

Crispy Cracks Symposium Explores Crispness and Water Management

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On March 19–20, 95 participants joined in the very first international symposium on crispness creation and retention. The symposium was organized by Cereals & Europe and TI Food and Nutrition.

The symposium contained three sessions with oral presentations and one poster session. During all sessions, there were lively discussions on the meaning of the presented ideas and data.

The first session, Crispiness—The Fundamentals, was opened by Julian Vincent, Bath University, UK, with a keynote presentation titled “Crispness Defined and Measured by Material Science.” He showed that it is possible to rank crispness of potato chips by determining their structural bending strength in three point bending tests, while other fundamental parameters such as the critical stress intensity factor and the energy of fracture were about the same for samples clearly differing in crispness. Other contributions in this session included “Crispness, Little Earthquakes in Your Mouth” and “Relationship Between the State Diagram Based on Brittle Ductile Transition and the Sensory Crispness of a Hard Cracker.”

The second session focused on water management. The introductory keynote lecture titled “Relationship Between Water Transfer and Crispness of Cereal-Based Products: Characterization, Modeling, and Control” was given by Stéphane Guilbert, SupAgro–INRA, France. First he discussed a mathematical predictive model based on Fickian diffusion that can be used to predict long-term moisture transfer in multi domain food products including not edible barriers. Required input parameter models are water sorption isotherms and effective diffusivities. In the second part of his lecture, various methods were discussed to slow down the rate of moisture

transfer to lead to longer shelf life of crispy products. Other presentations in this session were “Quantitative Imaging of Moisture Content and Migration by MRI,” “Effect of Ingredient Variation and Modification on Water Uptake Kinetics in Crispy Bread Crusts,” and “Multi-Scale Modeling of Moisture Sorption in Cellular Cereal Materials.”

Session three, From Fundamentals to Product Development, covered a variety of topics. The first lecture dealt with anti-plasticizing and hardening of crisp cereals. During the discussion it was remarked that these effects can be easily understood based on basic fracture mechanics. In the presentation on frying without fat, it was illustrated how for prefried products such as

French fries and expanded pellet snacks the final frying step can be replaced by a heating step using super heated steam. Other topics were, among others, loss of crispness of deep fried crusts, development of microwavable snacks with a crispy crust, and Microtec—an innovative chamber for the production of bread products with an optimal crispness. The last presentation of the symposium was a keynote lecture titled “Crispy Crusts: From Basic

Knowledge to the Real World” by Ton van Vliet, TI Food and Nutrition, the Netherlands. He discussed how one can come to guidelines to improve crispness creation and retention for bread systems based on fundamental considerations regarding the required fracture behavior for crispy products. Important product properties are water content, the morphology of the product, and the state/distribution of the water in the product. Furthermore, one should take into account physiological constraints with respect to perception of changes in force and sound.

The meeting was unique in combining different aspects of crispiness in one symposium. This was greatly appreciated by the audience. “It was one of the best meetings I have ever attended,” said Ted Labuza, Morse Alumni Distinguished Teaching Professor of Food Science and Engineering, University of Minnesota.

Inspired by this success, plans were already made to organize the next Crispy Cracks meeting in Montpellier, France, in 2010 (organizer: Stéphane Guilbert).



The first Crispy Cracks Symposium was held in Wageningen, the Netherlands, March 19-20, 2008 with nearly 100 participants.

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