

CLEAN LABEL PROCESS TOLERANCE

NOVATION Endura™ 0100 starch in
stirred yogurts processed with challenging
temperature and homogenization pressures

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Introduction

The market for clean label foods continues to grow at a very fast pace. The Naturally Healthy Packaged Food category in the US (natural, clean, free from foods) is forecasted to grow 8.6 % by year 2021 to reach \$23.4 billion (Euromonitor Report “Naturally Healthy Packaged Food in the US”, May 2017).

This consumer need has translated into an increase in more clean label product launches. Between 2012 and 2017 40% of total food new product launches in the US had clean label positioning (Mintel GNPD, 2017). Opportunities abound for food manufacturers to meet the demand for clean label foods. Recent advancements in functional native starch technology now allow for more foods, including dairy, to be produced using these clean label ingredients.

Formulating yogurts with clean label starches remains a challenge because of harsh processing conditions encountered in manufacturing and the limited process

tolerance of native (non-modified) starches. Typical manufacturing conditions include high temperature and homogenization pressures, which degrade the integrity of many existing clean label starches. The loss of starch integrity affects the functionality and ultimately the texture of finished yogurt product. NOVATION Endura 0100 starch, a next generation functional native starch based on breakthrough proprietary technology, allows manufacturers to retain the viscosifying properties of the starch in yogurts processed using high temperature/high pressure parameters.

Benchmarking the texture impact and stability in stirred yogurt of NOVATION Endura 0100 starch against chemically modified starches

Approach

NOVATION Endura 0100 starch was benchmarked in stirred yogurt against chemically modified starches typically used in this application, THERMTEX® and NATIONAL™ 1333 (Table 1). The yogurts were produced with a downstream homogenization process under demanding temperature/pressure parameters (190°F pasteurization temperature and 1740 psi total homogenization pressure) (Figure 1). The samples were evaluated for texture on a 0-15 scale by an expert descriptive sensory panel and instrumentally characterized over a 7 week refrigerated shelf life.

Results

The descriptive panel’s evaluation of the yogurt samples at 1 and 7 weeks showed that NOVATION Endura 0100 starch provided a texture impact similar to the samples formulated with the chemically modified starches, THERMTEX and NATIONAL 1333. Even when utilizing demanding processing parameters, there were no texture defects or signs of

TABLE 1: STIRRED YOGURT FORMULATIONS WITH FUNCTIONAL NATIVE (A) AND CHEMICALLY MODIFIED (B) STARCHES

A	INGREDIENTS	PERCENT
	Skim Milk	94.91
	Non Fat Dry Milk	1.34
	NOVATION Endura™ 0100 Starch	3.45
	Gelatin	0.30
TOTAL		100.00

B	INGREDIENTS	PERCENT
	Skim Milk	95.71
	Non Fat Dry Milk	1.34
	THERMTEX® or NATIONAL™ 1333	2.65
	Gelatin	0.30
TOTAL		100.00

FIGURE 1: TYPICAL DOWNSTREAM HOMOGENIZATION PROCESS FLOW DIAGRAM

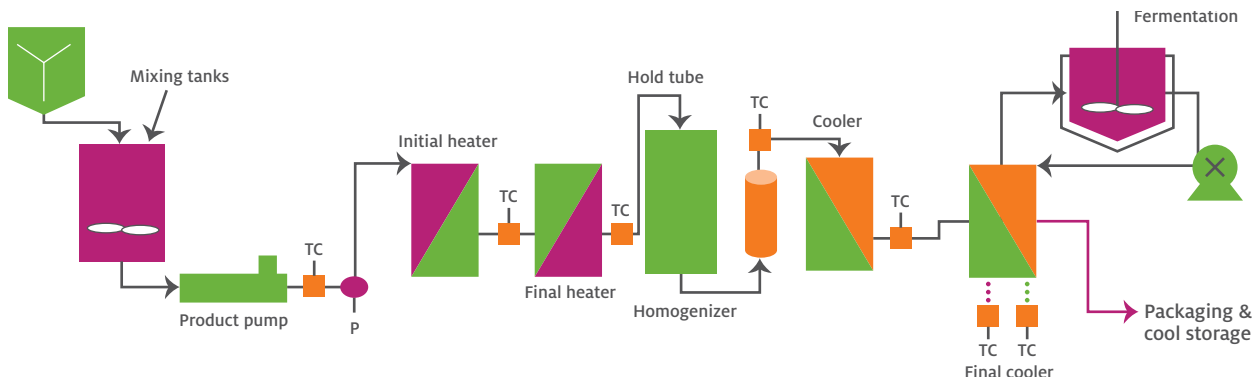
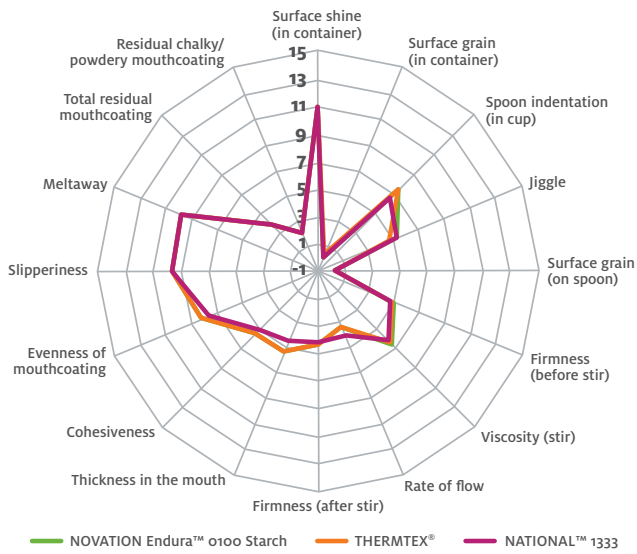


