

EVALUATION OF PROTEIN IMPACT ON YOGHURT TEXTURES



INTRODUCTION

The texture of yoghurts can be adjusted by several means. The fat content influences the creaminess and leads to more texturized yoghurts. However, customers want more and more fat free formulations. Fat free standard yoghurt are usually jelly-like and kind of brittle, without the full texture of whole milk yoghurts. The creaminess of fat free yoghurt can be obtained by mechanical way (stirred yoghurt) which breaks up the gel and release the whey. The choice and type of ferment can significantly influence the texture of yoghurts. Protein addition offers a third possibility to tune the texture properties of yoghurts. High quality proteins, which were extracted from milk and concentrated, can be added to the milk. These milk proteins were kindly provided by Ingredia. On the example of skimmed and half-skimmed yoghurts, the influence of high quality milk proteins are shown. A second example will show, how whole milk yoghurt can be impacted with another high quality milk protein to give more smooth yoghurts.

			Reference 1	Sample 1
Example 1	Skimmed Milk	Protein 1	14.0	12.0
		Protein 3	0.0	0.3
	Total fat content		0.0	0.0
	Total protein content		4.8	4.3
			Reference 2	Sample 2
Example 1	Half Skimmed Milk	Protein 1	11.1	9.0
		Protein 3	0.0	0.3
		Cream	5.0	5.0
	Total fat content		2.2	2.2
Total protein content		4.8	4.3	
			Reference 3	Sample 3
Example 2	Whole Milk	Protein 1	8.1	7.1
		Protein 2	0.0	2.1
		Cream	10.0	10.0
	Total fat content		4.2	4.2
Total protein content		4,76	4.6	

SAMPLE PREPARATION

Table 1: Composition of the samples in wt%.

Milk was prepared by rehydration (50°C, 1h) of the proteins with the above mentioned proportions, stored overnight and pasteurized (92°C, 5 min). A standard two culture ferment was used for fermentation (0.004%) at 44°C. The pH was measured until 4.65 was reached and the yoghurt was stored in the refrigerator for further analysis.

RESULTS

EXAMPLE SKIMMED AND HALF-SKIMMED YOGHURT

Milk fermentation can be studied in real-time as described in AN-Dairy product. Gel point and evolution of elasticity index and macroscopic viscosity index can be obtained. However, reinforcing proteins need usually several days to express and to provide the desired effect. The advantage of Rheolaser is, that the same sample can be stored in the refrigerator and analyzed several times at 4°C, which is not possible with a conventional rheometer.

Figure 1 shows the Elasticity Index at 4°C after storage overnight in the refrigerator for Sample 1 and Sample 2 and the corresponding Reference samples 1 and 2. It can be seen, that Sample 1 and Sample 2, which were enriched with protein 3 has higher EI the reference samples. The protein increased the texture, which qualifies it as reinforcing the functionality.



Figure 1: Elasticity Index after storage at 4°C over night.

INFLUENCE OF HIGH FUNCTIONALITY PROTEINS ON WHOLE MILK YOGHURT

With increasing fat content, the yoghurt increases not only in creaminess, but also gets higher elasticity. The texture is fuller. This is due to the fat globules which reinforce the protein network. Figure 2 shows the Elasticity Index as a function of the fat content after one day.

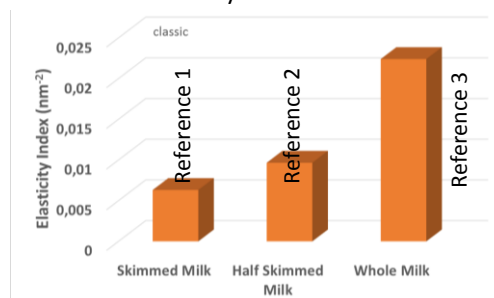


Figure 2: Elasticity Index as a function of the fat content at 4°C after storage overnight in the refrigerator.