Abstract

Bacterial Species Associated with Parsley (*Petroselinum crispum*) and Other Herbal Plants and their Interactions with Plants.

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It was observed that parsley plants have a wide spectrum of bacterial endophytes, which were identified based on their 16S rDNA sequences. Other herbal plants such as cress and rocket are also analyzed to compare their endophytic bacterial content with parsley. Endophytic bacteria were also found in these herbs but to a much less extent. Therefore parsley and its associated endophytic bacteria studied further to understand what is special about parsley and why so many endophytic bacteria were attracted to it.

To determine if there is a selectivity of these bacterial species towards parsley, a novel chemotaxis assay was used. Three bacterial species *Bacillus aryabhattai*, *Pseudomonas viridiflava* and *Pseudomonas fulva* isolated from parsley plants were tested by this assay. Surprisingly, *B. aryabhattai* showed positive chemotaxis towards the unwounded parsley exudates but less towards the wounded leaf exudates. On the other hand, *P. viridiflava* and *P. fulva* bacterial species showed no chemotaxis to the exudates from unwounded parsley plants but had a positive chemotaxis towards the exudates from the wounded parsley leaves.

To understand the chemical bases of the attraction to the leaf exudates of these herbal plants, three major secondary metabolites produced by plants acetosyringon, apiole and myrcene were tested. *B. aryabhattai* was highly attracted to apiole and myrcene but was not attracted to acetosyringon. The opposite of this was observed with *P. viridiflava* and *P. fulva* bacterial species in that they were only attracted to acetosyringon but not to apiole and myrcene.

Future work on the perception of parsley major volatiles by *B. aryabhattai* could allow the identification of microbial receptors responsible for chemotaxis, elucidate how these bacteria colonizes to parsley and show the role of these major volatiles in plant-microbe interactions.