Chemical Defenses in Plants: Effect of Picecolinic Acid on Heliothis Virescens

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Why would a plant use its energy to produce secondary compounds unessential to its normal growth or reproduction? Often these chemicals deter herbivores, but not always. One way to determine their function is through feeding trials; however, there is a chance the chosen study organism may be immune to the compound being tested or that the experiment is too short to show toxic effects. In a feeding trial, picecolinic acid, a secondary plant compound, was fed to larvae of Heliothis virescens for 8 or 11 days and produced very little effect. This was unexpected because picecolinic acid is a type of non-protein amino acid, and these are known to be toxic. It is possible that picecolinic acid is metabolized or detoxified by the insect; that it is being sequestered in parts of the organism where it does no harm; or that it is simply excreted in the feces. Alternatively, the toxic effects may appear later, for example, affecting reproduction. To test these possibilities we feed Heliothis v, a diet containing 1% or 2% picecolinic acid (a concentration commonly found in plants). We measured weight gained at 8 days, time to pupation, weight of pupae, and number of eggs laid. After 8 days, the larvae and their feces were tested using gas chromatography to determine whether the picecolinic acid was sequenced, metabolized, or excreted. Results pending.