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An Agriculture Monthly e-Magazine
Volume 01, Issue 03, 2023
Article ID: G-23-1204

EFFECTIVE MICROORGANISMS IN AGRICULTURE

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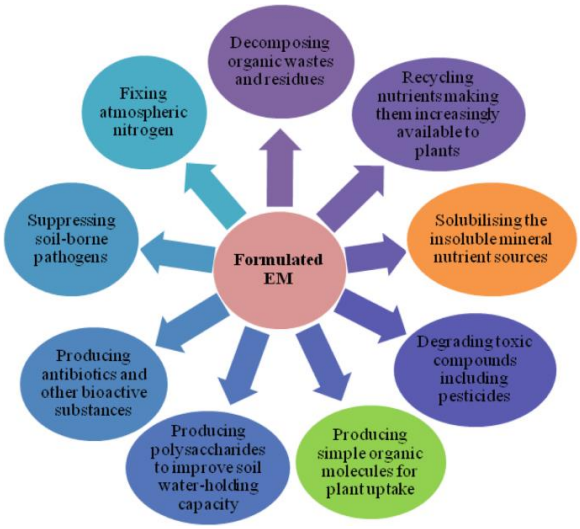
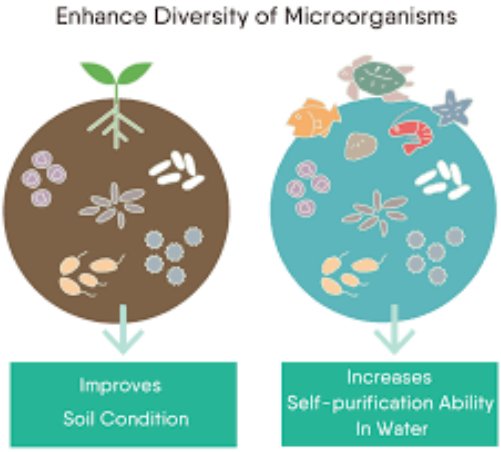
INTRODUCTION

Crop production and productivity have significantly decreased as a result of declining soil fertility and related restrictions. The combined effect of microorganisms' chemical, physical, and biological interactions is known as soil fertility. Numerous types of microbes contribute to maintain the ecological equilibrium. In order to boost the microbial diversity of the soil environment, the effective microorganisms are a mixed culture of naturally existing organisms.

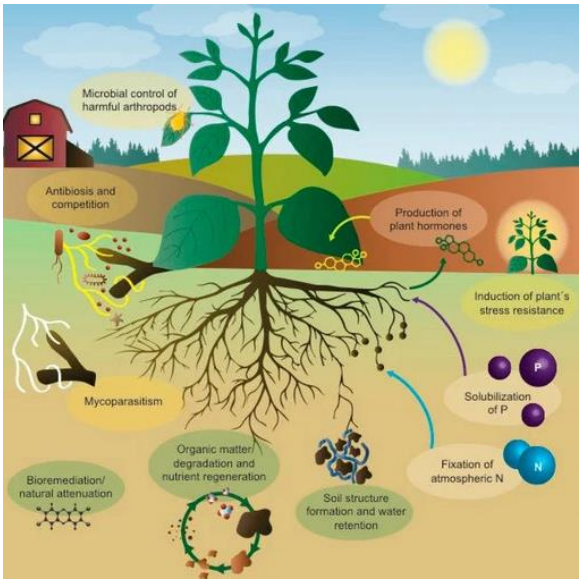


Effective microorganisms (EM) have demonstrated that they can increase plant development and yield while also enhancing the soil environment and quality. Professor Teruo Higa created the idea of useful microbes. EM comprises species of organisms that are common in soil ecology, such as actinomycetes, lactic acid bacteria, yeast, and photosynthetic bacteria. Because they can coexist in liquid culture and because the microorganisms in EM are mutually compatible, they can be employed successfully as microbial inoculants.



Agriculture prioritizes sustainability as one of primary focus for innovative technological developments that make use of advantageous microorganisms for agriculture and the environment. Based on the pace of decomposition and fermentation of organic fractions in the soil, the interaction of plant and pathogenic microorganisms, the function of helpful microbes and the plant, and their

synergistic relationship distinguish living soil from dead soil. They give the plant nutrition and minerals while preserving the structure, moisture, and nutrients of the soil.



