MASS MULTIPLICATION OF CYANOBACTERIAL BIOINOCULANTS

Cyanobacteria play an important role in enriching soil fertility and consequently increasing the yield of the field crops. They have a unique potential to enhance productivity by fixing atmospheric nitrogenin in a variety of agricultural and ecological conditions. Now a days, these nitrogen fixers are technically used as biofertilizer. Biofertilizer being essential components of organic farming play vital role in maintaining the fertility and sustainability of the soil.

Biofertilizer production technology

In general, there are four methods of mass production of bioinoculants (a) trough or tank method, (b) pit method, (c) field method and (d) nursery cum algal production method. The former two methods are essentially for individual farmers and latter two are for bulk production on a commercial scale.

Trough or tank method

i. Preparation of shallow trays (2mx1mx23 cm) of galvanised iron sheet or permanent tank.The size of the tank can be increased if more material is to be produced. ii. Spreading of 4 to 5kg of river soil and mixing well with 100g of superphosphate and 2g Sodium molybdate. iii. 5 to 15cm of water poured in the trays. This will depend upon local conditions i.e. rate of evaporation. Then ingredients were mixed properly. iv. In order to avoid the nuisance of mosquitoes and insects 10 to 15g Furadan granules or Malathion, or any other suitable granules was added. v. The mixture of soil and water was allowed to settle for 8-10hours. At this time, 200 to 250g mother culture of blue green algae was added to the surface of water without disturbing the water. vi. The reaction of the soil should be neutral. If the soil is acidic then CaCO3 was added in order to bring the pH of the soil to neutral. vii. If sunlight and temperature are normal then within 10-15 days the growth of the blue green algae will look hard flakes on the surface of the water/soil. Similarly, water level will be reduced due to evaporation. viii.This way water in the tray/pit is allowed to evaporate and the growth of the algae flakes is allowed to dry ix. If soil is dried the algal growth is separated from soil. These pieces of algal growth are collected and stored in plastic bags. In this way from one sq.m.tray or/pit about half tonnes kg

blue green algal growth is obtained. x. Again water was added to trays and stared the soil well. Then allow the algae to grow in this way. This time it is not necessary to add mother culture of algae or superphosphate. In this manner one can harvest growth of algae 2-3 times.

Pit method

This method of production of blue green algae does not differ from the one described above i.e. trough method. Instead of troughs or tanks pits are dug in the ground and layered with thick polythene sheet to hold the water or one half cement plastered tanks. Other procedure is the same as in the trough method. This method is easy and less expensive to operate by small farmers.

Field method

The field scale production of blue green algae is really a scaled up operation of trough method to produce the material on a commercial scale. i. First the area in the field for algal production was demarcated. The suggested area is 40m2 . No special preparation is necessary although algal production is envisaged immediately after crop harvest, the stubble is to be removed and if the soil is loamy it should be well puddle to facilitate water logging conditions. ii. The area is covered with water to a depth of 2.5cm. In trough or pit methods flooding is done only in the beginning, while in field scale method flooding is repeatedly needed to keep the water standing. iii. Then superphosphate 12kg/40m2was applied. iv. To control the insect-pests attack, carbofuran (3% granules) or Furadan 250g 40m2 is applied. v. If the field has received previously algal application for at least two consecutive cropping seasons no fresh algal application is required. Otherwise the composite algal culture of 5kg/40m2 .is applied. vi. In clayey soils, good growth of algae takes place in about two weeks in clear, sunny weather, while in loamy soils it takes three to four weeks. vii. Once the algae have grown and formed floating mats they are allowed to dry in the sun in the field and the dried algal flake, are then collected in sunny bags for further use. viii.One can continually harvest algal growth from the same area by reflooding the plot and applying super phosphate and pesticides. In such situations an addition of algal inoculums for subsequent production is not necessary. ix. During summer months (April-June), the average yield of algae per harvest ranges from 16- 30kg/40m2 .

Nursery production

Farmers can produce algae along with seedlings in their nurseries. If 320m2 of land are allotted to prepare a nursery, an additional 40m2 alongside can be prepared for algal production as described above. By the time rice seedlings are ready for transplantation about 15-20kg of algal material will be available. This much quantity of algal mass will be sufficient to inoculate one and half hectares of area. If every farmer produces the algal material required to inoculate his own land then he will reduce the cost of algal inoculums required to be purchased. So also one can cut the cost of chemical fertilizers to be applied as recommended. Methods of Application of BGA Biofertilizer One packet (500 g) of ready to use multani mitti based BGA biofertilizer is recommended for one acre of rice growing area. The packet is opened and mixed with 4 kg dried and sieved farm soil. The mixture is broadcast on standing water 3-6 days after transplantation. Use of excess algal material is not harmful; instead it accelerates the multiplication and establishment in the field. The field should be kept waterlogged for about 10-12 days after inoculation to allow good growth of BGA. When nitrogenous fertilizers are used, reduce the dose by one-third and supplement with BGA. Normal pest control measures and other management practices do not interfere with the establishment and activity of BGA in the field. Apply BGA for at least four consecutive seasons to have cumulative effect. One may not need to apply BGA further as these will establish in the field and reappear as and when the condition becomes favourable. Precautions: When fertilizer or pesticides (e.g. weedicides.) are applied in the field; the algal application should be followed after a gap of 3-4 days. Application of a small dose of phosphate fertilizer after BGA inoculation accelerates BGA multiplication. However, this quantity should be considered in the total application dose for rice corp.

References

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