

Impact of Electrical Disturbances on Crystallization in Food Systems

By **Dr. Alain Le Bail**

Food Science and Process Engineering
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Abstract

This presentation provides an overview on phase change in food systems with a focus on crystallization. Crystallisation lies in two major phenomena, nucleation and crystal growth. Nucleation is effective once stable clusters of molecules or atoms constitute nuclei. The stability of nuclei is directly linked to their size and also to supercooling or supersaturation. Crystals grow from nuclei. Nucleation and growth occur simultaneously as long as the supercooling or the supersaturation exists. Either nucleation or growth may be predominant over the other; this will impact the size distribution and also the shape of the crystals. After providing a background on the fundamentals of crystallisation, two focuses will be proposed.

A focus will be provided on the impact of electrical disturbances on the phase change of water in food systems. Static electric field permits to reduce supercooling; example on model aqueous solutions and on real food systems will be presented. More recently, it has been observed that radio-frequency and microwaves were able to reduce the size of ice crystals in frozen meat; examples will be presented including images of the microstructure of frozen systems.

An outlook will be proposed to based on the proposed examples.

About the Speaker



Prof Le BAIL Alain (PhD Heat Transfer-Fluid Dynamics (1990) University of Nantes – France) is Prof. at ONIRIS – Food Science and process engineering (www.oniris-nantes.fr). He supervises the group MAPS² = Matrices, Process/properties, Structure/sensorial (Joint research Unit UMR GEPEA CNRS-6144 (<http://gepea.fr>) dealing with food & non food applications.

Ongoing research concerns phase change in food systems with baking and refrigeration applications. Pr Le Bail has published over 130 Peer reviewed paper and has coordinated several national and European research project. He is member of IFSET and FAPT editorial board and is nominated member of CIGR (section 6) and IIR (com. C2).

Cake Staling: Understanding Interactions between Ingredients

By **Dr. Patricia Le Bail**

National Institut of the Agronomic Research,
France



Abstract

This presentation is a summary of the PhD of N. Hesso (2014) on reformulation of cake using selected pregel starch. Based on a multiscale approach, different techniques including DSC, XRays diffraction, NIR, CLSM have been used to better understand the interactions between ingredients and the impact of storage temperature on the kinetics of staling. Opposite to bread, cake staling is accelerated at higher storage temperature (20°C vs 4°C). Pregel starch permits to obtain softer texture; however, the batter to crumb transition is shifted which affects to oven rise and the final cake porosity.

About the Speaker

Dr. Patricia Le Bail is currently working at I.N.R.A (National Institut of the Agronomic Research) Nantes, Research laboratory Biopolymers, Interactions, Assemblages, (Interfaces and dispersed systems). She received her PhD at Institut des Matériaux de Nantes (I.M.N), Centre National de la Recherche Scientifique (C.N.R.S.) (Pr.ROUXEL)-France in 1989. Dr. Le Bail's research topic deals on dynamic and reactivity of ligands in starch- based food matrices at molecular scale. She is developing at present several research themes: Phase changes induced by hydrothermal treatments of starch and of their constituents; Trapping, retention and quantification of ligands in starch-based food matrices; Protection and controlled release of ligands in emulsified systems; Impact of ligands on interactions between starch and glucomanan (i.e. Konjac).

Host: Dr. Zhou Weibiao

Date: 1st April 2016, Friday

Time: 1 to 2 pm

Venue: Seminar Room S15-03-15

ALL ARE WELCOME !