



INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

ANALYSIS OF BIOFERTILIZER ON CROPS IN THE KHARIF AND RABI SEASON

Dr. Rajesh Rathore¹, Nisha Kumari², Hiral Thakkar³

¹Assistant Professor, Faculty of Management Studies, Parul University, Vadodara, Gujarat

^{2,3}Students, MBA Agribusiness Management, Parul University, Vadodara, Gujarat

ABSTRACT

The majority of India's population lives in arid and semiarid regions, where precipitation is scarce, making agriculture a crucial industry. Thus, farmers have started growing pulses like chickpeas, lentils, peas, and green gram to feed people. In these areas, black gram is one of the most common crops. Yields were poor because of the lack of water and nutrients (most nutrients are inaccessible owing to strong bonding with soil particles, and most nutrients are in the air gaseous form, principally nitrogen), which were also scarce. Farmers use excessive amounts of artificial fertilizers, which boost productivity but weaken the soil and kill off the biota. Biofertilizers, such as Rhizobium strains, PSB (phosphate solubilizing bacteria), VAM (vascular arbuscular mycorrhiza), Cyanobacteria, and other microorganism fertilizers, play a crucial role in pulse crops by increasing nutrient uptake in crops through the formation of nodules in their roots, which aids in the Mineralization process and converts the unavailable form of nutrient into a usable one.

Keywords: Agriculture; Biofertilizers; fixing; pulses;

INTRODUCTION

In agriculture, biofertilizers serve an essential function as living organisms with a wide variety of microbial cells. They are entities that have been prepared with microbial strains, both alive and dormant, that may aid in the absorption of nutrients from the root rhizosphere zone and, more importantly, in the fixation of nutrients from the atmosphere. There are many types of helpful microorganisms, and they do their good works in a variety of ways (Vesey, 2020). It is possible to treat seeds with biofertilizers and then either apply them straight to the soil or combine them with organic manures before applying them to the field. Chemical fertilizers are useful because they enable us to give plants precisely the nutrients, they need without disturbing the delicate ecosystem of the soil.

While most atmospheric nutrients are in gaseous form, biofertilizers may aid in nutrient absorption by fixing them from the atmosphere. Pulse crops and biofertilizers have a symbiotic connection, with Rhizobium and other bacteria fixing anywhere from 40 to 250 kg of nitrogen per hectare each year.

Pulse crops and the use of biofertilizers

Fixation of Biological Nitrogen by Rhizobium strains that may aid in improved nodule development in a symbiotic way with host plants is crucial to the success of the pulse crop and its yield. The nodules formed by the nitrogen-fixing bacteria, mostly Rhizobium species, in the root zone of pulse crops are a potential source of the element for the plant. It's possible that certain species are only able to live on certain pulses. Thus, it may be advantageous for pulse crops to choose suitable species.

When phosphate was fixed by phosphate-solubilizing bacteria, nitrogen fixation by Rhizobium species might be helpful. In this process, phosphorus-supplying bacteria including *Aspergillus*, *Bacillus*, and *Pseudomonas* play a significant role. Bioactive compounds and organic acids produced by the microorganisms to which they belong aid in the absorption of phosphorus by plants, hence promoting plant development and increasing crop output.

These organisms are especially useful because of the phytate activity they offer to plants, which allows plants to create phosphorus via phytate mineralization. Phosphorus-Solubilizing Bacteria (PSB) is an obligatory symbiont of fungi that may aid in boosting Phosphorus absorption in plants by expanding hyphal development in the rootzone near the nutrient region.

Cereals

Cereal comes from the Latin term cereals, which refers to the Roman goddess of grain. Cereal grasses are cultivated for their edible grain, which is often rather high in starch. One of the most important types of crops grown for human consumption is cereal. In rabi, wheat and barley are the two most common grains. Most people rely on cereals as a daily source of nutrition. The grains have a carbohydrate content of 58%-72%, protein of 13%, fat of 2%-5%, and dietary fiber content of 10%-22%. In addition, they have between 310 and 350 calories per 100g of grain.

