

Investigating Raman spectroscopy for monitoring metabolite concentrations in microbial fermentations

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The need to develop an on-line system that is rapid, non-invasive and inexpensive, and which requires little or no sample preparation is driven by economic need and process documentation. This project aims to monitor microbial metabolites in fermentation broths directly without *a priori* chromatographic separation using normal Raman spectroscopy. *Zymomonas mobilis* is of industrial importance because it produces ethanol and levan (a fructose polymer of variable monomer length). Thus we are investigating Raman spectroscopy to monitor the production of ethanol and levan by these bacteria as well as monitoring the changes in sugar substrate concentrations in the media. 'Gold standard' (or primary reference) methods based on enzymatic assays will be employed to measure the metabolites and sugar concentrations.

This poster will give details of current studies using a Renishaw Raman probe system 1000 with an incident laser light at 785 nm. Data will be analysed by chemometrics methods including principal components analysis and discriminant function analysis, and the concentration of the metabolites will be quantified by calculating the area under suitably characteristic Raman peaks and partial least squares regression.