

Three-Dimensional Visualization for Chemical Components within Rice Particle With a Microslicer-Infrared Microscope System

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A novel technique has been developed to observe the three-dimensional (3-D) distribution of chemical components in biological materials using both automatic sectioning microtome and infrared microscope. The 3-D image was reconstructed based on the relationship between the content and the absorbance of specified wavelength for chemical components. By using the automatic sectioning microtome, the kernel of rice sample fixed in paraffin was sequentially sliced with the thickness of 5 μ m after pasting the sliced sectional specimens on an adhesive tape. The chemical components of the specimens, which are placed on the X-Y controlling stage with positioning accuracy of ± 10 μ m, were analyzed by the infrared microscope. The 3-D images demonstrated that the zonal protein about 200 μ m in width was observed mainly at the outer parts of a rice particle, and carbohydrates entirely. These images can be observed by choosing arbitrary observation angle. The result indicated that the developed technique could be applied 3-D information to investigate intrinsic chemical components but also residual pesticides as well as bacteria contamination for agricultural produce.