LITERATURE REVIEW

Max Webber and his hierarchical approach to bureaucratic theory in the field of task distribution came next. The idea came to an end with Mayo and his friends' work on humanitarian relations, which showed the link between workers' performance and how happy they are at work, as well as the nature of their relationships with their managers. This idea helped figure out the relationship between performance on the one hand and the way a leader leads on the other. It also reached Japanese intellectuals, who figured out the basics of total quality management and the best ways to improve it.

Quality as a way to talk about something has been used since World War II. It was first used in Japan's industry after their telecom network broke down. The Japanese business world and the American Allied forces thought that the poor quality of the Japanese phone network was the main reason why communications broke down (Benavides-Velasco et al., 2014). In response, the two tried to fix the problem by using modern ways to manage quality, such as a quality inspection.

Because of this, monitoring tasks were given only to functional and other hierarchical units, and quality inspection became a purely technical job (Year, 2007). In this way, the quality inspection was supposed to help find high-quality, acceptable products and let them through while stopping low-quality, unacceptable products. The number of products that were good enough to sell showed how good the production was (Karah et al., 2014). Products that were thought to meet requirements were thought to be good. These were the technical features that were used to define what a quality product should have.

Quality inspection had no effect on productivity because it was only about the end result or product. Green (2012) says that technical standards and norms were the most important management tools that were used as the basis for quality inspections. In Japan, Western Europe, and the U.S. after World War II, quality inspection was a big part of making sure that all industries followed the same rules. The problem with the quality inspection process, though, was that it wasn't possible to check all products for quality in the same way. People also didn't think that small sample sizes gave a true picture of all the products (Al-Zoabi, 2012). So, the quality was wrong because the quality inspection method didn't catch a lot of bad products. To fix this problem, statistical quality control was added to quality inspection. Deming, an American expert on quality, had a big impact on this change from quality inspection to statistical quality control.

Deming thought it was important to think about problems with variation and what caused it. Deming, in particular, made a distinction between mistakes that happen by chance, like when the quality of the inputs is low, and mistakes that happen over and over again (Harrington et al., 2012). As the most important tools for management, it was suggested that statistical methods, such as sampling methods, be used. During World War II, both Great Britain and the United States made a lot of weapons, which made statistical quality control more important. But statistical quality control needed special departments for inspection and focused on the final products.

The "basic needs era" was the time when the first statistical quality control systems were put in place. So, the most important thing during this time was to meet people's basic needs and goals (Ashley, 2008). This was possible because a lot of things were being made at once. The price of goods on the market was by far the most important competitive factor. In terms of quality, the most important thing producers did was make good products for as little money as possible. Controlling quality and making sure things are good were

BACKGROUND OF THE STUDY

When the soil was modified with fly ash at 10 t/ha, Nitrogen fertilizer at 90 kg/ha, and biofertilizer BGA at 12.5 kg/ha, the rice crop (Saury 52) showed the greatest growth response and mineral composition, as reported by Tripathi et al. (2018). From their research in 2018, Dhar et al. also emphasized that using chemical fertilizers in conjunction with newly developed biofertilizers like those based on Multani mite and wheat straw is beneficial for increasing rice crop productivity, decreasing the need for chemical fertilizers, and maintaining soil fertility.

Cause and effect of biofertilizers on maize

Maize, sometimes known as maize (Zea mays L.), is a staple grain crop grown in many parts of the globe. Both people and animals may benefit greatly from the food's high nutrient content. These are samples of a small number of studies exploring maize's reaction to biofertilizers.

Use of the biofertilizer *Az spirillum Brasiliense* or the commercial biofertilizer 'cereal in' with half the quantity of N (144 kg N/ha) resulted in a considerable improvement in maize production, according to the research of Monme et al. (2021). Cereal in's increased net benefit, B:C, and marginal rate of return compared well to other N fertilizers, providing conclusive proof that biofertilizers may reduce N fertilizer consumption in maize by half. researchers Wu et al., 2005 found that using biofertilizers (with *Glomus mossier* or *Glomus intraradical* + *Azotobacter cerococcid*, *Bacillus megaterium*, and *Bacillus mucilaginous*) dramatically increased maize growth.

