

## Microbial bio-fertilizer formulation with a difference

Nitrate and phosphate are the major agricultural pollutants which seep into the surrounding soil and water bodies causing severe environmental and human health problems. These components are essential for agricultural productivity but only 12 to 30% of the same is utilized while the rest is washed off. The production of these nutrients in turn needs energy as well as finite resources like rock phosphate whose reserves are gradually getting depleted. In order to protect the environment and minimize the production of these nutrients (fertilizer), the alternative management strategy would be to prevent the leaching of these nutrients, sequester these excess nutrients within biomass and reuse the same for agriculture. Keeping this objective in mind an alternative nutrient management strategy was developed through microbial intervention. Two discrete microbial consortia were developed from environmental origin with potential for nitrate and phosphate removal from medium. Microbial consortia (mixture of an aerobic, BN7 and an anaerobic consortium, NB1) with potential for nitrate and phosphate sequestration were used to prevent leaching of nitrate from soil and restricting them within the plant root zone (upto 11cm depth in soil). This ensures prevention of eutrophication through leaching in soil during agriculture as well as from effluent discharge. The biomass with accumulated nutrient enhanced crop yield by 21.88% in case of mung bean cultivation. The elemental content of these seeds were better than chemical fertilizer grown seeds while the rest of the nutritional properties were at par with other formulations tested including chemical fertilizer. This alternative plant nutrient management approach could protect the environment from eutrophication and completely utilize the excess nutrients for agriculture producing higher yield of elementally rich seeds while retaining the fertility of the soil post cultivation.

