

Title:

SPRITE MRI of Food Materials – Oil Migration Chocolate Confections

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Food material processes have been examined by MRI methods for many years. However, in the vast majority of cases, employing liquid state MRI techniques, the resulting images are not quantitative because of uncontrolled relaxation time contrast. In many cases the transverse signal lifetimes are so short that important signal components are simply not observed in the images.

The SPRITE MRI method has proven to be the most quantitative MRI technique for observation and quantification of short signal lifetime components in a wide variety of realistic materials. In this presentation we describe the centric scan SPRITE experiment and outline its quantitative features. In a logical limit the centric scan SPRITE experiment permits one to spatially resolve the free induction decay by repetitive imaging with variable evolution time.

Model experiments of oil migration in chocolate confections were undertaken as a function of exposure time. The free induction decay is composed of a Sinc Gaussian time domain 'solid' component and an exponential liquid-like signal component. Fitting the Sinc Gaussian and exponential signal components permits one to determine the solid and liquid signal components. The solid and liquid fat content evolve due to oil migration and auto catalytic solid fat dissolution.

High gradient strengths, more than 200 Gauss/cm, employed in this experiment permit evolution times as short as 10 usec, and therefore observation of very short lived signal components for reasonable fields of view, less than 1 cm.