

Prospects of Monosodium Glutamate Use for Enhancement of Spinosad Toxicity Against Codling Moth Neonates

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It was demonstrated that neonates of the codling moth, *Cydia pomonella* (L.), feed on 'Red Delicious' apple leaves and successfully molt to the second instar. Next, using a non-choice bioassay, we targeted codling moth neonates feeding on apple leaves, with standard concentrations of a culinary taste enhancer, monosodium glutamate (MSG), and Success[®], which contains 22.8% spinosad as its active ingredient. The addition of 25 ppm MSG increased feeding by 20–30%. Stimulatory properties of MSG were preserved in the presence of 12.5 ppm Success, and mortality from a 12.5 ppm Success + 25 ppm MSG combination increased by factors of 3.1–1.6 compared with Success alone. In a field experiment without rain, MSG maintained its stimulatory properties for 24 h, increasing feeding by 37%. Consistently, without rain, MSG increased the toxicity of Success in the field by a factor of $\times 3.5$. However, the stimulatory properties of MSG dropped to 19% with 4.3 mm of rain, and to zero with 9.6 mm of rain. Increased Success toxicity by MSG was reduced to $\times 1.6$ with 4.3 mm of rain, and dropped to zero after 9.6 mm of rain. It is concluded that MSG seems to be a promising feeding stimulant, enhancing the toxic properties of Success which itself is a good candidate for codling moth control. However, field persistence of MSG needs to be improved, either by formulating the Success + MSG combination into some field-stable matrix, or by employing a sparingly water-soluble substance mimicking MSG's action as a feeding stimulant in codling moth neonates.

KEY WORDS: Codling moth; *Cydia pomonella*; codling moth feeding; monosodium glutamate; spinosad.

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