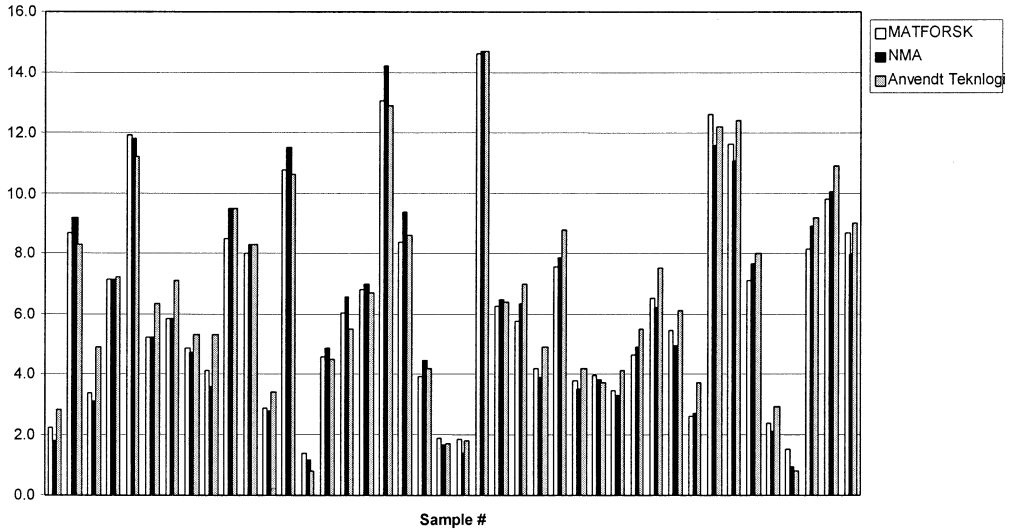

Fig. 1. Comparison of the NMR fresh method with chemical extraction and with NMR dried method (where the moisture has been dried out). 42 samples of minced beef meat with fat content varying from 1% to 15% were studied.

accompanied with a method that is fast, accurate, easy to handle and simple to calibrate. We believe to have developed such a method and it is implemented on a Resonance Instruments Maran23, where a sample weight up to 10 grams can be analysed using an application tool following the instrument. It takes less than 1 min to measure the total fat content, while it takes less than 2 min to measure both fat and moisture content.

Currently the method can measure the fat content in foodstuff, and moisture content in non-sugar containing foodstuff. (Fig. 1).

The reduction of the susceptibility effect in diffusion measurements of porous media using a modified PGSE sequence: demonstration by MR micro-imaging

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Contrasts in NMR micrographs tend to be diffusion weighted due to the motional restriction of diffusing particles by impermeable walls. In a strong magnetic field, the resolution is reduced also due to the susceptibility difference between the solid material and the fluid, which causes local distortions of the magnetic field. The CPG RF pulse train interspersed with a pulsed field gradient sequence can be used to remove the effect of the susceptibly difference [1]. The applied CPG sequence modulates the effect of a background gradient while keeping the dephasing by applied gradients unchanged. The spectral analysis [2] gives the spin echo attenuation as

$$(2\Delta) = \frac{1}{p}\int_0^\infty {}_F(\omega)_b^2(\omega)_d\,\omega, \text{ where } F(\omega)^2$$

$$= F_a(\omega)^2 + 2F_a(\omega)\,F_s(\omega) + F_s(\omega)^2.$$

The dominant susceptibility effect comes from the mixed term, which can be neglected if a proper modulation shifts the spectrum of susceptibility $F_s(\omega)$ outside the range of the applied gradient spectrum $F_a(\omega)$.

The method is demonstrated by diffusion weighted 1D MR micro images of water contained in a 2.8 mm wide notch milled in a piece of plexiglass acquired on a 2.35 T MR imaging system (Fig. 1). The first MR image was obtained by the PGSE sequence in which the second gradient pulse was prolonged to acquire the signal for 1D MRI, while the second MR image was obtained by the modified PGSE with a CPG RF pulse train to reduce susceptibility effects. The first MR image has less attenuated signal in the center of the profile than expected because of internal magnetic fields that reduced the effect of the external magnetic field gradient. The second MR image well agrees with the theoretical model [3]. The signal in the center of the profile is attenuated as expected for free self-diffusion, while the edges are enhanced due to restraint of molecular motion near proximity of impermeable walls.

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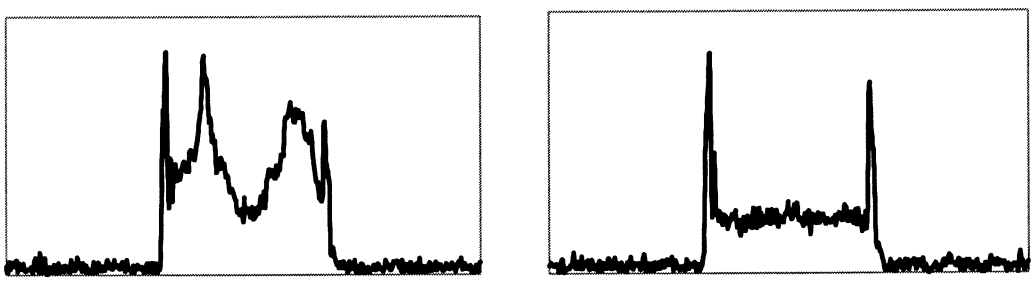

Fig. 1.