TAXONOMY & ECOLOGY

Beyond Classical Approaches

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DISTRIBUTION OF CUTICULAR HYDROCARBON COMPONENTS IN RELATION TO DEVELOPMENTAL STAGES AND BODY PARTS OF *EPILACHNA INDICA*

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ABSTRACT

Chemical composition of cuticular hydrocarbons of E. indica from three different development stages and five different body parts were analyzed by using high performance capillary gas chromatography-flame ionization detector (GC-FID). Hydrocarbons, made up of over 95% of the cuticular lipids peak areas, were detected with n-alkanes making up 21.05% of the total hydrocarbons extracted, ranging from n-octadecane (n-C_{18}) to n-hexatriacontane (n-C_{38}). The odd-numbered alkanes dominated the distribution of n-alkane in E. indica. n-heptacosane (C_{31}) was dominant in adult, pupae and larvae, whereby the adult showed a more complex and wider hydrocarbon pattern compared to pupae and larvae. Adult E. indica produced n-alkanes in the range of n-C_{18} to n-C_{38} while n-C_{18} was not detected in the larval and the pupal stages. DFA indicated that quantitative data from cuticular hydrocarbons of E. indica can discriminate samples into different developmental stages. The distributions of different cuticular hydrocarbons were consistent for different body parts, but varied in the amounts. A significant difference was observed in the cuticular hydrocarbon pattern of the abdomen as compared to other body parts. On the whole, the distribution of cuticular hydrocarbons in E. indica remain constant across different body parts and life stages.

Keywords: *Epilachna indica*, cuticular waxes, gas chromatography-flame ionization detector, Kota Samarahan.

INTRODUCTION

Previous study showed the compositions of cuticular hydrocarbons varied in different insect species examined (Jacob and Hanssen, 1986). The differences in the cuticular hydrocarbon composition between different groups of insects proposed that these compounds could be used in insect chemotaxonomy. Furthermore, universality of wax layers occurrence in insects make it possible for them to be used as markers for insect's identification. Recently, many studies on cuticular hydrocarbons of insects suggested that the components could be applied as taxonomic character (*e.g.* Chapman *et al.*, 1995; Takematsu and Yamaoka, 1997; Anyanwu *et al.*, 2000; Arsene *et al.*, 2002; Abdalla *et al.*, 2003).

However, their value in this context depends on the extent to which they vary phenotypically or genotypically within a species. The occurrence of variation in cuticular hydrocarbon compositions of insects was pronounced from various levels. Several studies also reported that the variation in distribution patterns of cuticular hydrocarbon occured among individuals of the same species (Chapman *et al.*, 1995; Brown *et al.*, 1998). These variations also involved the composition of cuticular hydrocarbon at different development stages and the distribution of the different components throughout the insect body.

If cuticular hydrocarbons profile can be extracted from any part of the insect body, it may be used to identify the insect species from fragments left of their body. It is the objective of this study to evaluate the composition of cuticular hydrocarbon from different development stages and different body parts of *E. indica*.