

# Real-time Monitoring of Production Processes

## Using Near-Infrared Spectra

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Predicting the properties and composition of materials is essential for quality control in industry. If these can be predicted in real time, effective quality control can be achieved. If we could determine these characteristic values and content levels—which were traditionally obtained through sampling and chemical analysis—without those steps, the benefits in terms of time and cost would be immeasurable. Efforts utilizing near-infrared spectroscopy have long been explored to achieve this, and its practicality has now improved significantly through combinations with various new techniques. In this presentation, I will introduce industrial case studies such as the promotion of precision agriculture through soil property management, automated internal quality prediction of fruits[1], and real-time monitoring of component concentrations in continuous formulation processes[2]. I will also expand the discussion to include the prediction of various physical properties in chemical manufacturing, thereby highlighting the role of near-infrared spectroscopy in process informatics.

### Bibliography :

- [1] M. Arakawa, Y. Yamashita and K. Funatsu, Genetic algorithm-based wavelength selection method for spectral calibration, *J. Chemometrics* , 25, 10–19 (2011)
- [2] H. Kaneko, K. Muteki, K. Funatsu, *Chemom. Intell. Lab. Syst.*, 147, 58-65, 2015.