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PRODUCTION AND UTILIZATION OF BLUE GREEN ALGAE IN RICE CULTIVATION

***Sanjana Singh, Ashok Singh, Avshesh Kumar and Rajkumar Yadav**

Department of Botany, T.D.P.G.College, Jaunpur Affliated to VBSP University, Jaunpur.

***Corresponding Author: Sanjana Singh**
Department of Botany, T.D.P.G.College, Jaunpur Affliated to VBSP University, Jaunpur.

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ABSTRACT

Blue-green algae (BGA) find highly favorable habitats in the moist conditions of paddy fields and provide cheap nitrogen for plants. It also increases crop yields by making the soil vibrant, fertile and productive.Pot experiments of rice seedlings with application of blue green algae were conducted in lab conditions.four sets of pots were established in lab and treated by BGA After application of BGA the grain and straw content were increased in comparison with control pot.

KEYWORDS: BGA (Blue Green Algae), Rice, Biofertiolzer etc.

INTRODUCTION

Biofertilizers are low-cost, renewable and non-polluting raw materials that utilize natural processes such as biological nitrogen fixation, solubilization of insoluble phosphorus, and decomposition to increase crop availability. Blue-green algae (BGA) find highly favorable habitats in the moist conditions of paddy fields and provide cheap nitrogen for plants. It also increases crop yields by making the soil vibrant, fertile and productive. His BGA biofertilizer for rice, commonly known as 'algalification', helps build green agro-ecosystems that ensure the economics of rice farming while saving on energy-intensive inputs. Rice (Oryza sativa L.) is one of the first leading ancient (3,000B.C.) cultivated crops of the world. On the other hand, the diet of the world's population is changing rapidly, and rice production is also increasing significantly around the world.

In this context, high-yielding, fertilizer-responsive rice varieties and improved cultivation methods have been introduced into the country. Farmers in India have started using not only conventional fertilizers but also good varieties of rice to increase production. Among the chemical fertilizers, nitrogen fertilizer is mainly used, and the application amount is 50 to 80 kg/ha (agricultural dosage) for rice. The agronomic potential of BGA in rice cultivation was recognized by De in 1938, who attributed the natural fertility of tropical paddy fields to nitrogen-fixing BGA. Cyanobacteria are photosynthetic, nitrogen-fixing, autotrophic, and produce growth-promoting substances such as hormones, vitamins, amino acids, and organic acids (Wilson, 2006). Cyanobacteria contribute significantly to the biogeochemical cycles of carbon, nitrogen and oxygen (Karl D. et. al., 2002 and De Ruyter et. al., 2008). Nitrogen fixation by algae to maintain paddy field fertility was recognized by De in 1938 (De P K, 1939). The use of cyanobacteria has been reported to have beneficial effects on barley, oats, tomatoes, radishes, cotton, sugarcane, maize, chili peppers, and lettuce (Thajuddin et al., 2005). Modern green technologies through the use of biofertilizers such as cyanobacteria, fungi and bacteria that produce plant growth-promoting rhizobia (PGPR) have the potential to improve and restore soil fertility and ensure sustainable agricultural production. there is. Prasanna et al. al (2012) reported that soil inoculation with cyanobacteria increased rice yield by 19% and increased nitrogen fixation. Additionally, these microbes can reduce the use of inorganic fertilizers and mitigate stressed agroecosystems and wastelands (Pathak and Sinha et.al, 2018). Several studies have shown that cyanobacterial vaccination has a positive effect on rice production. Saadatnia and Riahi (2009) reported that inoculation with cyanobacteria increased rice growth and improved soil properties in pot experiments. Cyanobacteria-based biofertilizer technology can be an effective tool to improve soil fertility and increase rice yield.

