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Application of high input technologies has resulted in significant increase in agricultural productivity. There is however a growing concern about the adverse effects of indiscriminate use of chemical fertilizers on soil productivity and environmental quality. Cyanobacteria offer an economically attractive and ecologically sound alternative to chemical fertilizers for realizing the ultimate goal of increased productivity, especially in rice cultivation.

Cyanobacteria also called blue-green algae evolved very early in the history of life. They constitute a vast potential resource in varied applications such as food, feed, fuel, fertilizer, medicine, industry and in combating pollution. Cyanobacteria can photosynthesize and fix nitrogen and these abilities together with great adaptability to various soil types make them ubiquitous. Cyanobacteria also have a unique potential to contribute to productivity in a variety of agricultural and ecological situations. They have been reported from a wide range of soils, thriving both on and below the surface. Their presence often also characteristic features of other types of sub-aerial environment and many intermittently wet ones such as rice fields which provide a potential source for nitrogen fixation at no cost.

Due to this important characteristic feature of nitrogen fixation, the utility of cyanobacteria in agriculture to enhance production is emerging. Many studies have been reported on the use of dried cyanobacteria to inoculate soil as a means of aiding fertility. The term ‘algalization’ is now applied to the use of a defined mixture of cyanobacterial species to inoculate soil and research on algalization is going on in all major rice producing countries. The average of the results from all these studies has shown an increase in grain yield of 15-20% in field experiments. It has been suggested that the cyanobacteria once introduced into field as part of algalization can establish themselves permanently if inoculation is done consecutively for 3-4 cropping seasons.

From the above investigations, it is proved that cyanobacteria serve as natural renewable biological sources of biofertilizer for rice. In biofertilizer formulation
carrier is of paramount significance as it forms the vital ingredient in preserving the inoculants for a long time. So the shelf life of a biofertilizer depends on the quality of the carrier and also it helps to spread a small volume of inoculum over a large surface area. Soil is generally used as a carrier material for cyanobacterial biofertilizer but this was often not successful due to decreased shelf life and loss of viability due to the hydrophilic nature of soil that remove moisture beyond the minimum requirement for retaining the viability in cells. Hence, many other carrier materials have been tried for bacterial biofertilizer such as straw, husk, peat, corncobs, peanut hulls were expensive and require preliminary treatment.

*Cocos nucifera* Linn. is the widely cultivated palm in the tropics. At present India is the principal producer and exporters of coir products. The by-products of coir industry are pith and coir dust which is the major waste as it get accumulated enormously making its disposal difficult due to its high lignin content and slow degradation in the natural environment.

In addition to environmental pollution due to the release of natural phenolic compounds from agro-industrial operations have become widespread in the world and utilization of these wastes is essential in the foreseeable future. Hence, this present investigation aimed toward the following objectives to understand the dynamic of growth characters of the selected cyanobacteria and its degradation of coir pith in four different media (BG11, NPK, Complex and Urea) under laboratory and field conditions to develop mass of coir pith based cyanobacterial biofertilizer in a simple and optimum growth conditions. Finally the developed biofertilizer was compared with chemical fertilizer on the growth and yield of *Oryza sativa* and *Allium cepa var. aggregatum*.

*Rice* (*Oryza sativa*) is native to tropical, subtropical southern Asia and southeastern Africa and it provides more than one fifth of the calories consumed by humans in their global diets. It is a monocarpic annual plant, growing to 1-1.8m tall, occasionally more depending on the variety and soil fertility. Rice is a staple food for
a large part of the world’s human population, especially in East, South and Southeast Asia, making it the most consumed cereal grain. Rice cultivation is well-suited to countries and regions with low labour costs and high rainfall, as it is very labor-intensive to cultivate and requires plenty of water for irrigation. Although its species are native to South Asia and certain parts of Africa, centuries of trade and exportation have made it common place in many countries.

Onion (Allium cepa var. aggregatum) is staple food in India and are therefore fundamental to Indian cooking. The onion is a hardy biennial with a bulb and hollow leaves and can easily propagated, transported and stored. It contains a range of sulfur containing compounds like cyteine sulfoxide and cepaenes. It is a pungent herb protecting against infection, relaxing spasms, reducing blood pressure as well as blood clotting and blood sugar levels. It further has expectorant and diuretic properties. Also they contain anti-inflammatory, anticholesterol, anticancer and antioxidant components such as quercetin.

**Objectives**

- Optimize the growth of cyanobacteria with coir pith in four different media (BG11, NPK, Complex and Urea) in laboratory and field condition.
- Estimate the released products during degradation of coir pith by cyanobacteria grown in four different media (BG11, NPK, Complex and Urea).
- To confirm the presence of enzyme activity for degradation.
- Mass cultivation of cyanobacteria in the selected medium with coir pith to perform field trials.
- Compare the above developed biofertilizer with chemical fertilizer by performing pot culture experiment and field trials.