Results from their research also showed that applying biofertilizer at a rate 50% lower than that of organic or chemical fertilizers yielded comparable results. Soil parameters including organic matter content and total N were also shown to be enhanced after being treated with microbial inoculums. Jilani et al. (2017) performed an experiment showing that the same amount of maize could be grown with half the usual dosage of NP fertilizer in combination with Biopower + Bacterial Potassium Fertilizer (BPF) / EM (effective microorganisms). When manufacturing costs were lowered as a consequence, net profits went up.

RESEARCH METHODOLOGY

METHODS FOR DATA COLLECTION & VARIABLES OF THE STUDY

Methods for data collection

Primary Data

Secondary Data

Primary Data

The primary source of data was collected by questionnaire.

Secondary Data

- Secondary source of data was collected from
- Books
- Journals
- Magazines
- Web's big data es

Sampling

The sample technique utilized for data gathering is convenient sampling. The convenience sampling method is a non-probability strategy.

Sampling size

Big data indicates the numbers of people to be surveyed. Though large samples give more reliable results than small samples but due to constraint of time and money,

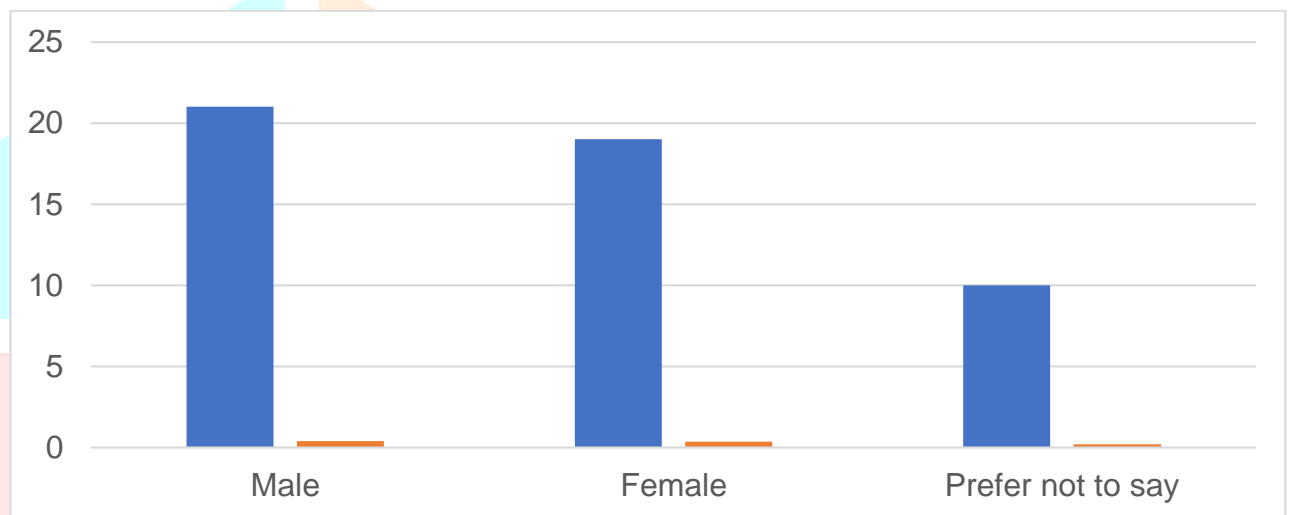
Plan of analysis

- Diagrammatic representation through graphs and charts
- Big data able inferences will be made after applying necessary statistical tools.
- Findings & suggestions will be given to make the study more useful.

