



## ***Introduction***

# **1. INTRODUCTION**

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## **1.1. *Solanum lycopersicum* L.**

Tomato (*Solanum lycopersicum* L.) is the most popular edible fruit which is grown worldwide in the tropical and subtropical area. Popularity of tomato and its products continue to increase as it is a good source of vitamins, minerals and antioxidants which are necessary for human health. Tomatoes are widely used for salads, sandwiches, salsa, pastes, sauces, soups and juices, they are also used in making processed foods like ketchup.

Tomato intake can reduce cholesterol (a triglyceride level of white blood cells), cardiovascular risk associated with type II diabetes, risk of breast cancer, neck cancer and strong protective against neurodegenerative disease. Tomatoes are grown by using chemical/organic/combined fertilizers. It grows best in well drained soils that are well supplied with organic matter.

## **1.2. Organic farming**

Organic farming is a substitute for chemical method as it utilizes organic wastes (plants and animals) and microbes like bacteria, fungi, algae, mycorrhizae to produce manure. The addition of manure to the soil results in improved yield of many field crops. The application of organic materials such as crop residues, animal manures and green manures to soils can improve soil fertility, soil physical characteristics and enhance microbial activities.

## **1.3. Organic manure**

Organic manures are produced from decaying material of plant or animal sources and hence, it contributes to soil fertility and microbial population. In addition to nutrients, it provides carbon and different constituents that induce soil humus content, biological activity and soil physical structure and incredibly influence the accessible soil microbial

populations which are capable of managing the supply of nutrients to higher plants. The microbial population of organic manure contains various groups of bacteria and fungi. Among these, bacteria are the most abundant and the most important microbes for decomposing waste. Bacteria uses waste for their own metabolism and finally produce some simple and useful products which are important for soil health, plant growth and also keep a good balanced natural ecosystem. Therefore, it can be measured for better maintenance of soil organic matter. Organic manures have been proven to extend the efficiency and reduce the need for chemical fertilizers, to improve the soil fertility and soil health.

#### **1.4. Coir pith**

Coir pith, lignocellulosic byproducts produced during extraction of coir fiber from coconut husk, dumped as a waste material near coir processing factories, which creates environmental and disposal problems. Coir pith will not decompose by itself and remains in the soil over years polluting the environment. It has a high amount of lignin, cellulose, hemicelluloses and C/N ratio, which makes it difficult to get degraded. Microbial degradation of coir pith is considered as a safe, valuable and environmentally friendly process. Hence, the lignocellulosic material must be converted into simpler compounds by composting process by microorganisms for easy uptake by the plant.

#### **1.5. Cyanobacteria**

Cyanobacteria are utilized in the form of biofertilizers because of their exclusive capacity to fix both carbon and nitrogen from the atmosphere and they are called microbial biofertilizers. Cyanobacteria also increase the oxygen concentration and improve other physicochemical parameters of the soil environment, in which they develop and thrive. They are easy to maintain with high growth potential and have an ability to degrade the coir pith which is to be used as biofertilizer and are also effective in reducing the pollution.

### **1.6. Cyanopith**

Cyanopith is an organic biofertilizer prepared by the degradation of coir pith using fresh water Cyanobacterium, *Oscillatoria annae*. Coir pith degradation by Cyanobacterium is a partial degradation and also application of coir pith based cyanobacterial biofertilizer (cyanopith) to the soil takes more time to degrade by soil microbes. Hence, preparation of minimum particle sizes of cyanopith can be easily degraded by soil microbes which can promote easy uptake by plants thereby increasing the productivity of crops.

### **1.7. Jiwamrita**

Jiwamrita is one of the cheapest bio enhancers, which can be prepared by individual farmers and used regularly to enhance the biological properties and humus content of the soil. It is rich sources of microbial consortia which enhance quick decomposition of organic wastes present, captures nitrogen from the atmosphere, develops solubility of phosphorus and provides tolerance to most of the soil borne diseases. Microorganisms are well activated in soil by the application of Jiwamrita which also maintains soil productivity. These organic liquid manures play an important role in promoting growth and providing immunity to plant system. The use of Jiwamrita treated organisms improves the physicochemical and biological properties of soil, besides increases the degradation efficiency of manure. The potential of Jiwamrita is to furnish materials and to act as food support for beneficial microbes.

Hence, the present study was carried out for the production of organic manure from three different particle sizes of coir pith based cyanobacterial biofertilizer (cyanopith) with jiwamrita for further degradation process and to characterize and analyze their impact on *Solanum lycopersicum* L. (Tomato) plant growth and yield.

## **OBJECTIVES**

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- **To convert the partially degraded Cyanopith into three different particle sizes (a. 1-10 mm; b. 0.1-1 mm; c. 0.01-0.1 mm)**
- **To enrich the Cyanopith with Jiwamrita for the further degradation process.**
- **To analyze the physicochemical parameters of Cyanopith**
- **To study their impact on the growth and yield of Tomato (*Solanum lycopersicum* L.) as an experimental crop using the above developed organic manure.**

# Work plan