FIGURE 2: EXPERT DESCRIPTIVE PANEL EVALUATION OF STIRRED YOGURTS AT 1 WEEK



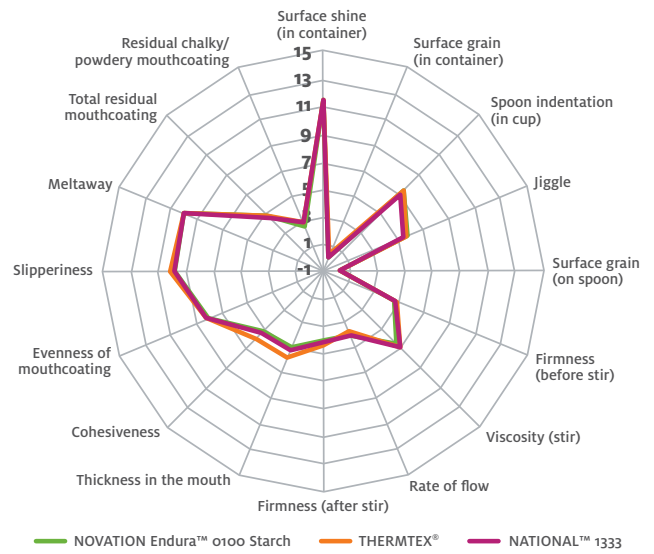
instability in any of the NOVATION Endura™ 0100 starch samples. As the samples aged, they became more similar to each other in several attributes like spoon indentation, jiggle, and firmness (after stir).

The spider plot in Figure 2 shows virtually no differences between modified and functional native starches in key textural attributes at 1 week. Figure 3 shows the same results at 7 weeks.

The tests show that the texture of yogurts made with NOVATION Endura 0100 starch, under demanding processing parameters, does not differ from industry standard chemically modified starches, THERMTEX® and NATIONAL™ 1333. There were no signs of inherent instability with any of the samples evaluated and, as expected, they showed an upward trend in all rheological measurements over the 7 week refrigerated shelf life due to normal aging related to the setting of the protein/starch network (Figure 4).



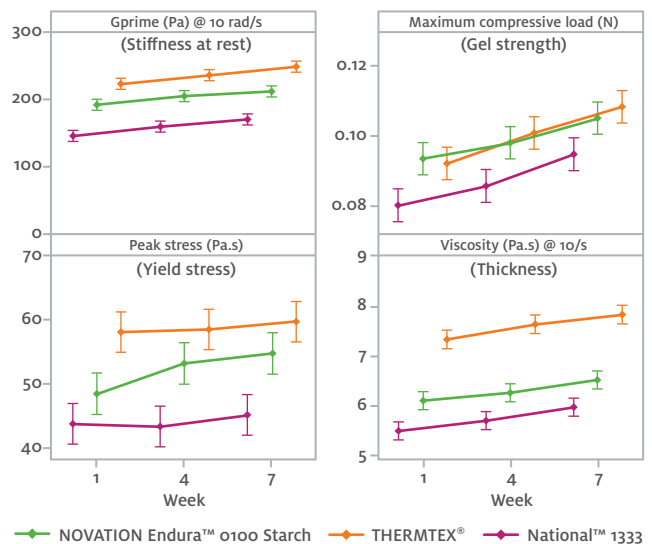
FIGURE 3: EXPERT DESCRIPTIVE PANEL EVALUATION OF STIRRED YOGURTS AT 7 WEEKS



Conclusions

NOVATION Endura 0100 starch can provide similar texturizing functionality in stirred yogurts as compared to chemically modified starches. It allows for a simpler, cleaner label to address consumer needs, without sacrificing performance. Even with demanding processing parameters, such as high temperature/pressure combinations, clean label stirred yogurts can be readily made with NOVATION Endura 0100 starch because of its ability to remain fully functional over a wide range of processing parameters. Equally important, the functional native starch maintains as stable a texture as the chemically modified benchmarks over typical refrigerated shelf life.

FIGURE 4: RHEOLOGICAL MEASUREMENTS OF STIRRED YOGURTS OVER 7 WEEKS



Bars represent 95% confidence interval: pooled error

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