Nematode Worms

Nematode worms or ‘roundworms’ are found in all biotic environments on earth. More than 90,000 species have been identified with approximately 15,000 of these noted to be parasitic. Plant parasitic nematodes can be responsible for crop failures while animal parasitic nematodes can infect cattle. Human parasitic nematodes are responsible for many clinical conditions, such as *Brugia malayi* which causes elephantiasis. Other nematodes can be beneficial; predetory nematodes kill garden pests and can be used as a form of organic pest control. One nematode, *Caenorhabditis elegans*, is used extensively in molecular biology as a ‘model organism’ providing insight into a wide range of biological phenomena ranging from cell differentiation to nicotine dependence.

IR Spectroscopy of Micro-organisms

Infrared spectroscopy can provide insight into the biology of living cells and organisms. Such information can be useful both for the identification of species and for the monitoring of biological processes. The figure below shows three IR spectra obtained from different regions of an individual *Steinernema feltiae* nematode, showing the potential differences in spectral profile within an individual, as well as highlighting the main regions of biological interest.

Sample Preparation

Nematodes were purchased dried from biohelp GmbH (Austria). A small scoop of dried nematodes were rehydrated in distilled water and filtered using a NanoSep filtration device (Pall Corporation, USA) to remove any contamination from the packaging process. The nematodes were then resuspended in distilled water, spotted onto ZnSe plates and allowed to air dry. IR measurements were taken immediately after drying. All IR measurements were taken using a Bruker Hyperion 3000 imaging microscope operating in transmission mode with a resolution of 4 cm⁻¹. Single point spectra were collected using 32 scans while the FPA measurements were collected for 256 scans.

Conclusion

The results presented here highlight the effectiveness of IR imaging spectroscopy for the identification of the distribution of biological molecules within different nematode species, illustrating the use of this technique for the study of multicellular organisms.