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Developing Cucurbitacin a Minimum Inhibition Concentration of Meloidogyne Incognita Using a Computer-Based Model

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Abstract : Minimum inhibition concentration (MIC) is the lowest concentration of a chemical that brings about significant inhibition of target organism. The conventional method for establishing the MIC for phytonematicides is tedious. The objective of this study was to use the Curve-fitting Allelochemical Response Data (CARD) to determine the MIC for pure cucurbitacin A on Meloidogyne incognita second-stage juveniles (J2) hatch, immobility and mortality. Meloidogyne incognita eggs and freshly hatched J2 were separately exposed to a series of pure cucurbitacin A concentrations of 0.00, 0.25, 0.50, 0.75, 1.00, 1.25, 1.50, 1.75, 2.00, 2.25 and 2.50 µg.mL^{-1}for 12, 24, 48 and 72 h in an incubator set at 25 ± 2°C. Meloidogyne incognita J2 hatch, immobility and mortality counts were determined using a stereomicroscope and the significant means were subjected to the CARD model. The model exhibited density-dependent growth (DDG) patterns of J2 hatch, immobility and mortality to increasing concentrations of cucurbitacin A. The average MIC for cucurbitacin A on M. incognita J2 hatch, immobility and mortality were 2.2, 0.58 and 0.63 µg.mL^{-1}, respectively. Meloidogyne incognita J2 hatch had the highest average MIC value followed by mortality and immobility had the least. In conclusion, the CARD model was able to generate MIC for cucurbitacin A, hence it could serve as a valuable tool in the chemical-nematode bioassay studies.

Keywords : inhibition concentration, phytonematicide, sensitivity index, threshold stimulation, triterpenoids.
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