

Investigating the Synergistic Effect of Hesperidin and Fisetin on *Aspergillus niger* and *Hippodamia convergens*

Yip, Natalie (School: Thousand Oaks High School)

Pesticides are used in agriculture to deter plant pests and pathogens, but are known to have a detrimental effect on the environment and ecosystem because of their ability and frequency to kill non-target organisms. *Hippodamia convergens* (Ladybugs) are an important organism in the ecosystem as they protect plants from pests, but their mortality is ever increasing due to pesticides. *Aspergillus niger* (*A. niger*) is a fungal mold that causes food spoilage and post-harvest decay and is a part of the group of pathogens that pesticides are designed to control. This study focuses on flavonoids called hesperidin and fisetin and exploring their potential as bio-pesticides. In this study, *A. niger* was individually and synergistically treated with hesperidin and fisetin, while *H. convergens* were used as the non-target organism. Using varying concentrations of hesperidin and fisetin in individual and synergistic treatments, inhibition of spore growth was measured using a hemocytometer. To determine the effects of these flavonoids on non-target organisms, similar concentrations were tested on *H. convergens*. Using an ANOVA test, it was determined that hesperidin and fisetin had a statistically significant synergistic effect at reducing spore count with a p-value < 0.05, with a linearly regressive relationship ($r^2=0.978$). Additionally, an ANOVA test was conducted showing none of the treatments demonstrated a statistically significant effect on the mortality of *H. convergens* with a p-value > 0.05. Alternative hypothesis was accepted because the synergy of hesperidin and fisetin was found to inhibit the spore growth of *A. niger* and while having no effect on *H. convergens*. These results suggest that hesperidin and fisetin may be used as potential natural alternatives to pesticides.

Awards Won:

