

Responses of total protein in *Meloidogyne incognita* juveniles to Nemafric-BL phytonematicide

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Introduction

Cucurbitacin phytonematicides – have lipophilic and hydrophobic properties. Nematode epicuticular layers are lipid-rich, whereas subcuticular layers are protein-rich (Fig. 1). The objective of the study was to determine the responses of total proteins in *M. incognita* J2 to increasing concentration of cucurbitacin phytonematicide.

Materials and methods

Thirty egg masses of *M. incognita* were picked using a toothpick into water in a Petri dish and torn open to release eggs, with sheath discarded. Eggs were incubated for three days at 26°C for 10 days and separated from eggs using the modified Baermann method. Approximately 1000 J2 were each exposed to 0, 2, 4, 8, 18, 32 and 64% Nemafric-BL phytonematicide, replicated three times. At 72 h after exposure, total proteins were determined using TruSpecCHNS Macro (Leo, St. Joseph, MI, USA).

Prior to subjecting the data to Statistix 10.0 software, phytonematicide concentration (x-axis) data were expressed as exponentials (20, 21, 22, 23, 24, 25 and 2) and transformed using $\log_2 2^x = x$ (1) to homogenise the variance. Normality of total proteins versus transformed phytonematicide data was assessed using the Shapiro-Wilk test, with data subjected to ANOVA and then lines of the best fit.

Results and discussion

Total protein in J2 versus increasing phytonematicide concentration exhibited negative quadratic relation ($R^2 = 0.97$), with minimum value achieved at $x = 4.9\%$ phytonematicide, beyond which there was a gradual increase in total protein. The declining curve depicted isoprenylation (breakdown of proteins to a minimum point (Fig. 2). After the minimum (4.9%), total protein gradually increased, depicting farnesylation (biosynthesis of proteins).

Conclusion

Results of the study showed that cucurbitacin phytonematicides have nematicidal properties.

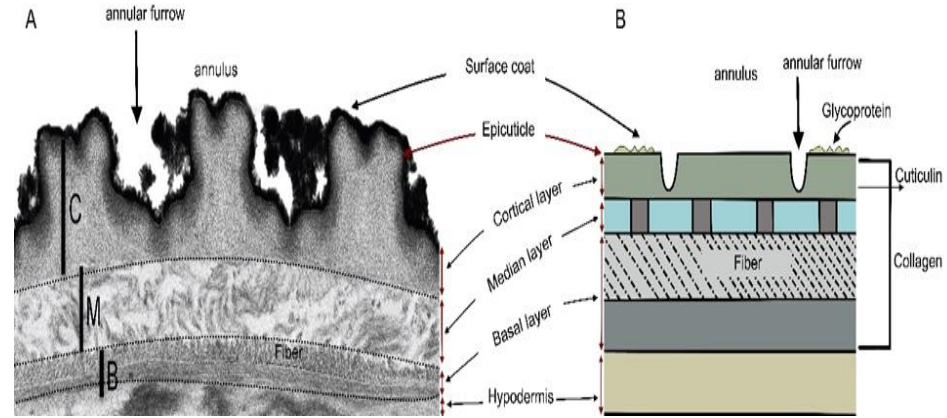


Fig. 1. Nematode cuticle being molted (A) and cuticle layers (B) (Schultz et al. 2014).

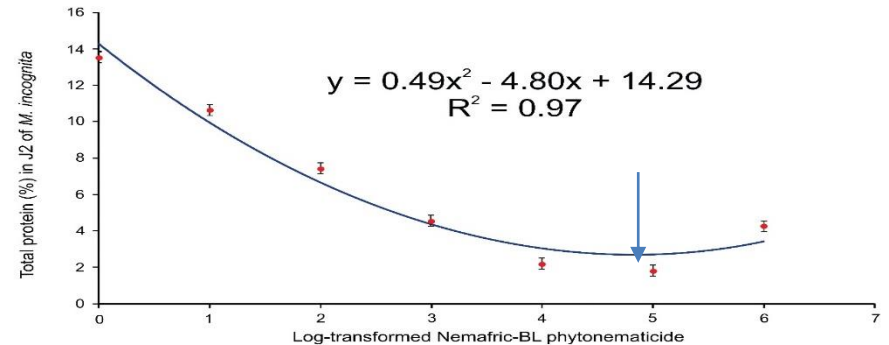


Fig. 2. Response of total protein to increasing concentration of Nemafric-BL phytonematicide.