Ecofriendly synergists for insecticide formulations (EcoSyn)

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The world-wide use of synthetic insecticides to control insect pests has led to insecticide resistance and to environmental contamination. One possible route to reduce insecticide use without compromising control is to use a synergist in combination with insecticide. Synergists are themselves nontoxic but act by increasing the effectiveness of the insecticides they are used with. The mode of action of most synergists including the well-known compound piperonyl butoxide (PBO) is to inhibit the metabolic systems in insects that metabolise or sequester insecticide molecules. As a result they can increase the sensitivity of insecticide-susceptible insects and also delay and/or overcome metabolic resistance, a common form of resistance mediated by enhanced production of detoxifying enzymes. EcoSyn consists of a consortium of experts to optimise the use of synergists in agriculture by elucidating the relationship between synergist chemical structure and activity on a variety of target insect metabolic enzymes and efficacy to resistant and susceptible pest insects and beneficials in a laboratory and field environment. This presentation discusses *in vitro* and *in vivo* results obtained by the project and discusses optimal strategies for their deployment.