

CYANOBACTERIA ISOLATION FOR BIOFILMED BIOFERTILIZER FROM MAIZE FIELDS

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Biofilmed biofertilizers (BFBFs) are economically attractive and ecologically sound alternatives to chemical fertilizers for realizing the ultimate goal of enhancing plant productivity. Incorporation of a number of beneficial microbes into BFBFs was a newly introduced biotechnological application and the current study was focused on isolation and identification of cyanobacterial species which could be incorporated to enhance the efficacy of BFBFs. Cyanobacteria play an important role in biofertilization by fixation of atmospheric N₂, solubilization of phosphorous and secretion of plant growth promoting substances. Since they are autotrophic, they do not receive energy or carbon from the host plant.

Cyanobacteria were isolated from soils of maize fields where maize biofilmed biofertilizers (incorporated with fungal bacterial biofilms) were applied along with and without chemical fertilizers. They were cultured in GO medium with and without nitrogen and purified by sub culturing 4-5 times. Isolated cultures were identified based on microscopically observed morphological characteristics. Final isolated cultures were tested for nitrogen fixation by using the Acetylene Reduction Assay (ARA).

There were five different types of cyanobacterial isolates namely *Anabeana sp.*, *Nostoc sp.*, *Oscillatoria sp.*, *Gloeotheca sp.* and *Anacystis sp.* The number of cyanobacterial species isolated from fields where BFBFs applied was significantly higher than the fields applied with chemical fertilizers. All the isolates possessed nitrogenase activity. Incorporation of these cyanobacteria could enhance the efficiency of existing maize BFBFs by supplying energy, nitrogen and carbon sources for the growth and functioning of such tri-partite BFBFs. Further studies are needed to test the efficiency of such fungal, bacterial and cyanobacterial biofilmed biofertilizers under field conditions.

Key words: Acetylene Reduction Assay (ARA), Biofilm, Biofilmed Biofertilizer, Cyanobacteria