METHOXYFENOZIDE: EFFECTS ON DEVELOPMENT, REPRODUCTION AND SOME ENZYME SYSTEMS OF THE COTTON LEAFWORM, *SPODOPTERA LITTORALIS* (BOISD.)

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Abstract

Methoxyfenozide (RH-2485) belongs to a new group of insect growth regulators (IGR's) with bisacylhdrazine structure that mimic the action of the natural insect moulting hormone. After ingestion of fourth larval instar to methoxyfenozide, percentage pupation and adult emergence were reduced as compared to control. No egg deposition was recorded when methoxyfenozide applied at 1.2 ppm (LC_{50} = 1.19 ppm). Percentage of eggs viability (hatchability) and sterility were 26.16 and 90.21, respectively, after treatment with 0.72 ppm. Accumulation of methoxyfenozide in the subsequent larval and pupal stages, might lead to significant macromolecular abnormalities. LC_{50} of methoxyfenozide reduced protein metabolism and detoxification enzymes. Biochemical readjustment after treatment was discussed. The effect of methoxyfenozide on detoxification enzymes, esterses and alkaline phosphatase, may be useful in the management of insect populations where insecticide resistance has developed as a result of elevated enzyme activities. It could be concluded that methoxyfenozide secondary and delayed effects on the cotton leafworm are significant and could be added to its acute toxic effects, so it is suggested that methoxyfenozide is potentially potent alternative for control of *S. littoralis.*

INTRODUCTION

Methoxyfenozide (RH-2485) belongs to a new group of insect growth regulators known as bisacylhdrazines, which mimic natural insect moulting hormone, ecdysone (20 E). In a review of Dhadialla *et al.* (1998), ecdysone agonists have been reported to manifest especially lethal effects on larvae of various orders in insects, showing symptoms of hyperecdysonism. Treated larvae show induction of precocious and incomplete moulting leading to death shortly afterwards (Heller *et al.,* 1992, Smagghe *et al.,* 2001, Gore and Adamczyk, 2004). The compounds act by binding to the ecdysone receptor as does the 20 E, in cell lines from Lepidoptera (Swevers *et al.,* 2003), as well as *in vivo* in intact insects (Wing *et al.,* 1988, Smagghe *et al.,* 2001, Boudjelida *et al.,* 2005 and Wang & Tian, 2009).