

**BIO- FERTILIZER- KEY TO SUSTAINABLE AGRICULTURE IN MP****\*Dr. Mukesh Kumar Napit**Department of Zoology, Govt. Dr. Shyama Prasad Mukherjee Science and Commerce P.G. College (Old Benazeer)  
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**ABSTRACT**

The Bundelkhand region of north India is encompassed by two states, i.e., M.P. and U.P. Its greater part falls in M.P. covering 5 district viz, Damoh, Sagar, Chhatarpur, Tikamgarh and Panna. Its terrain being rocky has reduced water level, and due to this, the area has much irrigation potentiality. With a view to meet this demand of the region M.P. state irrigation department is giving greater importance to the development of irrigation projects in Bundelkhand region. Accordingly, many major, medium and minor irrigation reservoirs are constructed. Indiscriminate use of synthetic fertilizers has led to the pollution and contamination of the soil, has polluted water basins, destroyed microorganisms and making the crop more prone to diseases and reduced soil fertility. Bio fertilizers are one of the best modern tools and a gift of our modern agricultural science Bio- fertilizers are applied in the agricultural field as a replacement to our conventional fertilizes. In MP the availability and affordability of fossil fuel based chemical fertilizers at the farm level have been ensured only through imports and subsidies. Today bio-fertilizers have emerged as highly potent alternative to chemical fertilizers due to their eco-friendly, easy to apply, non toxic and cost effective also they make nutrients that are naturally abundant in soil and atmosphere, usable for plants and act as supplements to agrochemicals This paper underline achievements/disappointments issues in Indian context and for its future in India emphasizes the need for high degree of Innovation and active participation in scientific research and development, public awareness programme to enhance the extra potential of sustainable agriculture.

**KEYWORDS:** Bio-fertilizers, Organic farming, Crop growth, Sustainability.**INTRODUCTION**

Bio-Fertilizers means biologically active products or microbial inoculants, containing living cells or latent cells of efficient strains of microorganisms and help crop plants uptake nutrients by their interaction in the rhizosphere when applied through seed or soil. Use of bio-fertilizers is one of the most important components of integrated nutrient management, as they are cost effective and renewable source of plant nutrient to supplement the chemical fertilizers for sustainable agriculture. Conventional fertilizers contain compost and green manure. Those are not as effective as chemical fertilizers. So farmers often try to use chemical fertilizer in the field for crop development but obviously the chemical fertilizers are not environment friendly, they are responsible for various types of pollution and can spread cancer causing agents. Moreover, they may destroy the fertility of the soil in long run. Scientists have developed bio-fertilizers to prevent pollution and to make this world healthy in a natural way. Bio-fertilizer contains microorganisms which promote the adequate supply of nutrients to host plants and ensure the proper growth and regulation of their physiology. Only those microorganisms are used which have specific functions

to enhance plant growth and reproduction. Several microorganisms and their association with crop plants are being exploited in the production of bio fertilizers. They can be grouped in different ways, based on their function as-  $N_2$ -fixing, P solubilizing and P- mobilizing bio-fertilizers etc. The role and importance of bio-fertilizers in sustainable crop production has been reviewed but the progress in the field of production remained always below satisfaction in our country, because of various constraints.

**NEED OF BIO-FERTILIZERS**

At Present, one of the new challenges of the new millennium is to obtain more and more agricultural food production from shrinking per capita arable land. Demand is much higher than the availability. It is estimated that by 2020, to achieve the targeted production of food grain the requirement of nutrient and availability will be deficit of about 4.7% Bio-fertilizers have important and long term environmental implication, negating the adverse effects of chemicals Depleting feed stock and increasing cost of fertilizers, is becoming unaffordable by small and marginal farmers, depleting soil fertility due to widening gap between nutrient

removal and supplies, glowing concern about environmental hazards, increasing threat to sustainable agriculture, Besides these facts the long term use of bio-fertilizers is economical, eco-friendly, more efficient productive and accessible to marginal and small farms over chemical fertilizers. Bio-fertilizers production is always demand driven, creation of demand among farmers is one of the most important steps required towards promotion of bio-fertilizers Bio-fertilizer. Can act as renewable supplement to chemical fertilizer and organic manures. They have the capacity to produce natural resistance in plants against pest and soil borne diseases, because antibodies are produced and beneficial micro-organisms participate in the soil to increase fertility. Bio-fertilizers require organic manures after being added to soil for their growth and development, as well as for their activity in soil.

