

## Identifying Metabolic Pathways Producing Alkamides in *Echinacea purpurea*

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*Echinacea purpurea* is a widely used herbal supplement that is frequently taken to relieve cold symptoms. Alkamides are a secondary metabolite found throughout the *Echinacea* genus that contain fatty acid chains incorporated into amides and are believed to be the bioactive agent in *Echinacea*. Our goal is to identify and understand the specific metabolic processes by which *E. purpurea* produces alkamides. In our experiment, *Echinacea* seedlings were grown to where the first true leaf emerged and unfurled which is when alkamide production is known to be most active. Alkamides were then extracted and taken to the GC/MS and LC/MS for analysis. Extracted alkamides were analyzed by triple-quadrupole chromatography to investigate <sup>13</sup>C labeling by glucose. Solid phase extractions were also performed to better observe fragmentation patterns. Fatty acids were also extracted to determine if fatty acids and alkamides were affected the same way by light or the lack of light, which would indicate that they are being synthesized in the same place. It was determined that neither compound experienced a synthesis decrease in the dark significant enough to support a model where acyl chains are newly created in the chloroplasts. Therefore alkamides are more likely to be made in the mitochondria. We are currently in the process of examining the spectra in order to determine the structures of the alkamides as well as any metabolic relationships.