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GC-MS analysis of semiochemicals produced by cowpea plant in response to herbivory attack

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Plants respond to herbivore feeding through increased biosynthesis and emission of volatile compounds that act as attractants for natural enemies such as parasitoids or predators which serve as a means of indirect defense against herbivores. For emitted volatiles to effectively act as a signal for natural enemies, the emitted volatiles should be specific for prey and must be distinguishable from intact plants odor. Plants emit different blend of volatiles in respond to different herbivore attack. Chemical composition of the emitted volatiles are variable but are usually dominated by isoprenoids, lipoxygenase-derived volatiles and aromatics. Mass spectrometry to be continuously preferred technique for structure elucidation, due to the higher degree of sensitivity that can be achieved by the use of this technique. Cowpea is an important food legume in Africa because of its cheap source of protein. The plant however, is attacked from seedling to podding stage by insect pest causing yield losses up to 80%. Exploring the use of natural enemy could help protect the plant and increase yield. To investigate the volatiles been produced by cowpea plant in responds to different herbivory attack, the plants were challenged with Aphis craccivora, Myzus persicae and Latio vivida. The response signals were analyzed using a Gas Chromatography and coupled Gas Chromatography-Mass Spectrometer (GCMS) and chemical structure confirmed by co-eluting authentic compound with plant volatiles. The plant responded differently to the three modes of feeding. Compounds produced were dominated by terpenoids, green leaf volatiles (GLV) and an aromatic compound indole.

Biography

Jonathan Osei-Owusu is currently pursuing PhD in Organic Chemistry at the Department of Chemistry, Kwame Nkrumah University of Science and Technology (KNUST), Ghana and working under the supervision of Dr. Tony Hooper of Rothamsted Research, UK and Dr. Samuel Acquaah of KNUST, Ghana. His research area of interest is the structure elucidation of semiochemicals produced by plant using Mass spectrometry techniques. He has worked as a visiting worker at Rothamsted Research, UK where he was involved in structure elucidation of some semiochemicals.

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