

Chemotaxonomic Classification of Pigmented Microbes in Soil Using Resonance Raman Spectroscopy

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Soil habitats consist of a significant number of microbes that cannot be cultivated by conventional means thereby posing obvious difficulties in their identification. This necessitates the need for advanced and culture free techniques for the identification and classification of soil microbes.

In recent years, vibrational spectroscopic techniques such as conventional Raman, resonance Raman and SERS have been applied to address multiple aspects associated with microbes¹⁻². Resonance Raman spectroscopy can be used to probe specific bio-molecular profiles of the soil microbes that are already cultivable and potentially be of help for the identification and classification of non-cultivable microbes in soil based on comparison to these profiles.

Soil microbes having carotenoids as pigments will be the main focus of this study favouring resonance Raman specificity towards carotenoids. Soil microbes with different pigments belonging to the genera *Micrococcus*, *Deinococcus* and *Kocuria* will be probed and classified mainly based on their pigment profile along with the overall biomolecule profile. In addition, the photo protective response of these microbes to UV-A radiation will be analysed pertaining to the fact that carotenoids play a vital role in protecting them from daily exposure to different doses of radiation from the sun³⁻⁴. This differential photo protective response will also be considered as a potential chemotaxonomic marker.

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