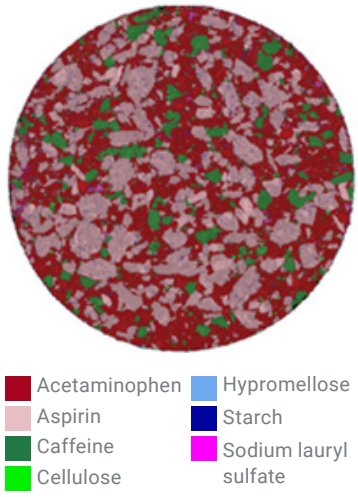
Chemical Imaging of Tablet Surfaces

Using the Agilent 8700 Laser Direct Infrared (LDIR) Chemical Imaging System

The Agilent 8700 Laser Direct Infrared (LDIR) chemical imaging system



A high resolution 'chemical map' of a generic headache tablet consisting of three APIs (acetaminophen, aspirin and caffeine) and four excipients. All seven components were imaged across the entire tablet (11 mm diameter) with 10 µm pixel size in only 1 hour.

Create a chemical map of a tablet surface in hours, not days

Molecular spectroscopy techniques such as Raman, FTIR, and NIR imaging are used to create an image showing the distribution of ingredients in solid dose (tablet) formulations—a 'chemical map' of the tablet surface. Their main limitation? Speed. Often, these techniques can take a day or more to deliver a detailed image. Coupled with the requirement for highly skilled staff, they are underutilized in formulation development, despite the value they can bring.

The Agilent 8700 Laser Direct Infrared (LDIR) chemical imaging system changes that by enabling nonexperts to create chemical images of an entire tablet surface in hours, not days. Ideal for solid dosage form development or production troubleshooting, these images can reveal critical qualitative information about your formulation such as:

– Spatial distribution of APIs and excipients across the tablet surface

– Detailed information on cluster diameter and shape

– Mixing homogeneity

– Presence and distribution of various polymorphic forms of the API

These factors can impact drug stability, tablet dissolution, and even the therapeutic effect. A series of chemical maps of the same samples over time is useful for stability testing. The images can reveal API degradation, including the formation and shape of degradation products.

How the 8700 LDIR works

The 8700 uses a Quantum Cascade Laser (QCL) light to create highly detailed chemical images. Other chemical imaging techniques cannot offer the combination of analysis speed, flexible field of view, variable resolution and ease-of-use available with the 8700 LDIR.

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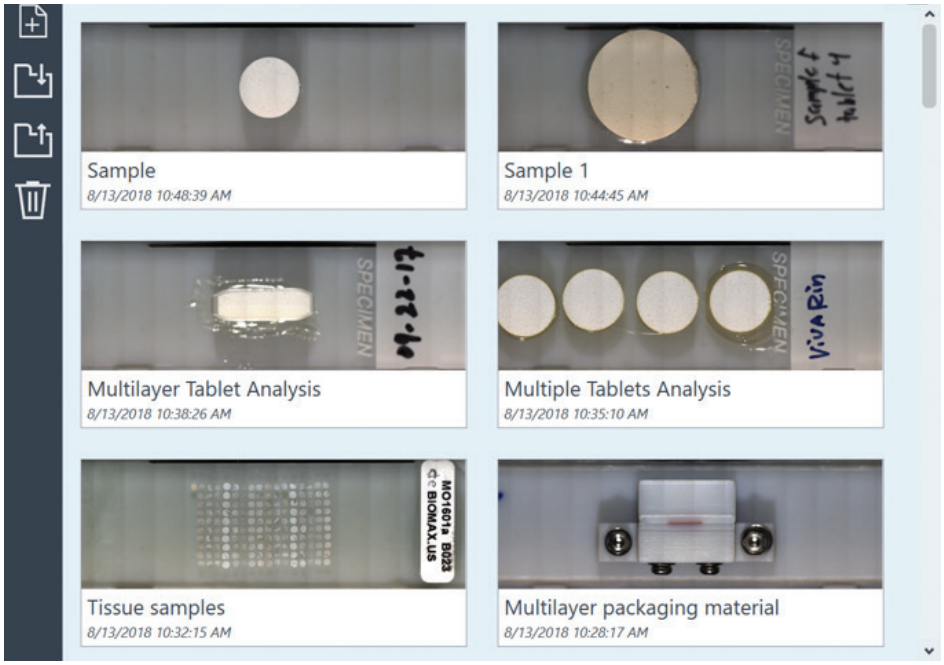

A range of sample types can be measured. Mounted on a slide, a visual image of the sample allows you to select the area you want to analyze in more detail.

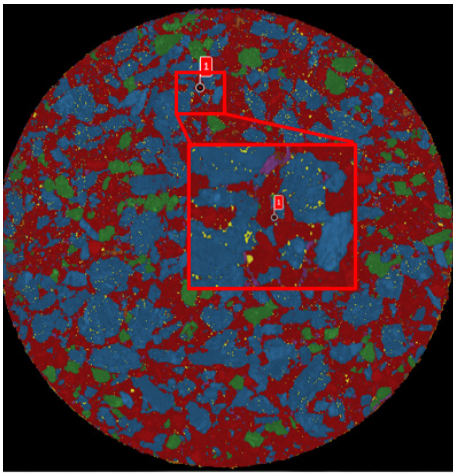

Image areas of interest in high resolution, as small as 1 µm pixel size.

The 8700 has several advantages over conventional FTIR or Raman imaging:

- Automates and simplifies imaging of tablet surfaces (single or multiple tablets per sample slide) in minutes or hours, compared to days on other systems
- Delivers a high spatial resolution as close as physically possible to the absolute resolution limit of mid-infrared wavelengths
- Is equally sensitive to APIs and excipients, with each component easily recognizable through image color coding
- Does not suffer the fluorescence interference that can impact Raman imaging techniques
- Does not require cryogenic detector cooling, multiple scans, or extended acquisition times to achieve maximum sensitivity

What you can do with chemical imaging provided by the 8700 LDIR

- Quickly analyze many tablets in detail, giving you the data to make better informed and faster decisions—saving time and money
- Easily visualize API and excipient cluster diameter and shape, spatial distribution, and mixing homogeneity on the entire tablet surface
- Help troubleshoot production problems such as the poor distribution of components within tablets or contamination issues
- Include a series of images over time in product stability testing data
- Discover information to correlate physicochemical effects with therapeutic effectiveness in product development

For more information, visit:
www.agilent.com/chem/8700-ldir

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