Introduction
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To meet our increasing demand for food, we have been resorting to intensive cultivation practices with the use of chemical fertilizers, pesticides, fungicides and other inputs. Use of these inputs has been polluting our soil, water, and environment causing slow degradation of soil health thereby resulting in depleted yield. Therefore, there is a need to sustain the production and improve the soil health by organic farming. Biofertilizer can provide the farmers an economically viable weapon to attain the ultimate goal of increasing crop productivity. In order to dispense with the use of chemical fertilizer or to use less quantity of chemical fertilizer for the reason stated above, biofertilizer application should be increased to a large extent and their application contribute 20-30 kg N/ha. This should be enlarged in a big way to substitute chemical fertilizer, since cyanobacteria offer an economically attractive ecologically sound alternative to chemical fertilizers for realizing the ultimate goal of increased productivity in cultivation of plants.

A growth regulator is a natural or synthetic organic compound that promotes, inhibits or qualitatively modifies growth and development of a plant. These compounds are biologically active at very low concentration and elicit response similar to those observed from plant hormones. Since most plant growth and development processes are regulated by natural plant hormones, these processes may be manipulated either by altering the plant hormone level or changing the capacity of the plant to respond to its natural hormones.

The commonly recognized classes of plant hormones are the auxin, gibberellin, cytokinin, abscisic acid and other growth inhibitors like ethylene, brassionosteroids and the hypothetical florigens or anthesins. Auxin is one of the plant growth regulator produced from the bacteria, fungi, cyanobacteria and plants. The auxins are classified based on the occurrence by natural source or synthetic.

Indole acetic acid (IAA) is a natural auxin which is also synthesized in many species of non seeded plants, many bacteria, fungi and algae. The amino acid tryptophan is commonly regarded as the precursor for the biosynthesis of auxin in plants. By a pathway, tryptophan is converted to indole pyruvic acid via a
transaminase reaction, which requires a keto acid and pyridoxal phosphate in addition to the enzyme. Indole pyruvic acid is next decarboxylated to indole acetaldehyde in a reaction requiring a decarboxylase thiamine pyrophosphate. Either an oxidase or a dehydrogenase then oxidizes indole acetaldehyde to IAA.

In some cases, the basal application of biofertilizer or hormone may be drained into the water system. So the plant cannot utilize the basal fertilizer fully. Therefore, foliar fertilization has the advantage that translocation takes place directly into the plant. This application has been used as a means of supplying supplementary doses of minor and major nutrients, plant hormones, stimulants and other beneficial substances.

Cyanobacteria are the largest and most widely distributed species in the environment, they are oxygen evolving gram negative photosynthetic prokaryotes, and are common in varied aquatic and terrestrial habitats in nature as well as in association with other organisms. Since some of the cyanobacteria are also able to fix atmospheric nitrogen, they can be used as a biofertilizer for paddy fields. They show high flexibility to varied environments because of their tropical climate independence to carbon and even nitrogen in a number of cases and play a potential role as feed and biofertilizer. Cyanobacteria are inexpensive to maintain with high growth rates and produce various biologically active substances like proteins, vitamins, carbohydrates, amino acids, polysaccharides and plant growth regulators. Thus, they have the unique potential to contribute to productivity in a variety of agricultural and ecological situations. There are three economically important host plants namely *Oryza sativa* L., *Hibiscus esculentus* L., and *Helianthus annuus* L., selected for the study based on the usage and nutritive value for testing cyanobacterial extract as foliar spray.

Rice (*Oryza sativa* L.) belongs to the genus *Oryza*. There are eighteen valid wild species distributed mainly in Asia, Africa and America. Seventeen amino acids are normally present and the amino acid composition of the protein determines the nutritional value.
The Okra or *Hibiscus esculentus* L. belongs to the family Malvaceae. It can be grown in all types of soil, but grows best in friable, well drained soil and cultivated throughout India for its immature fruits. It is a warm season crop and will not stand a continuous cold spell. In central and southern India, it can be grown throughout the year. Immature fruits are used as vegetable and the stem of the crop is used in paper industry and also for the extraction of fiber.

The *Helianthus annus* L. is native to North America and tolerate wide range of soil types. From the seeds of the plants, oil is being extracted and used for food preparation. Meal from processed seed has been used as livestock feed. Since the seeds are rich sources of calcium, and fifty percentage of the fat composition is mainly polyunsaturated linoleic acid, the whole seeds are used as edible oil.

Hence, this present study was undertaken to analyze the foliar application of cyanobacterial extract on these economically important plants like *Oryza sativa* L. (IR 20), *Hibiscus esculentus* L. (Pusa) and *Helianthus annus* L. (Ankur) using the following objectives.

**OBJECTIVES OF THE WORK**

1. Collection of Cyanobacterial sample from paddy field.
2. Isolation, identification, characterization and selection of cyanobacteria from the collected samples.
3. Bioassay and screening of efficient cyanobacterial strain.
4. Application of the cyanobacterial extract for germination of economically important seeds.
5. Extraction, identification, characterization and quantification of indole-3- acetic acid from the selected cyanobacterial strain (FTIR and HPLC).
6. Foliar application of cyanobacterial extract on the economically important crop plants under field condition.