

# Yogurt sensorial properties right after preparation

## - Correlation between viscoelastic analysis and panel tests -



### KEY BENEFITS

- RAPID SCREENING
- SAME DAY RESULTS
- NO STRESS

### Introduction

Testing the textural properties of yogurts can be tedious and expensive, when employing a test panel. Conventional methods, such as oscillatory rheometry or viscosimetry are often not sensitive enough, and texturometry, tribology and panel tester can be used only after fabrication (up to days). We propose here a new innovative and simple method to study the impact of yogurt recipe on the textural properties such as whey syneresis, stiffness, ropiness using Rheolaser<sup>MASTER</sup>. During a two years research project (RHEOLACT'), theoretical models were developed to **predict sensorial parameters of set yogurts the day of fabrication (Day 0)**.

Microrheological descriptors obtained directly during fabrication were successfully correlated to panel test results, which will accelerate innovation cycles and product development.

### Preparation of the yogurt

Different yogurts were prepared at *Technological Hall of Toulouse Engineering School for Agriculture and Food - INPT Toulouse, France* with wide range of textural properties (Table 1).

Each batch was dispatched into 3 Rheolaser measurement cells and at least 40 standard plastic yogurt beakers (150g) for parallel testing. Fermentation temperature was set to 42°C and experiment was conducted until pH 4.6 was reached (measured in parallel).

	Milk	Starter	Protein addition	Protein type
Recipe 1	Whole milk	YCX11	YES	Promilk 600A
Recipe 2	Whole milk	YoMild	NO	
Recipe 3	Skimmed milk	YC370	NO	
Recipe 4	Whole milk	YCX11	YES	Spray 0%
Recipe 5	Whole milk	YCX11	NO	
Recipe 6	Skimmed milk	YCX11	YES	Promilk 852A

Table 1: Recipes for panel test and Rheolaser Master

Panel tests were performed after **10 days** with a trained panel of 12 persons. 5 different descriptors were tested:

Parameter	Definition	Min. Score	Max. Score	Definition
Whey content	No whey	0	4	1 coffee spoon or more
Firmness	Easy to penetrate	0	3	Hard to penetrate
Adhesion in mouth	Fast dissolving, low adhesion	0	3	Resistent in mouth, high adhesion
Heterogeneity in mouth	Homogeneous, smooth, not granular	0	3	Heterogeneous, granular
Heterogeneity after stirring	Smooth, not granular	0	3	Heterogeneous, granular

Table 2: Scoring rules for panel tests.

The panel was trained before each testing with reference products. Scores between 0 and 3 (4 for whey content) were attributed to each recipe in a blind test.

### Data treatment

Typical data obtained during milk fermentation will look like shown in Figure 1. MSD curves are shown as a function of decorrelation time. These MSD curves (Mean Square Displacement) contain all information of the viscoelastic properties, such as elasticity, viscosity, stiffness, displayed in real time.

The blue curves on the top show the liquid milk at pH 6.5 at the beginning of the fermentation. With time, the bacterial activity decreases the pH and yogurt milk gel is formed. The MSD curves show then a bent signature, typical for viscoelastic samples with a solid-like character. At the end of the process, red curves, the sample shows a clear elastic plateau, typical for a milk gel.

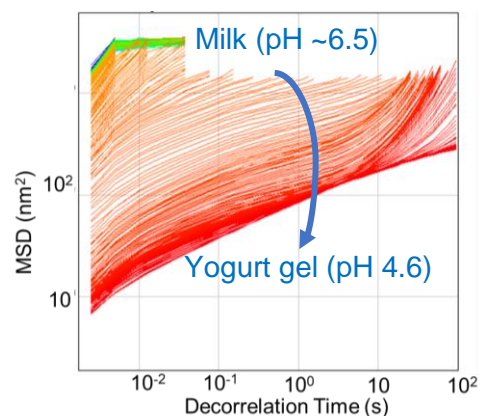


Figure 1: Typical result of Rheolaser<sup>MASTER</sup> measurement during yogurt fabrication

Microrheological Parameters (MP) right after fabrication at pH 4.6 were extracted and correlated to the corresponding scores of the panel tests. Correlation was done using multiparametric linear regression with 1 or 2 MP to describe 1 panel parameter.