

## Phosphatic Biofertilizer *Pseudomonas Pelleroniana* Strain N26

Phosphorus (P) is one of the major essential macro-nutrient for plants. It is the second major macronutrient required for the growth and development of plant. In agricultural crops this phosphorus is supplied by the application of chemical phosphatic fertilizers in agricultural fields. Extensive use of these chemical fertilizers has an adverse effect on soil and human health. An ideal alternative to these chemical fertilizers might be to exploit the microbial potential to increase the availability of P in soil.

One of the most promising alternatives is the use of phosphate solubilizing bacteria (PSB). These bacteria 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 pelleroniana* strain N26 was isolated from an agriculture field at Western Indian Himalaya (WIH), Nainital. This bacterium was showing phosphate solubilization potential at in-vitro experiment with P solubilization index of 3.15 and solubilization efficiency of 440.14 µg/ml in NBRI-BPB medium. In field trial experiment N26 showed better plant growth promotion of *Cicer arietinum* besides improving soil fertility. Thus N26 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 N26 promote the growth of chickpea in absence of chemical fertilizers.
2. Besides solubilizing phosphate, N26 increases seed germination percentage of *Cicer arietinum* and also fix atmospheric nitrogen.
3. Once applied, N26 remain active in soil for 60 days. Thus repeated inoculation is not required which save money and labor input.
4. N26 is a cold adapted bacteria and can be used as phosphatic biofertilizer in cold climatic agro-ecosystem.
5. N26 can be used as phosphatic biofertilizer for organic farming.
6. N26 can be produced conveniently in large scale using inexpensive routine culture medium.
7. N26 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 in low temperature (-80°C) forever.
9. N26 is non pathogenic to the plants and animals. No disease is reported to be caused by this bacterium in plants and animals till date.
10. N26 reduces the use of chemical fertilizers besides improving plant productivity and soil health.