

## **Characterization of the Volatile Organic Compounds of Traditional Maize Accessions present in Sri Lanka using GC-MS**

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Chemical communication plays a crucial role in insect life as it enables them to recognize and respond to environmental stimuli. Volatile organic compounds (VOCs) released by plants mediate, conveying information about a plant's growth stage, health, and presence of predators or prey. Fall armyworm (FAW), a destructive pest that feeds on corn plants, uses plant VOCs to find suitable hosts for feeding and reproduction. Traditional pest control methods have limited effectiveness against FAW, making it crucial to explore alternative strategies, such as semiochemical-based approaches that use chemicals that mimic natural communication signals. This study aimed to identify the VOCs released from six traditional maize accessions with commercial variety Bhadra to identify potential semiochemicals for use in FAW management. Four of them (SEU02, SEU16, SEU14, and SEU15) were susceptible to FAW, while two (SEU18 and SEU21) were moderately resistant. VOCs were extracted from the plants in the vegetative stage using two methods: solvent-assisted extraction and dynamic headspace sampling. The extracted VOCs were analyzed using gas chromatography-mass spectrometry (GCMS). The analysis identified several hydrocarbons, esters, aldehydes and alcohols. SEU18 and SEU21 had particularly high levels of specific compounds, such as 9-eicosene, (E)-, hexadecen-1-ol, trans-9-, 3-octadecene, (E)-, 3-tetradecene, (Z)-1 -nonadecene, hexacosane and 1-docosene. Whereas, SEU02, SEU06, SEU14 and SEU15 showed high concentrations of 3-hexen-1-ol, acetate, (Z)-, hexanal, 5,5-dimethyl-, -myrcene, phthalic acid, butyl-2-pentyl ester, 1-hexanol, 2-ethyl, decanal, methyl salicylate, decane, heneicosane, 9,12,15-octadecatrienoic acid, (Z,Z,Z)-, octacosanol, hentriacontane, phytol and n-hexadecanoic acid. Principal component analysis showed that SEU18 and SEU21 were separately clustered in factorial space, consistent with their previously observed resistance to FAW. Identified VOCs can be further investigated for their potential use in GC/Electroantennography (EAD) detection and behavioural bioassays to assess their effect on FAW antennae response and oviposition. In conclusion, the current study provides new insights into the VOCs profiles of traditional maize accessions and highlights the potential use of semiochemicals for FAW management.

**Keywords:** Fall armyworm, Maize, Traditional accessions, Volatile organic compounds