

Title:

The use of synchrotron light to study food systems at molecular level

Abstract:

A synchrotron is a powerful source of X-rays. The X-rays are produced by high energy electrons as they circulate around the synchrotron. The X-ray beams emitted by the electrons are directed toward "beamlines" that surround the storage ring in the experimental hall. Each beamline is designed for use with a specific technique or for a specific type of research, as for example X-ray diffraction (XRD) or Fourier Transform Infrared Spectroscopy (FTIR) among others, providing specialist analytical techniques for the atomic to microscale characterisation of materials ranging from food ingredients and formulations through to packaging and food processing components.

The aim of the course is to provide students first with a general overview on the synchrotron facility, and focusing after the attention on the application of four techniques used to study food systems at molecular level: 1) Extended X-ray Absorption Fine Spectroscopy (EXAFS), 2) X-ray Diffraction (XRD), 3) Small Angle X-ray Diffraction (SAXS) and 4) Fourier Transform Infrared Spectroscopy (FTIR). Particular cases of interest will be discussed and work by students, including a beamtime application project.