

[O 38] Process Control in Flavour Generation : NIR-MVA as a tool to monitor key odorants formation

Monforte A R¹, Martins S I F S², Silva Ferreira A C¹

1) Universidade Católica Portuguesa - Escola Superior de Biotecnologia, Porto, Portugal

2) Unilever R&D Vlaardingen, Discover, Vlaardingen, The Netherlands

asferreira@porto.ucp.pt

Sensors suitable to monitor chemical reactions leading to the formation of potent odorants in foods and consequently enabling process control are on increasing demand. In the present work real time kinetic analyses were made by developing new methodologies combining near infrared spectroscopy (NIR). These were applied to study the dynamics in phenylacetaldehyde formation through a number of reactions, namely (i) glucose and phenylalanine, (ii) gallic acid and phenylalanine and (iii) gallic acid, phenylalanine and glucose. Phenylacetaldehyde as well as other reaction intermediaries were monitored during 60 min with a frequency for data acquisition of 3 spectra/min. A 10 minutes' reaction intervals samples were collected and target analysis was performed using mass spectroscopy (GC-ITMS and LC-qTOF). For comparison, the spectral data were analysed in a conventional way fitting kinetics for specific wavelengths, and then by soft-modelling multivariate alternative least squares (MCR-ALS) method for modelling spectral data with quantification of reaction compounds, and perform deconvolution of spectral data. The method developed allows to unlock chemical information related with specific compounds present in the reaction (phenylacetaldehyde, benzaldehyde, quinones and dicarbonyls). Different reaction rates were observed according to the perturbation, i.e. metals addition, temperature increasing and substrate class. A database for feature comparison has been developed to classify each new set of 'individuals' taking into account their ability to form potent odorants. In conclusion the method allows for a real time, high-throughput and low cost analysis for process monitoring.