

Optimization of Headspace Solid Phase Microextraction (SPME) Technique Coupled with GC MS for Identification of Volatile Organic Compounds Released by Trogoderma Variabile

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Abstract : The warehouse beetle, *Trogoderma variabile* Ballion (Coleoptera: Dermestidae), is a major pest of packaged and processed stored products. Warehouse beetle is the common name which was given by Okumura (1972). This pest has been reported to infest 119 different commodities, and it is distributed throughout the tropical and subtropical parts of the world. Also, it is difficult to control because of the insect's ability to stay without food for long times, and it can survive for years under dry conditions and low-moisture food, and it has also developed resistance to many insecticides. The young larvae of these insects can cause damage to seeds, but older larvae prefer to feed on whole grains. The percentage of damage caused by these insects range between 30-70% in the storage. *T. variabile* is the species most responsible for causing significant damage in grain stores worldwide. *Trogoderma* spp. is a huge problem for cereal grains, and there are many countries, such as the USA, Australia, China, Kenya, Uganda and Tanzania who have specific quarantine regulations against possible importation. Also, grain stocks can be almost completely destroyed because of the massive populations the insect may develop. However, the purpose of the current research was to optimize conditions to collect volatile organic compound from *Trogoderma variabile* at different life stages by using headspace solid phase microextraction (SPME) coupled with gas chromatography-mass spectrometry (GC-MS) and flame ionization detection (FID). Using SPME technique to extract volatile from insects is an efficient, straightforward and nondestructive method. Result of the study shows that 15 insects were optimal number for larvae and adults. Selection of the number of insects depend on the height of the peak area and the number of peaks. Sixteen hours were optimized as the best extraction time for larvae and 8 hours was the optimal number of adults.

Keywords : *Trogoderma variabile*, warehouse beetle , GC-MS, Solid phase microextraction

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