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Commentary

Develop the Grape Yield through Bio-fertilizers: Using Microbial Diversity for Sustainable Viticulture

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DESCRIPTION

The synthetic manures have to be sure altered the extent of horticulture with benefits like plant development advancement and expanded blossoming. But using these fertilizers for a long time, especially urea, makes the soil more acidic, making it harder for good bacteria to grow. The over the top utilization of these manures additionally creates 'synthetic leaf singe' or 'substance consumes' which seriously influence efficiency. Greenhouse gases and other pollutants are released into the environment during the manufacturing process of chemical fertilizers. Their disposal has a negative impact on aquatic life because it pollutes and eutrophizes groundwater. Sustainable approaches to plant nutrition are gaining popularity due to the aforementioned factors. Because of their potential to safely replace chemical fertilizers, research into the efficacy of bio-fertilizers is being encouraged. The majority of microorganisms, primarily bacteria, can be found abundantly in the soil. Through their metabolic activities, microorganisms aid in the transformation of complex nutrients into simpler forms that can be utilized by plants. They are collectively referred to as Plant Growth Promoting Rhizobacteria (PGPR) because they increase the availability of nutrients in the rhizosphere and produce hormones that stimulate growth.

Biofertilizers can be made by imitating this natural phenomenon and designing them with various microorganism combinations that will increase crop yield. Biofertilizers, in contrast to chemical fertilizers, work by causing nitrogen fixation and phosphate solubilization, which in turn provide phosphorus and nitrogen to plants. Additionally, the security of biofertilizers permits their immediate application to the seeds or yield surfaces. Grapes (*Vitis vinifera*) are one of Maharashtra's most important cash crops. Nasik is referred to as the "Grape capital of India" due to the widespread cultivation of it there. Scientists tried to make a biofertilizers for viticulture. They found that in the presence of 0.1-0.15% nitrogen, 12.3-15 mg/100 g potassium, and 0.4-3.6 mg/100 g phosphorus in a soil layer up to 40 cm, plant growth improved significantly. The fruit yield in their study was between 6804 and 8772 kg/ha. In addition, they reported that *Azotobacter* sp. stimulated plant growth the most effectively.

According to a different study, an increase in the amount of nitrogen present in the soil was associated with an increase in vegetative growth parameters like trunk diameter, leaf area, and leaf fresh and dry weight. To achieve a cost-effective yield, the four biofertilizers Nitrobeine, Rhizobacteria, Biogen, and active dry yeast were used in place of mineral nitrogen. It was accomplished by isolating growth promoters, phosphate solubilizers, siderophore producers, and nitrogen fixers and assembling them into a group for grape use. The biofertilizer's microorganism viability is typically determined by the type of carrier used in its formulation, which has an impact on the pH and electrolyte availability nearby. The benefits of utilizing cocopeat are high porosity permits retention of huge volumes of water and soil molding properties. They can typically take in five to six times their weight in water. Additionally, cocopeat's 31% lignin content improves its stability. Additionally, cocopeat's rapid ability and quick draining properties reduce nutrients lost through leaching. Natural elements, as well as microbiome design of the dirt, fundamentally influence the supplement content in the dirt, and consequently impact plant development. The availability of nitrogen and phosphate is a important factor in increasing fruit yield in viticulture. In a similar vein, it is common knowledge that siderophore producers' availability of iron has an effect on plant growth as a whole.

CONCLUSION

Additionally, *Trichoderma* sp. has been linked to increased soil fertility. In light of this fundamental understanding, a consortium of the aforementioned microorganisms was utilized in our study as a biofertilizer that was beneficial to the growth of grape plants. Given the advantages of natural growth promoters, several aspects of viticulture can be examined separately and in conjunction with observing its effect in the field. However, considering the compatibility of its constituents with the diverse

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rhizosphere microbial population, designing an appropriate consortium may be challenging. We may be able to move in the right direction for the successful application of PGPR-based biofertilizers in agriculture by making use of suitable carriers that have been designed using environmentally friendly nanotechnology and similar studies that have been carried out with a consortium that has a greater diversity of microorganisms.