

Multi dimensional imaging of foods using Magnetic Resonance Imaging.

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KEY WORDS: MRI, visualisation, image analysis, time-series, hydration, water migration, water transport, food microstructure, macrostructure

Knowledge of the macro – and microstructure of foods and its relation to product properties is necessary to develop new and better products. Consumers need high quality food products with a superior taste, texture, freshness and shelf life and that are ready-to-eat or quick and easy to prepare. Magnetic resonance imaging (MRI) can be used to analyse dynamic structural changes in foods during processing and storage. The internal structure, water content and status of food products can be followed in real-time and non-invasively. New MRI techniques were developed which are able to image food products with a low water content and/or low water mobility [1,2] and which can image fast processes with sufficient spatial resolution [3]. Examples are given of the imaging of a sandwich during storage [1,2] and of the cooking of a single rice kernel [3]. The migration of water and structural changes were visualised in time as a movie by using 3D surface – and volume rendering of the time series. A selection of time points are shown in fig. 1 and 2. The water transport in food products and the change of their structure can be monitored in time, in a quantitative manner by using MRI and image analysis. Such data provide valuable input for models describing the moisture migration [4].

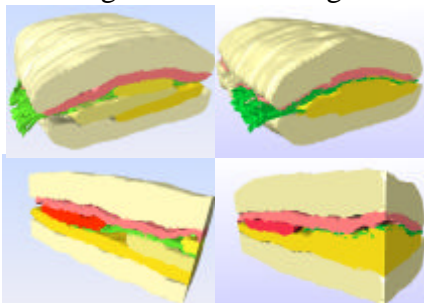


Fig.1 3D iso-surface visualisation of MRI images of sandwiches with tomato, cheese, ham and lettuce after preparation (left) and after 24 hours (right).

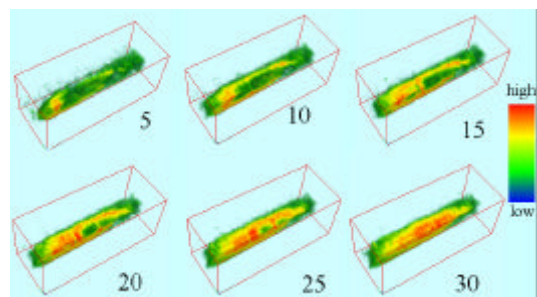


Fig.2 The water uptake of a rice kernel as function of time (min) during cooking. Volume rendering after clipping by a horizontal & vertical plane through the centre of the kernel.

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