ABSTRACT

TITLE:	Glycosylated Monoterpenoids: Miticides to Protect Honey Bee Colonies
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PRESENTED AT:	2016 Undergraduate Research and Creative Activities Symposium, Fort Lewis College

ABSTRACT: Worldwide honey bee (Apis milifera) populations are in a state of flux, and the corresponding beekeeping profession is in economic distress. An established, primary contributor to honey bee population decline is the aptly-named, ectoparasitic mite: Varroa destructor. These mites both weaken bees' immune systems by feeding on hemolymph fluid (akin to blood), and are attributed as a vector by which viruses are transmitted between beehives. Botanically derived, naturally occurring monoterpenoids such as thymol and carvacrol (constituents of oil of thyme and oil of origanum) have recently shown promise as volatile-based acaracides against the Varroa mite. Nevertheless, efficient and selective delivery of these molecules remains a challenge. This study investigated whether glycosylated monoterpenoids could be utilized as pro-drug acaracides in honey bee hives.To this end, thymol and carvacrol were synthetically glycolsylated under phase-transfer catalysis reaction conditions with protected glucose derivatives. Bulk quantities of both molecules were produced after selective deprotection. Liberation of the pro-drug was accomplished utilizing the honey bee beta-glycosidase enzyme assay. Current efforts are focused on evaluating the acaracidal efficacy of these glycosylated monoterpenoids in bee colonies.