Analyzing the Nutrient Production of Teosinte and Modern Maize Through the Use of Fluorescent Biosensors
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Microbial biosensors are versatile detection tools that have a variety of applications in areas including medicine and environmental research. Green Fluorescent Protein (GFP) is frequently used for in vivo protein localization and maintains its fluorescent properties when fused to proteins of interest, allowing visualization with an epifluorescence microscope. A GFP mutant that has been altered to fluoresce red instead of green, known as Red Fluorescent Protein (RFP) biosensor, will be incorporated into Sinorhizobium meliloti. S. meliloti is a bacteria that creates a symbiotic relationship with plant roots, forming nodules to fix nitrogen. This will be introduced and grown alongside the teosinte (ancestor of corn) and modern corn roots to evaluate the phosphate uptake by the plants. Biosensors created in preliminary research will be used to compare the sensing capabilities of the ancient and modern corn lines. Our experiment will be designed to determine if teosinte or modern maize will have greater phosphorus uptake when grown in environments with a variety of phosphorus levels. Due to the increasing use of fertilizers and human selection for crop characteristics, we predict many modern maize lines have lost their ability to produce a variety of nutritional compounds.