



Study of gelling of yogurt in real time

Introduction

Yogurts are a growing food segment worldwide, especially for children and health conscious consumers. It is therefore critical to ensure the quality of the textural properties for consumer acceptability.

In order to characterize these properties, the “classical” mechanical rheology may face some experimental issues (slippage, fracture, etc...) due to the weak structure of these systems. Monitoring the creation of the gel structure in such a weak product is even more complicated and the interest of a non-intrusive technique is obvious.

In this example, the process is as follow: milk and bacillus are mixed and put at a temperature of 42°C. Effect of the bacillus is to turn the lactose into lactic acid in the milk. The lactic acid will then break the micelles of proteins, by changing the pH and solubilize them. While the pH is still evolving, the proteins will then create a network, bringing fat globules together in aggregates, and giving a gel structure to the yogurt.

Two mixtures are tested here: the first one (Yogurt 1) contains only one kind of bacillus, the second one (Yogurt 2) contains a combination of two different species of bacillus. The purpose is to monitor the effect of varying the composition on the kinetics of the process, and the final texture of the product.

Application

Food

Objective

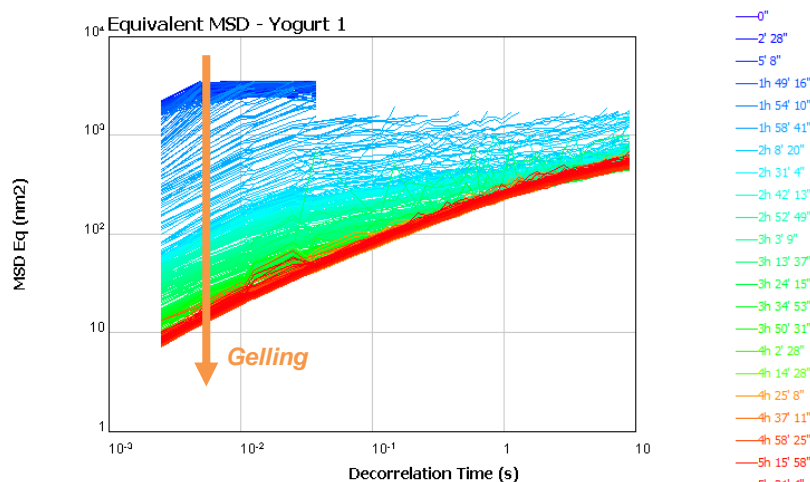
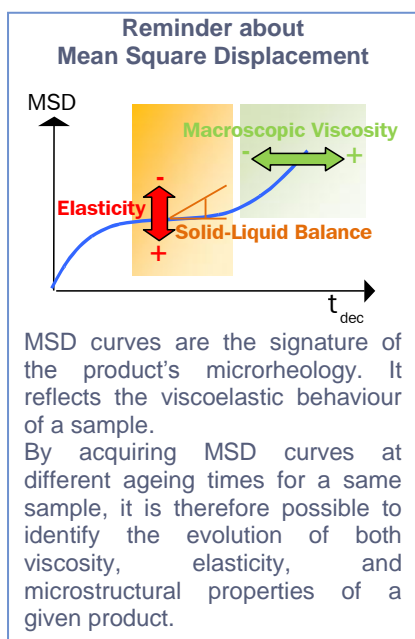
Analyse the evolution of the gelling during the formation of a yogurt.

Device

Rheolaser® LAB6+

Raw data: Particle Mean Square Displacement (MSD)

In microrheology, particles probe the viscoelastic behaviour of the sample. Thus, particle Mean Square Displacement curve is the signature of the product rheology.



MSD curves (see above) give an indication about the milk+bacillus behaviour during the process.

During the creation of the network, the MSD curves are moving to the bottom of the graph (increase of elasticity), reflecting the creation of the proteins network, and the decrease of its characteristic mesh size.