Maximizing of crop yield with the best revenue of using nitrogen fertilizer and inoculation of seed with bacteria in sustainable agricultural systems in soybean (Glycine max L.)

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Introduction

In recent years, the use of nitrogen fertilizers in crop production has been extensively reviewed. The addition of nitrogen to the soil is crucial for crop growth and yield. However, the excessive use of nitrogen fertilizers can lead to environmental problems such as water and air pollution. Therefore, it is essential to develop sustainable agricultural systems that maximize crop yield while minimizing the use of nitrogen fertilizers.

Nitrogen Fixation

Nitrogen fixation is a process by which nitrogen gas is converted into a form that can be used by plants. This process is carried out by legumes such as soybean, which can form a symbiotic relationship with Rhizobium bacteria. Rhizobium bacteria live in the root nodules of legumes and convert atmospheric nitrogen into a form that can be used by the plant.

Sustainable Agricultural Systems

Sustainable agricultural systems aim to meet the needs of the present generation without compromising the ability of future generations to meet their own needs. Sustainable agricultural systems focus on the use of resources in a way that maintains the health and productivity of the soil over the long term. This can be achieved through practices such as crop rotation, cover cropping, and the use of organic matter.

Split Plot Design

Split plot design is a statistical method used to analyze the effects of two or more factors on a response variable. In this study, a split plot design was used to evaluate the effects of nitrogen fertilization and Rhizobium inoculation on soybean yield.

Results

The results of this study showed that the use of nitrogen fertilizers and Rhizobium inoculation significantly increased soybean yield. The combination of these treatments resulted in the highest yield, followed by nitrogen fertilization alone and Rhizobium inoculation alone.

Discussion

The results of this study highlight the importance of sustainable agricultural practices in maximizing crop yield while minimizing the use of nitrogen fertilizers. By using Rhizobium bacteria to fix nitrogen, farmers can reduce their dependence on synthetic fertilizers, which can be costly and harmful to the environment.

Conclusion

In conclusion, the use of Rhizobium bacteria for nitrogen fixation in sustainable agricultural systems can significantly increase soybean yield while minimizing the use of nitrogen fertilizers. This can lead to more sustainable and environmentally friendly agricultural practices, which are essential for the long-term health and productivity of the soil.

References


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