

Spinochromes: Kairomones Involved in the Symbiosis between the Shrimp *Tuleariocaris holthuisi* and *Echinometra mathaei*

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Abstract : Seawater being an ideal dispersing agent, chemical communication stays predominant in marine ecosystems. However, if many molecules acting in chemical heterospecific communication have already been well described in terrestrial ecosystems, only three of these molecules were identified in marine ecosystems. Echinoderms and their symbiotic organisms constitute very good models to study heterospecific chemical communication because each class synthesizes a specific type of molecules and symbioses with echinoderms as hosts are very usual. In this study, the chemical communication that allows the commensal shrimps *Tuleariocaris holthuisi* Hipeau-Jacquotte, 1965 to live with their host *Echinometra mathaei* (Blainville, 1825) was investigated. The chemoreception of the shrimp was characterized using olfactometers and it was demonstrated that hosts and synthetic hydroxynaphthoquinones are attractive to the symbiotic shrimps. Hydroxynaphthoquinonic pigments also known as spinochromes are by the way synthesized by sea urchin and involved in all probability in a lot of mechanisms. To our knowledge, this study is the first highlighting the ecological function of naphthoquinones as kairomones. Chemical extractions were also performed on sea urchins in order to analyze and identify their specific hydroxynaphthoquinones using HPLC-ESI-MS. Accurate mass identification and elemental composition have been performed on various organs (gonads, coelomic liquid, digestive system and test) in different morphotypes of *Echinometra mathaei* for a better understanding of the molecular diversity of these semiochemicals. Moreover, some experiments were performed to investigate the dependence of *T. holthuisi* for their host. First, the analyses showed that the molecules involved in shrimp pigmentation are the same that the ones involved in *E. mathaei*, suggesting a potential feeding on the host. Secondly, a substantial shrimp depigmentation and an increase of the mortality rate were demonstrated after the symbionts-host separation which could mean a potential implication of spinochromes in the shrimp metabolism.

Keywords : crustacean, sea urchin, spinochrome, symbiosis

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