### EFFECT OF AGROCHEMICALS

All modern agricultural practices widely carry on a very different heavy range of agrochemicals including different types of organic and inorganic fertilizers. They washed off from land along with water through irrigation, rain fall drainage, reaching in to various water bodies, where they turn fully to our natural ecosystem, then effect human life in direct or indirect ways.

- (i) Vegetables grown in  $\text{NO}_3$  rich soil may lead to anemia, diseases which lead to various ailments as damage to respiratory and vascular system and even concern.
- (ii) Increasing cancer about environmental hazards.
- (iii) Fertilizers containing  $\text{NO}_3$ , increase the total crop yield but at the expense of proteins, which leads to malnutrition.

(iv) Use of chemical fertilizer imbalances the whole mineral pattern of plant body viz excessive potassium (K) treatment decreased Voluble nutrients in food like ascorbic acid and carotene.

Unavailability of suitable carrier resources constraint, lack of awareness of farmers and quality assurance, faulty inoculation techniques, are few environmental limitation for the application of bio-fertilizer.

### EXPERIMENTAL OBSERVATION

A comparative study has been done to investigate the effect of chemical and bio-fertilizers growth and yield production. Rice was on planted in a pot containing day soil and watered and maintaining regularly over three months period. The study was conducted to assess the potential of bio-fertilizers as viable alternatives to chemical fertilizers. It was discovered that treatment with bio-fertilizers produced plant height with the highest yield of crop. Plants treated with chemical fertilizers produced lowest yield and lowest plant height compared to bio-fertilizer treatment. Maximum plant height 920 cm in 100 days and increase percentage yield approximately 15% over the control with bio-fertilizers treated plants. Chemical fertilizer treated plants was recorded 86.2 cm in the same time period and increase field percentage 8% over the control. The uptake or accumulation of the macronutrients like N,P,K is the direct reflection of the rice field production. The bio-fertilizers were better than chemical fertilizers in terms of increasing the number of N-fixing bacteria's.

**Table – 1: Comparative chart of chemical and bio- fertilizers.**

Treatment	Weight of grains [500]	Percentage yield	Increase percentage yield
Without treatment	8.230	100	00
Chemical fertilizer	9.420	107.91	7.91
Bio-fertilizer	10.235	114.56	14.50

### RESULT AND DISCUSSION

Results indicate that microbial population of soil can be increased by organic matter and their effectiveness can be increased by inoculation with bio-fertilizers. The grain qualities of all plants were less than chemical treated pots, due to early harvesting of plants before they reach maturity. However plants treated with bio-fertilizer had the highest percentage grain yield. Possibility due to the earliest grain development  $\text{N}_2$  seem to be an important factor for growth of plants as indicated in the experiment. It could also due to bio-fertilizers having highest,  $\text{N}_2$ - fixation, compared to chemical fertilizers.

Bio-fertilizers contain one or more beneficial bacteria or fungal stains in easy to use and economical carrier material which add, conceive and mobilize crop nutrient in soil. In other word when bio-fertilizers applied to seed, plant surface or soil, colonizes the rhizosphere or interior of the plant and promotes growth by increasing the

availability of primary nutrients to the host plant, Organic fertilizers contain organic compounds which directly or y them decay increase soil fertility.

### CONCLUSION

Bio-fertilizers production is always demand driven, creation of demand among farmers is one of the most important steps required towards promotion of bio-fertilizers Organic farming has emerged as an important priority area globally in view of the growing demand for safe and healthy food and long term sustainability and concerns on environment pollution associated with indiscriminate use of agrochemicals. Bio-fertilizers being essential components of organic farming play vital role in maintaining long term soil fertility and sustainability by atmospheric nitrogen, mobilizing fixed and micro nutrients or convert insoluble phosphorus in soil in to forms available to plants, there by increasing than efficiency and availability. In this context, bio- fertilizers

would be the viable option for farmers to increase productivity per unit area and fertility of soil in Indian Agriculture.

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