

A303

Section Analysis of Wheat Grain with New Mapping Software

Field

Plastics, Polymer, Forensic, Food, Pharmaceuticals, Electronics

Equipment

FTIR-8000 series

AIM-8800

Necessary Accessories

ATR Objective

Necessary Software

Mapping Software

Section Analysis of Wheat Grain with New Mapping Software

Mapping Analysis enhances the capability of IR Microspectroscopy. The IR Microscope is a good tool for surface analysis because it provides the ability for verification of uniform component distribution by monitoring specific chemical groups.

Mapping software for Shimadzu AIM-8800 provides a large visual image with capture screens. The Mapping area and Aperture settings are specified on the captured image and specified through the PC.

Here below is a mapping application for measuring a cross-section of Wheat grain.

A. Preparation and Measurement

Sample is hard wheat grown in Canada (CWRS). A wheat grain was packed in an epoxy resin and sliced into 10um pieces with a microtome (sharp cutting tool). A piece was placed on the Diamond window of the Microscope stage as shown in Fig.1; where it shows a clear synthesized image of the sliced wheat grain. The green grid markers represent the positions that were scanned.

Fig.2 includes the three individual spectra of the positions referred to below with white arrows in Fig.1.

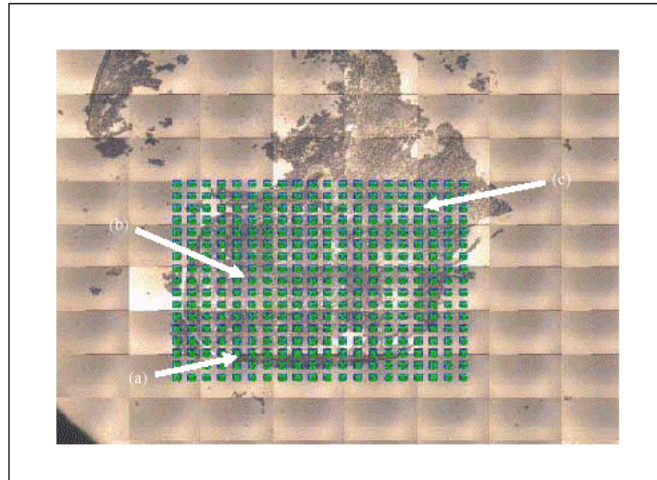


Fig.1 ビュースキャン後の画像
Result of Scanning View

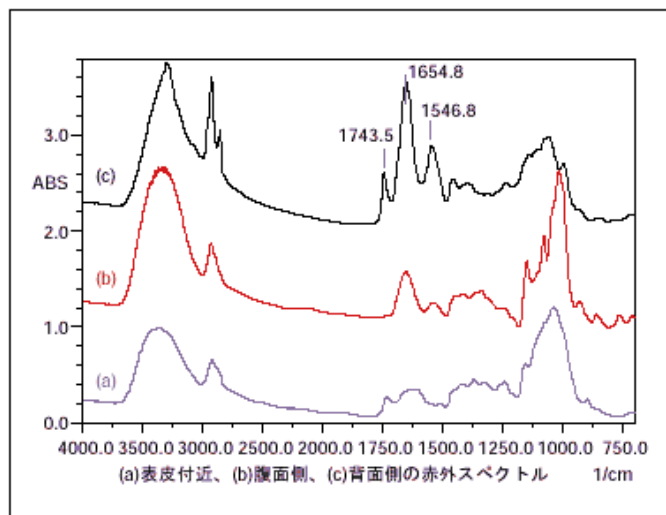


Fig.2 硬質小麦粒断面の赤外スペクトル
IR spectra in the Section of Hard Wheat Grain

B. Result of Mapping

Distribution of Lipids, Proteins, and Sugars can be observed by peaks present at 1740cm^{-1} ($\text{C}=\text{O}$), 1650cm^{-1} (Amide), and 1000cm^{-1} ($\text{C}-\text{O}$) as shown above in Fig.2 Fig.'s 3 to 5 show contour mapping. Fig.'s 6 to 8 show a birds-eye views (3D view) of the data plotted for each peak intensity.

