3-D imaging of foods using X-ray microtomography.

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The microstructure of food products determines to a large extent the physical, textural and sensory properties of these products. Developing a proper understanding of the microstructure, particularly the spatial distribution and interaction of food components is a key tool in developing products with desired mechanical and organoleptic properties. Information about the 3D microstructure can be obtained by X-ray microtomography (XRT). XRT can probe the microstructure non-invasively into a few millimetres depth with an axial and lateral resolution down to a few micrometers. Examples are given of the imaging of air bubbles in aerated dairy products (fig. 1) and vegetables and herbs in fat products. The features in the stacks of 2D images are identified and measured using image analysis. For visualisation in 3D space isosurface rendering was used.

Fig.1 XRT image (2D horizontal cross section) of an aerated dairy product (inner diameter of sampling straw = 2.9mm) with 3D isosurface visualisation (1.8mm*1.8mm*4.3mm), voxel size = 4.5*4.5*9.0 µm.