MATERIALS AND METHODS

The experiment was conducted in the rice pots in department of Botany T.D.P.G.College Jaunpur,U.P., in the year 2022. The treatments were conducted in 4 sets with each of 4 replicates over the control replica. Basmati 370 was used in this pot experiment.It matures in about 140 days. Its average yield is about 16 quintal

of paddy per acre. Basmati 370 – This variety is about 165 cm tall, photo period sensitive and lodge under high fertility conditions. It does best on average fertility soils.. Soil based BGA fertilizer containing the species of *Nostoc Anabaena, and Aulosira* was taken from the rice field of jaunpur and was identified in the lab of Botany Department of Tilakdhari College Jaunpur. The fertilizers were applied in pots having rice seedlings. After the growth of rice plant, the rice yield and yield parameters were recorded. The data were analyzed by using statistical methods.the parameters in this experiment were- Temp (0C)Moisture (%),W.H.C. (%),pH, OrganicCarbon (%),Organic matter (%),Total Nitrogen(%),C:N and E.C. (dsm-1).

RESULTS AND DISSCUSSION

The highest value of grain yield, straw yield and yield parameters was obtained in the treatment containing reduced dose of NPK with BGA (Table 2). In this condition, the grain yield was increased by 19%. However, the straw yield was recorded 20.1% over the control. The plant height, panicles/hill, spikes /panicle, number of grains/panicles were found maximum in the above treatments. In all treatments inoculated with BGA with low dose of NPK, there was significant increase in all parameters of yield over the control.Table 2 significantly show that the treated pots were high NPK than the control pots.controls pots have low amount of nitrogen content and the yield was low in control replica but after add of BGA, the yield was high in treated pots due to the activity of blue green algae.however the straw content in treated pots was high in comparison to control but the grain yield was also in high amount in treated pots comparison to control pots. In treatment of 3 precent increase was highest in comparison to all treated pots. Overall the treated pots were high amount of grains in comparison to untreated pot.

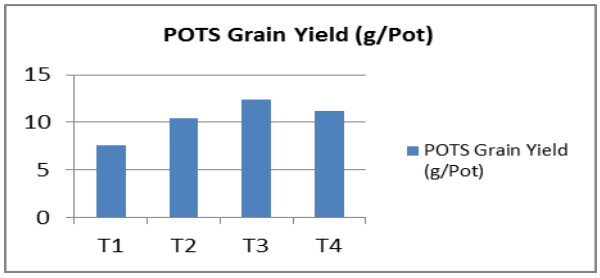
Table 1: Physic chemical properties of soil collected from the rice field of Mungrabadshahpur, Jaunpur.

S. No	Parameters	Control Soil
1	Temp (^{0}C)	37.3
2	Moisture (%)	3.4
3	W.H.C. (%)	23.4
4	pH	8.3
5	OrganicCarbon (%)	0.03
6	Organic matter (%)	0.054
7	Total Nitrogen(%)	0.003
8	C:N	10.0
9	E.C. (dsm-1)	0.83

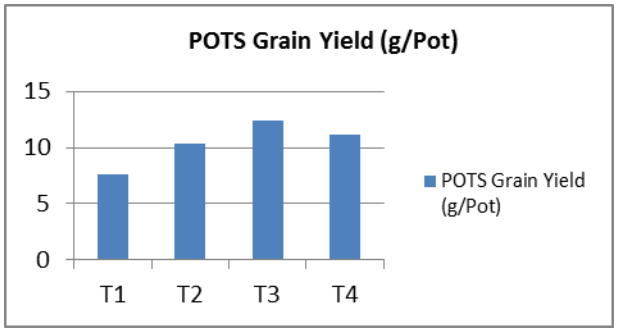
Statistically significant 5%

Table-2: Effect of biofertilizers on the yield and yield attributes of rice.

S. No	Treatments	Plant height (cm)	Panicles/Pot	Weight of500 Grains (g)	No. of Grains/Panicle	Grain Yield(g/Pot)	% Increase	Straw Yield(g/Pot)	% Increase
1	T_1	67.4	4.2	11.3	88.6	7.6	100	11.8	99
2	T_2	73.1	4.3	11.1	99.4	10.4	111.4	10.4	111
3	T_3	77.3	5.5	11.4	116.3	12.4	130.2	15.3	123
4	T_4	75.4	4.6	11.2	103.4	11.2	115.4	13.4	113



Graphical Representaion of Straw yield in treated pots



Graphical Representaion of grain yield in treated pots

CONCLUSION

On the basis of the results of this research, it is concluded that rice inoculated with BGA, increased gain yield up to 8% - 21% and straw yield up to 8.2%-19.4% respectively. So, Blue Green Algae can be used as biofertilizer to increase rice yield.

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