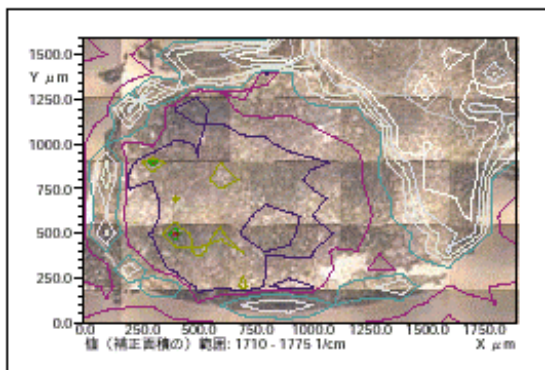


Fig.3 カルボニル基の等高線図
Contour Map of Carbonyl Group

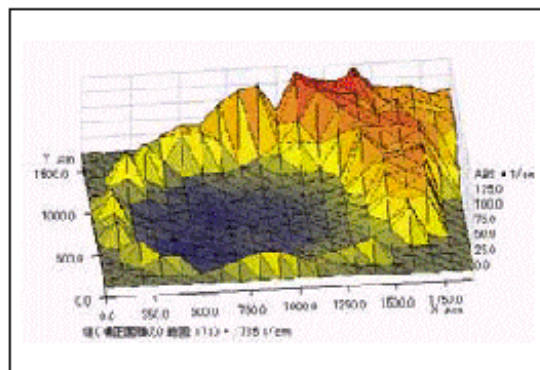


Fig.6 カルボニル基の3次元表示図
3D-Map of Carbonyl Group

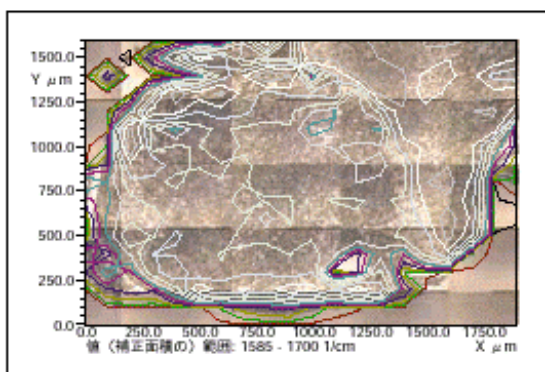


Fig.4 アミド結合の等高線図
Contour Map of Amide Group

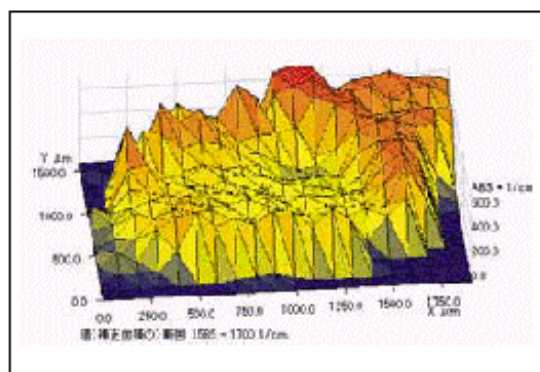


Fig.7 アミド結合の3次元表示図
3D-Map Map of Amide Group

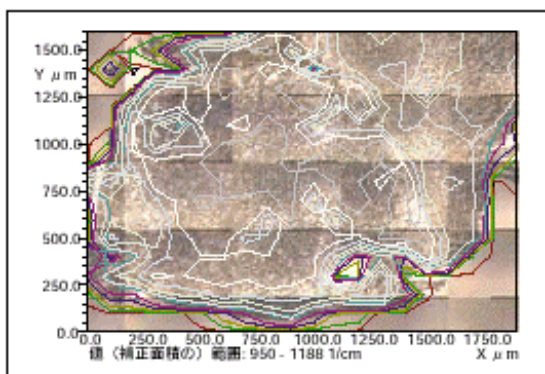


Fig.5 C-O結合の等高線図
Contour Map of C-O Group

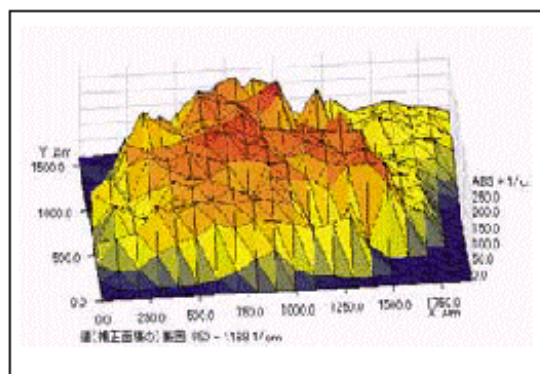


Fig.8 C-O結合の3次元表示図
3D-Map of C-O Group