DATA ANALYSIS

1. Gender

Category	Respondents	Percentage
Male	42	42%
Female	38	38%
Prefer not to say	20	20%

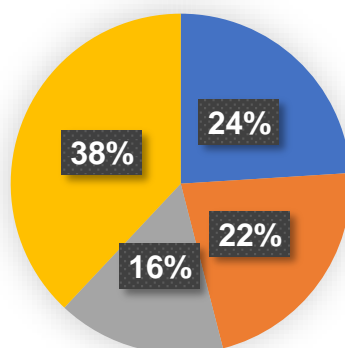


Interpretation:

Men and women make up 42% and 38% of the 50 respondents used to construct the aforementioned bar chart, respectively; the remaining 10% did not choose to disclose their sex.

2. Age

Category	Respondents	Percentage
15 -18 years old	24	24%
19 - 28 years old	21	21%
29 - 39 years old	17	17%
Above 40 years	38	38%



Interpretation:

Out of a total of 50 respondents, 24% are between the ages of 15 and 18, 21% are between the ages of 19 and 28, and 17% are between the ages of 29 and 39; the remaining respondents are all older than 40.

CONCLUSION

The prospective biofertilizers play a significant part in preserving the productivity and sustainability of soil systems, which in turn aids in raising the crop's potential for output. It functions as a farmer-friendly, environmentally responsible, and economically advantageous input that is simple to utilize in farms for a variety of crops. The aforementioned evaluations have led us to the conclusion that biofertilizers provide a wide range of advantages. Biofertilizers are beneficial for the development of pulse crops since they are essential for fixing atmospheric nutrients in plants.

You may apply these biofertilizers straight to the soil or use them to treat seeds. Various biofertilizer strains play diverse roles in the fixation of plant nutrients. They might be beneficial for improving the development and yield characteristics of crops, namely leguminous plants. Conclusion. Chemical fertilizers should always be replaced with biofertilizers. In addition to harming the soil and its production, the chemicals are also harmful to the living things that eat the crops that are cultivated there. The utilization of microorganisms as fertilizers was thus found by the scientists.

REFERENCE

- DW Dhar, R Prasanna, & BV Singh. Results from a Comparison of Three Carrier-Based Blue Algal sustainable rice farming with biofertilizers. Magazine of Producing food in a way that doesn't destroy the environment. 2017; 30(2):41-50.
- Growth, nutrient absorption, and yield. Dileep K. Ravinder R. effects on the wheat (*Triticum aestival L.*) genome nitrogen and organic fertilizers Journal of Indian Agriculture. 2014; 51(1):37-39.
- Farmyard manure's impact, Dixit KG, Gupta BR. influences of chemical and biological fertilizers on rice production and grain quality (*Oryza sativa L.*) and the composition of the soil. Publication. There is an Indian soil science society. 2020; 48(4):773-780.
- Use of algae biofertilizers. Dubey AK, Rai AK. Anabaena doliolid and aulos *Ira fertilise tenuis* Bharadwaj) to keep northern India's rice fields fertile India. The Journal of Plant Research in Israel. 1995; 43(1):41-51.
- It was found that chick peas had better yield than (*Cicer arietinum L.*) to phosphorus and potassium fertilization. soil biofertilizers for laterite. Progress in Agronomy and Related Fields the study of soils. 2019; 55(2):147-155.
- El Habbasha, S. F.; Husain, M.; Khalafallah, M. A.; Integration result of phosphorus concentration and biofertilizers on the production and quality of faba beans (*Vicia faba L.*) the sands of a recently farmed land. Scholarly Journal of Agriculture, as well as the Biological Sciences. 2017; 3(6):966-971.
- Impact of application of biofertilizers to young corn and sunflower plants in a controlled environment cadmium tension. The Journal of Cryosphere and Soil Science Dissecting the plant. 2022; 43(1, 2):272-279.
- Chick pea production and growth in response to nitrogen fertilization: a review. seeds of *Cicer arietinum* (Common flax) with *Rhizobium* sp. Biology and physics. 2020; 8(9):232-236.