

## **Vitamins and Minerals: A Metabolic Analysis of Coccinellidae**

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Coccinellidae (ladybird) infestation in agricultural areas and human dwellings causes crop damage as well allergic reactions in humans if bitten, respectively. This class of beetle continues to gain interest because during prolonged habitual climate change results in an increase of ladybird population. An interest in their feeding habits can be used to determine their predation. The analysis of the presence of the fat soluble vitamins and minerals in ladybirds is of interest due to their ability to produce alkaloids as a defense mechanism. Vitamins and minerals are critical coenzymes/cofactors to the function of numerous metabolic pathways and can provide evidence to the production of alkaloids. This investigation was initiated due to the limited methods of detecting alkaloids using high-performance liquid chromatography coupled with gas chromatography-mass spectrometry. Ladybird eggs were provided and stored in -20 degrees Celsius. The eggs are digested in methanol, mixed with hexane, and liquid phases are separated into separate glass containers. The methanol phase will be passed through glass-wool and rinsed twice with methanol. The rinsed samples will be analyzed in the liquid chromatograph followed by the mass spectrometer. This model of analysis will demonstrate that various vitamins and minerals along with alkaloids are present such as heterocyclic, straight-chain, and steroidal-alkaloids. This project will also show that the retention times could be reduced by varying gradient solvent of methanol and acetonitrile. The results from this investigation will provide evidence that alternative methods can be determined to identify the vitamins, minerals, and alkaloids when the ladybirds are subjected to various conditions.