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## Infrared spectroscopy combined with imaging modalities is a new technique to understand the disease pathology

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Development of modern infrared spectroscopy has a wide range of biological applications. Initially, it was extensively used for protein secondary structure analysis as well as nucleotides, lipids and carbohydrates. Now with time, it extended to biodiagnostic tools such as cells, tissues and bio-fluids. Infrared imaging can be used to discriminate between healthy and diseased one. IR microscope equipped with FPA (focal plane array) detector able to scan the larger area with quick time and that helps to measure the cells as well as tissue (histopathology). An IR synchrotron light source connected with IR microscope further enhances the spatial resolution at diffraction limit. The use of this method of infrared spectroscopy in disease pathology with two examples (breast cancer and multiple sclerosis) will be presented in this study. The spectroscopic imaging data on breast cancer and multiple sclerosis samples were acquired in transmission on deparaffined 3-5  $\mu\text{m}$  thick tissue slices deposited on 40 $\times$ 26 mm<sup>2</sup> BaF<sub>2</sub> slides. For cells, the fibroblasts were grown on CaF<sub>2</sub> window and directly used for FTIR measurements. We used a hyperion imaging system (Bruker) equipped with a 64 $\times$ 64 MCT (Mercury-Cadmium-Telluride) FPA (Focal Plane Array) detector. FTIR imaging technique was used to discriminate healthy and diseased samples on the basis of chemical changes due to its potential to probe tissues and cells at the molecular level. Now with the application of advanced focal plane array detector, large area of samples in a short time can be scanned and investigated the specific changes that could be correlated with the pathology and different environmental stresses.

### Biography

Saroj Kumar has completed his PhD from Stockholm University, Sweden and Postdoctoral studies from Université Libre de Bruxelles, Belgium and Canadian Light Source, Canada. He is the Project Leader in Department of Engineering Science, Uppsala University, Sweden. He has published more than 22 papers in reputed journals and has been serving as a Reviewer in reputed journals.

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