Identification of Volatiles Produced by Agrobacterium

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Volatile organic compounds exist as a gaseous form and serve important functions for an organism. In the past, extensive efforts have been placed on the volatiles produced by plants. Interestingly, recent studies have shown that some bacteria also produce the hormone-like volatiles that are important for inter or intra organismic communication. However, to date, no information exists concerning production of volatiles by Agrobacterium species, a group of plant pathogens that are widely used as plant biotechnological tool. In this study, standard growth conditions to cultivate Agrobacterium isolates for production of volatile compounds were established. Four different Agrobacterium strains were cultivated in YEB liquid medium for volatiles collection using a Solid Phase Microextraction (SPME) needle. Subsequently, the collected volatiles were analyzed by Gas Chromatography Mass Spectrometry (GC-MS). For each specific peak on GC-MS profile, the information regarding its corresponding chemical were obtained by comparing its retention time and mass spectrum of the chemical in the NIST library. Its relative abundance was also calculated based on its peak area. Two major volatiles, hexadecanoic acid and methyl (7E)-7-hexadecenoate, were produced by two A. tumefaciens strains and one A. rhizogenes strain. Interestingly, one A. tumefaciens strain does not produce any of these volatiles. In summary, this study provides the first and compelling evidence showing that Agrobacterium species can produce an enormous amount of volatile compounds. The findings from this study also provide insights into the delicate interactions between this important bacterial organism and its plant host.

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