



Characterization of powder blends by Near Infrared HyperSpectral Imaging (NIR-HIS)

> Context / customer need

HyperSpectral imaging (HSI) is an analytical technique combining a camera and a spectrometer, thus making it possible to simultaneously obtain spatial and spectral information on a given sample.

This technique is therefore particularly useful to combine those two types of information. Thus, in the pharmaceutical industry, it is for example very well suited to topics like visual inspection of lyophilizate quality, fraud detection, or homogeneity evaluation of certain mixtures.

Powder blends are studied here, and their homogeneity is evaluated using a Near Infrared (NIR) hyperspectral camera.

> Ondalys solution

Since the studied powders are all white, they are indistinguishable by visual inspection. NIR spectroscopy is therefore of great interest.

Vials of powder mixtures were inspected using HypeReal, an NIR hyperspectral solution developed by INDATECH Chauvin-Arnoux. This NIR inspection equipment scans the samples from below, without contact, in a fast and non-destructive way.

The identification of unmixed powders, then of different blends, makes it possible to build models for compound identification, and thus to assess the blend homogeneity or content uniformity. Classification models can also be developed.

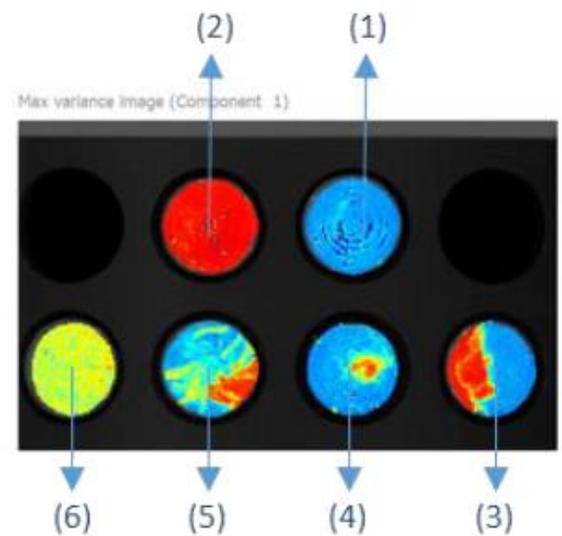
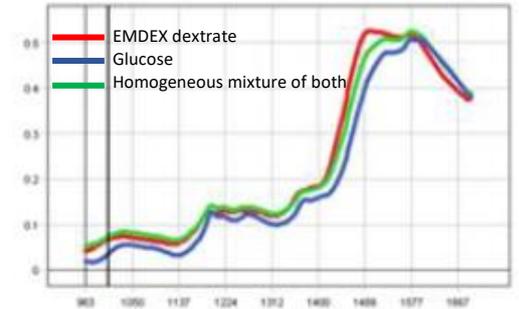
> Results / Customer benefits

Six samples were measured simultaneously: pure glucose (sample #1), a pure compressible excipient widely used in the pharmaceutical industry - EMDEX dextrate - (sample #2), then different mixtures - 3 to 6. Only the mixture (#6) is a homogeneous blend.

A PCA (Principal Component Analysis) model was developed on these data. This model, together with the analysis of the spectra, makes it possible to label the hyperspectral image, i.e., the different areas of the image identified according to their chemical composition. Then, the software can assign false colors to each pixel of the image, allowing the user to quickly identify the location of the various chemical compounds.

Thus, the vial (#3) in the image is clearly identified as non-homogeneous: the blue zone corresponding to the glucose is clearly separated from the red zone of the excipient. The vial (#4) has also got an excipient agglomerate in the middle of the glucose powder. This kind of observation could also be used in the cases of product contamination. The mixture (#5) is not homogeneous either, with areas clearly identifiable as excipient alone or glucose alone; a yellow part corresponding to the blend of both products is also visible. This type of R&D study provides a better process understanding on the blending step. Thus, in the case of powder blending, optimal mixing times can be defined, with an end-process identification when the blend homogeneity is reached.

Normalised pseudo absorbance spectrum



> Contact-us

 - ✉ contact@ondalys.fr - 🌐 <http://www.ondalys.fr> - ☎ +33 4 67 67 97 87