

Characterization of Water Diffusion in Food Products from MRI Experiments

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INTRODUCTION

Cabbage products contain components that contribute to consumer's health. During drying they may deteriorate. To predict and to optimize the content of these components, it is necessary to know internal moisture distribution inside the product.

With traditional measurement methods, it is difficult to monitor water transport inside the product. As an alternative, Magnetic Resonance Imaging (MRI) is used to study the complex food materials.

OBJECTIVE

- Monitor the moisture changes and shrinkage during hot air drying process
- Estimate moisture diffusion coefficient in food products during drying process

EXPERIMENTAL SETUP

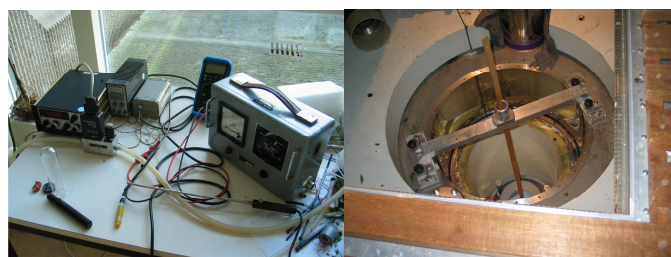


Fig 1. MRI experimental setup

Left: Air condition controlling system: including air flow sensor, temperature controller, RH sensor and sample holder

Right: The measurement chamber

RESULTS



Fig 2. Series of MRI intensity of the middle slice in time

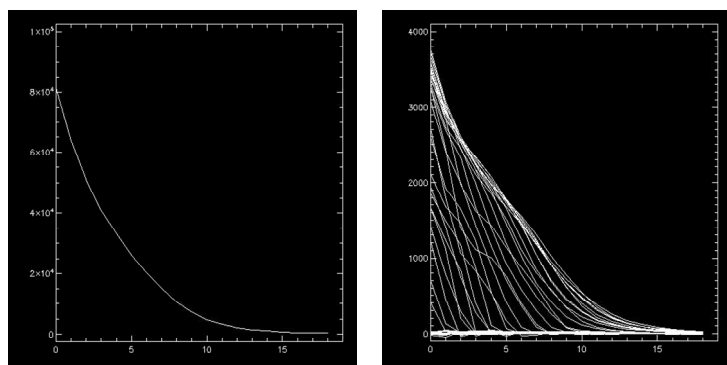


Fig 3. Left: Total 3D intensity profile during drying

Right: Total intensity profile per slice during drying

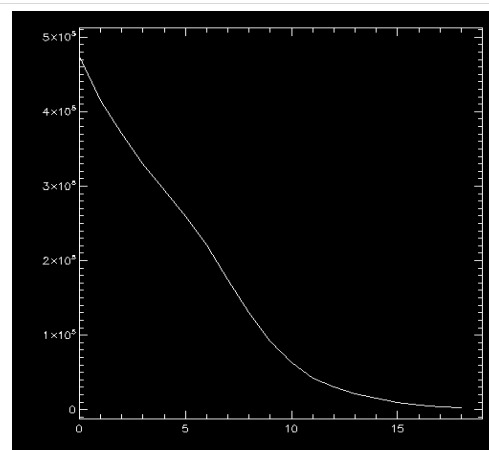


Fig 4. Total of all T2-amplitude during drying

CONCLUSIONS

- Moisture distribution and shrinkage are monitored through MRI
- Average moisture content can be estimated through MRI data
- This method can be applied to other vegetable products