

# Aroma diffusion and salt interactions in food <sup>1</sup>H DOSY and <sup>23</sup>Na DQF NMR study on a model system

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Flavour control is a great challenge for food industry. A better understanding of interactions of aroma and salt with structure of the food matrix is essential <sup>(1)</sup>. Iota-carrageenan gel (polysaccharide which is used as thickener in food industry) was chosen as a model system because of the high structure sensitivity to cationic environment. Gel samples (1% wt) containing different aroma compounds (ethyl hexanoate, 1-octen-3-ol, 2-heptanone and butanoic acid) and salt contents (0.1 to 5.0% wt) were studied. To investigate aroma diffusion and sodium dynamics (characterisation of the binding state of Na<sup>+</sup> ions), diffusion ordered spectroscopy (DOSY) <sup>(2)</sup> and <sup>23</sup>Na double-quantum filtered (DQF) NMR spectroscopy <sup>(3)</sup> approaches were used.

<sup>1</sup>H DOSY NMR experiments were done on Bruker 500 and 600 MHz with a 5 mm z-gradient inverse probe. <sup>23</sup>Na DQF measurements were performed on a Bruker DRX-400 using a 10 mm double-tuned <sup>1</sup>H/<sup>23</sup>Na NMR probe built in house.

Results showed that aroma self-diffusion coefficients change according to the matrix structure. Depending on sodium concentration, interactions between sodium ions and iota-carrageenan molecules were observed, and correlations with aroma diffusion were made.

This work demonstrates that NMR spectroscopy is a powerful tool to characterise the mobility of flavour compounds and their interactions with food matrix at molecular scale.

## References:

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