ABSTRACT

The entomopathogenic nematodes, *Heterorhabditis* and *Steinernema* together with their associated bacteria *Photorhabdus* and *Xenorhabdus*, respectively have come about because of their biological control potentials. The distribution of the insect defense reactions could be used in biological control of the insect pests. To address some of the fundamental factors underlying the immunocompetence of the host insect *Schistocerca gregaria* following nematode infection, we tested a hypothesis that the insect immune-mediating eicosanoid pathway may be affected by the virulent action of the Egyptian nematode isolate *H. indicus* (RM_1). Haemocoelic injection of the nematode into the fifth instar nymphs of *Sc. gregaria* evoked the haemocyte microaggregation and nodulation reactions as well as increased the mortality percentages of these economically important pest. Separate treatments with specific inhibitors of the phospholipase A_2; the cyclooxygenase and the dual cyclooxygenase / lipoxygenase pathways, reduced both haemocyte microaggregation and nodulation reactions, supporting the point of view that nodule formation is a complex process involving both cyclooxygenase and lipoxygenase products. The inhibitory effects of the phospholipase A_2 inhibitor, dexamethasone, on microaggregation and nodulation were obviously apparent during the first hour of injection and these effects increased greatly over the following 24h . The dexamethasone effects were expressed in a dose-dependent manner and they were reversed by the co-injection of the nematode-injected insects with the exogenous eicosanoid-precursor polyunsaturated fatty acid, arachidonic acid (C20:4n-6). These findings strongly support the identification of microaggregation and nodulation as a specific insect cellular defense reactions that are mediated by eicosanoids. The *Sc. gregaria* nymphs contain trace levels of the eicosanoid-precursor polyunsaturated fatty acids in six different tissues as detected by mass spectrometry.

Keywords:Entomopathogenic nematodes; microaggregation; nodulation; inhibitors; eicosanoid; *Schistocerca gregaria*.

CONTENTS