormones, which stimulate plant growth. These growth-promoting substances were identified to be cytokinins and gibberellins. The present study showed direct evidence that *Bacillus polymyxa* inoculation affected the status of cytokinins and gibberellins in brinjal seedlings. The amount of zeatinriboside in culture filtrate of *B. polymyxa* tested by Immuno detection was found to be 114.7 pg/mole. The plants treated with *Bacillus polymyxa* had a zeatin riboside concentration of 65.66 pg.<sup>1</sup> fresh weight of the plant sample as compared with 16.77 pg.<sup>1</sup> fresh weight of the plant sample of the control plants. The amount of gibberellin in the culture supernatant of *Bacillus polymyxa* (BBI) was 0.08 μg/mg. The plant treated with *Bacillus polymyxa* (BBI) showed an increase of 61.08 % in gibberellin concentration over the control plants.

**Conclusion:** The plants treated with *Bacillus polymyxa* showed an increase of 61.08% in gibberellin concentration over the control plants. The results of the present study are pointers to the fact that growth hormones are produced by *Bacillus polymyxa*.

**KEYWORDS:** *Brinjal, Ragi, Bacillus Polymyxa, Azospirillum, Root Hairs, Gibberellins*

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