# Effect of Exogenous L-Glutamine on Soybeans

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With the increased necessity for sustainable agriculture comes the need to understand the complex systems plants use for growth. One of these systems is the GS/GOGAT cycle, a mechanism used for ammonium assimilation. Glutamine is fundamental to this cycle. To measure the effect of glutamine on the root growth of soybeans, soybeans were grown under four different glutamine molar concentrations: 0.2, 0.4, 0.6, and 0.8. The control group was not treated with glutamine. Glutamine was added after two weeks of growth every two days. After a growth period of four weeks, the soybean plants were taken out of the soil and set out to dry for three days. The mass of the roots was collected for each plant and averaged within each concentration group. The soybeans grown with a glutamine concentration of 0.8 M had the lowest average with 0.017 grams. The soybeans grown with no glutamine had the highest average with 0.21 grams. Interestingly, root growth drastically declined from 0.4 to 0.6 M, with 0.4 M having an average root mass of 0.2 grams while 0.6 M had an average root mass of 0.03 grams. This data suggests that while glutamine is initially beneficial to soybean root growth, eventually soybeans exhibit a threshold. This could potentially be explained by glutamine increasing gene expression in genes associated with stress responses when present in higher concentrations.

**Awards Won:**