Rhizobia: The Future Natural Fertilizer of Leguminous Plants

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Through my experience in 4-H and living on a farm, I became interested in the genetics and growth patterns of crops my family grew. I wanted to analyze the growth and fertilization of soybeans and I wanted to know if there was a way to naturally fertilize soybeans to enhance their growth and their yields. Rhizobia is a nitrogen-fixing bacterium that can be found in the root nodules of leguminous plants. The bacteria grows by forming a symbiotic relationship with the soybean root. Through this symbiotic relationship, the bacteria obtains nutrients from the soybean and produces nitrogen through a process called biological nitrogen fixation. The bacteria convert atmospheric nitrogen to ammonium nitrogen, which is the form of nitrogen available to the plant to help with growth. This symbiosis is important because it can relieve the requirements for added nitrogenous fertilizers during the growth of the leguminous crop. The purpose of my project was twofold. For my first test, I will harvest the Rhizobia bacteria and reapply it to the soil and plant soybeans that I will grow in a greenhouse. I will do this to see if the added Rhizobia would enhance the growth of the plants or even enhance the yields of the soybean plants. Second, I tested to see if I can grow the bacteria so it could be mass produced by inoculating nutrient agar with dried soybean powder to simulate the symbiotic relationship. My hypothesis is that Rhizobia will enhance the growth of the soybean plants. Furthermore, I will be able to grow the bacteria through replicating the symbiotic relationship between the bacteria and the soybean plant in the agar that I will use, In both my experiments, my predictions were correct. Rhizobia did increase growth and I did see growth of bacteria in my Petri dishes.

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