Production line real time near infrared (NIR) monitoring

- Effect of sample flow and density

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Purpose: Investigate near infrared (NIR) acquisition settings fitted for different types of particle movement and density.

Methods: Sample movement in process environment was mimicked by designing fast and slow velocity flow devices with NIR probe interfacing. In addition, same NIR probe was interfaced with fluidizing model particles (pellets) and further, signal from compacted pellets was measured. The quality of spectral acquisition with all the NIR interfaces was evaluated by performing Principal Component Analysis (PCA).

Results: A defined spectral area linked with the active content was found. PCA analysis on that area revealed a clustering given the active content of the samples for all the different setups.

Conclusion: The present study shows different ways to interface NIR spectroscopy with production line depending on the sample movement and density. The developed setups enable the real time monitoring of samples directly from the production line, giving the opportunity to ensure the final product conformity at the end of the manufacturing process itself.