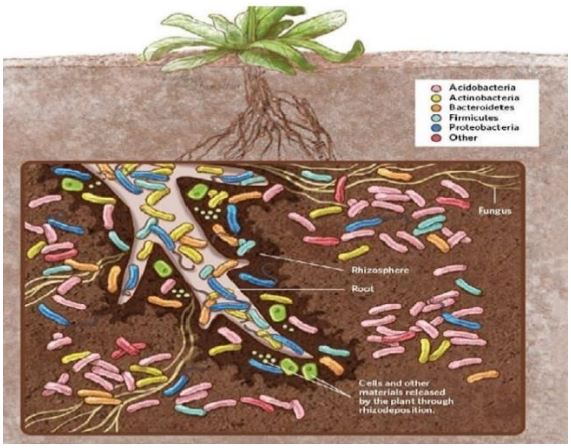
The excessive use of chemical pesticides, fungicides, herbicides, and other fertilizers has stunted the growth of a group of helpful microorganisms that break down organic matter and increase soil fertility. The decline in yield and rapid increase in plant infections and illnesses served as an indicator of the significance of microbial connection with the soil and plant. Yeast, phototrophic bacteria, lactic acid bacteria (LAB), and others are among the basic microorganisms found in the EM. They promote the rapid decomposition of organic materials while suppressing dangerous microbes. Photosynthetic microorganisms play a key role in this. Microorganisms are environmentally friendly and have a wide range of advantages when applied to crops. One of them is the upkeep of ecological balance. Since EM is a naturally occurring microorganism, it is sprayed on the soil as an inoculant to increase its population. They have a significant influence on the development and growth of plants.

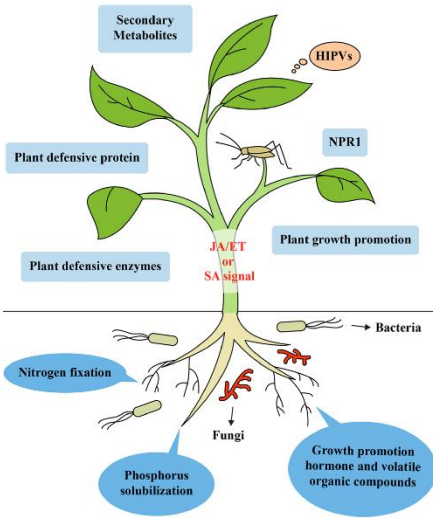
ENHANCING THE NUTRIENT UPTAKE

The EM offers nutrients more readily available in the soil, requiring less frequent nutrient delivery. The population of advantageous microorganisms in the phyllosphere rises as a result of EM treatment to foliage. The bacteria that improve photosynthetic rate and efficiency and fix nitrogen in the soil are both photosynthetic and nitrogen-fixing microorganisms. When compared to a single activity, EM's complex microbial formulation, which contains many microbes, boosts the activities. The availability of N, P, and K doubles upon the application of field modifications like FYM due to enhanced EM activity.

SUPPRESSING THE PATHOGENS

The activity of EM inhibits the pathogen's growth, development, and spread as well as its infection. The organic matter in the soil is affected by EM and is made available for plant uptake. Plants' immune systems are stimulated by nutrients, and the pathogen's growth is suppressed when resources are scarce in the phyllosphere. Less harmful bacteria mean less impact on the plant and its surroundings.





BOOSTING THE DEVELOPMENT

By the inoculation of EM, the plant can develop successfully even with a less amount of fertilizer and other nutritional supplements applied, leading to a sustainable production. There are occasions where the EM activity in black gram boosted grain yield to a degree of 45%. demonstrating the role of EM in the plant's enhanced yield status.

The structural and chemical activities of the soil are greatly impacted by long-term application because they work on the soil, supplying it with the nutrients it needs and promoting plant development and rhizosphere microorganisms. Plant growth stimulants, siderophores, and antibiotics used in EM synthesis all significantly improve plant functions and other general activities.

The variety of environmental microorganisms and their importance to the production system and sustainable agriculture cannot be overstated. The EM proves to be the ideal substitute for all chemical formulations since it boosts soil structure and health, which promotes plant growth, pathogen protection, and increased yield.

THE YIELD OF THE PLANT

The application of EM to crops results in a significant increase in yield; the yield of the plant is directly proportional to the enhanced nutrient mobilization and nitrogen fixation by the microorganisms and higher yield attributes of the crop.

The chlorophyll content of a normal crop and EM sprayed crops differ significantly, leading to higher nutrient uptake, enhanced growth, larger leaf area, and ultimately higher yield. The presence and activity of the microorganisms directly affect the crop's yield. Due to their lack, insoluble micronutrients frequently decrease crop efficiency. The fertility and productivity of the soil are significantly impacted by the solubilization and mobilization of nutrients.

The application of EM can not only improve the yield and growth parameters but also have a good effect on growth parameters but also have a good effect on soil fertility and productivity.