

## Phosphatic Biofertilizer *Pseudomonas Jesenii* Mp1

Phosphorus is an important plant nutrient for agricultural production. It is the second major macronutrient required for the growth and development of plant. Adding phosphorus fertilizer to the soil not only increases the cost but also create environmental destruction. It creates long term effect on the environment viz. soil fertility depletion, eutrophication, carbon footprint etc. An ideal alternative to these chemical fertilizers might be to exploit the microbial potential to increase the availability of P in soil. Therefore, the use of phosphate solubilizing bacteria could be an eco-friendly approach for sustainable agricultural development.

Phosphate solubilizing bacteria (PSB) solubilize the complex phosphate compounds present in soil into the simpler readily absorbable form. Moreover, there is no requirement of additional application of phosphatic fertilizers as inactive phosphorous is readily present in the soil which will be solubilized steadily by these bacteria, thus providing a sustainable source of phosphorous to the crops. Therefore, ability of PSBs to release soluble ortho-phosphate (Pi) from rock phosphate holds potential importance for the development of phosphatic fertilizer technologies.

Bacterium *Pseudomonas jesenii* MP1 was isolated from an agriculture field of Munsyari, situated at Kumaon region of Western Indian Himalaya (WIH). This bacterium was showing phosphate solubilization potential at *in vitro* experiment with P solubilization index of 7.2 and solubilization efficiency of 398.14 µg/ml in NBRI-BPB medium. In field trial experiment MP1 showed better plant growth promotion of *Cicer arietinum* besides improving soil fertility. Thus MP1 could be used as potent P solubilizer for sustainable agriculture.

### Advantages:

1. Chickpea (*Cicer arietinum*), is an important pulse crop of the Northern India and MP1 promote the growth of chickpea in absence of chemical fertilizers.
2. Besides solubilizing phosphate, MP1 increases seed germination percentage of *Cicer arietinum* and also fixes atmospheric nitrogen.
3. Once applied, MP1 remain active in soil for 60 days. Thus repeated inoculation is not required which save money and labor input.
4. Being a cold adapted bacterium, MP1 can be used as phosphatic biofertilizer in cold climatic agro-ecosystem.
5. MP1 can be used as phosphatic biofertilizer for organic farming.
6. MP1 can be produced conveniently in large scale using inexpensive routine culture medium.
7. MP1 can be applied directly on seed, sprinkled in soil directly and can be mixed with carrier and applied in powder form.
8. Once revived this bacteria can be sub-cultured and maintained at low temperature (-80°C) forever.
9. MP1 is non pathogenic to the plants and animals. No disease is reported to be caused by this bacterium till date.
10. MP1 reduces the use of chemical fertilizers besides improving plant productivity and soil health.