

# Abstract

Terpenoids are natural compounds, which can be found in the form of tens of thousands diverse molecules in all forms of life. Terpenoids are mostly represented in plants, microorganisms, and animals. It should not be a surprise that terpenoids are often found in insects, the most species-rich class of Metazoa. In insects terpenoids are mostly used for communication as pheromones and for chemical defence. In comparison to widespread knowledge of terpene (and terpenoid) biosynthesis in plants we lack thorough knowledge in insects.

Studies conducted in past few years showed that the ability to synthesize terpenoids has occurred independently and repeatedly in various lineages of insects. It was also found that terpene synthase genes evolved via duplication and neofunctionalization of specific genes, which were responsible for isoprenyldiphosphate synthesis. Despite these discoveries the terpenoid synthesis in insects is mostly unknown and remains to be elucidated.

This thesis aims to functionally characterize three candidate terpene synthases from the termite *Nasutitermes takasagoensis*. Expression of selected proteins was done in two bacterial systems. For the purification of recombinant proteins immobilized metal ion affinity chromatography was used. Detection of products from assays with purified protein samples was done on two-dimensional gas chromatograph coupled with mass detector. Terpene synthase activity was detected only in one of three purified protein samples. Nonetheless the practical knowledge accumulated within this thesis will help in future research of more candidate TPS coding genes in several termite species.

Key words: termites, terpene biosynthesis, isoprenoids, functional characterization, *Nasutitermes takasagoensis*

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