Maximising Productivity with Natural Biosolutions
Novonesia - who are we?

What are consumers looking for in yogurt?

Yogurt producers are under pressure from many sides - what can you do?

New combined cultures for yogurt production

Testimonial of a successful relationship from around the world
Now an even better toolkit, from the partnership and people you can trust

**Novonesis**
Leading portfolio of Food & Beverage Biosolutions

**Chr. Hansen**
150 years of microbial expertise

**Novozymes**
80 years of enzymatic expertise
Purely dedicated to biology

Biosolutions are tiny but mighty enzymes and microbes.

The right combination helps transform your products, your processes and your impact on the planet.
Value for money and sensory experience are the most important motivators for purchasing yogurt

**REASONS FOR CHOICE – RANKED BY IMPORTANCE**

% of UK consumers

- Great flavour: 54%
- Value for money: 51%
- Really tasty: 45%
- A brand I trust: 41%
- Healthy: 38%
- Great texture: 34%
- Low or no fat: 33%
- Natural: 29%
- Pack size is just right: 27%
- Fresh: 26%
- Low or no sugar: 20%
- Good for the gut: 19%
- Good source of calcium & vitamins: 17%
- Soft texture: 15%
- Good mouth feel: 14%

In Scandinavia, **flavor** and **price** are also the most important purchase motivators.

54% of US consumers are willing to pay more for **creamy** and **thick texture**.

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1 Chr. Hansen consumer insights on yogurt and fermented milk, UK 2020 - What are all your reasons for choosing - Select all that apply.
2 Chr. Hansen consumer insights on yogurt and fermented milk, Denmark, Sweden, Norway and Finland 2021
3 Chr. Hansen consumer insights on yogurt and fermented milk, United States 2021: percent among consumer who buy yogurt and check food labels
“Natural” is a crucial theme for yogurt buyers

22% of recent spoonable yogurt launches claimed to contain no artificial additives

66% of US consumers are even willing to pay more for yogurt made with all-natural ingredients

MOST IMPORTANT CLAIMS WHEN BUYING FOOD AND DRINK PRODUCTS
1. No artificial ingredients
2. No preservatives
3. Locally produced/sourced
4. All natural

1. Mintel 2022, Claims: Free from Added/Artificial Flavourings; All Natural Product; No Additives/Preservatives; Free from Added/Artificial Additives; Free from Added/Artificial Preservatives
2. L.E.K. survey of 1600 consumers, 2020
3. Chr. Hansen consumer insights on yogurt and fermented milk, United States 2021: percent among consumer who buy yogurt and check food labels
Dairies are under pressure from multiple factors and often seek even higher productivity to remain competitive.

TYPICAL DAIRY COST PRESSURES

- Raw material cost & availability
- Labour cost & availability
- Retail margin pressure
- Energy cost
- Milk & powder price
- Raw material cost & availability
- Climate regulation

FreshQ® Bioprotective cultures
YoFlex® Premium texturising cultures
Our comprehensive understanding of the full texture equation helps us collaborate with you to find the perfect solution.

YOGURT TEXTURE DEPENDS ON THREE IMPORTANT FACTORS

- **Starter culture**
  - Resilient acidification
  - Exocellular polysaccharides

- **Milk composition**
  - Milk protein
  - Additives

- **Manufacturing process**
  - Temperature
  - Shear

Our century of expertise within starter cultures provides the foundation for our work to help our customers create superior yogurt products.

However, the perfect texture can only be achieved by understanding the effects of milk composition and production parameters as well.
YoFlex® Premium 11 is the most recent culture in our YoFlex® Premium range with the highest texture development and robust post-acidification control.

**IMPROVED TEXTURE**

Premium 11 provides increased mouth thickness and gel firmness compared to all other YoFlex® cultures.

**MILD FLAVOR PROFILE**

Premium 11 delivers our mildest flavour profile yet – opening the door to sugar reduction and longer shelf-life.

**REduced POST ACIDIFICATION**

Premium 11 offers very low post-acidification, even at elevated temperatures - enabling increased filling temperatures.
YoFlex® Premium 11 provides increased texture and gives the premium experience that consumers are looking for.

**MOUTH THICKNESS**
Measured by shear stress (Pa)

- YoFlex® Premium 1.0: 26 Pa at 30.2 s⁻¹
- YoFlex® Premium 11: 38 Pa at 30.2 s⁻¹
- YoFlex® Premium 1.0: 54 Pa at 300 s⁻¹
- YoFlex® Premium 11: 68 Pa at 300 s⁻¹

**GEL FIRMNESS**
Measured by complex modulus (Pa)

- YoFlex® Premium 1.0: 144 Pa
- YoFlex® Premium 11: 155 Pa

Shear stress measured at 13 °C day +7, with sample storage at 6°C.
Complex modulus extracted from oscillation measurements at 152 s⁻¹ measured at 13°C, day +7, with samples stored at 6°C.
Plain stirred yogurt: 1.5% fat and 4.0% protein (fresh milk and skim milk powder). Fermentation at 43°C, cut pH 4.55.
YoFlex® Premium 11 has very low post-acidification at refrigerated temperatures vs. Premium 1.0.
Introducing FreshQ® Premium

Ready-to-use one-pouch cultures for yogurt: combining fermentation-enabled bioprotection with YoFlex® Premium, our market-leading starter culture
FreshQ® Premium offers the perfect partnership of taste and texture while keeping yogurt fresh for longer.

**PREMIUM TASTE AND TEXTURE**
Achieve indulgent texture and taste, combining high mouth thickness and gel firmness with a robust culture performance for a mild flavor consumers love.

**FERMENTATION-ENABLED BIOPROTECTION**
Use good bacteria that help protect yogurt against spoilage caused by yeast and mold when used in fermentation – keep yogurt fresh for longer.

**INCREASE PRODUCTIVITY**
Lower recipe cost and enhance profitability with natural cultures that reduce the need for expensive skim milk powder and keep product waste low.

Novonesis is dedicated to being the perfect partner for supporting your business as you innovate for the future.

FreshQ® Premium 11 represents our mission to help you remain competitive and relevant to consumers, so you can meet their needs tomorrow and beyond.
YoFlex® Premium 11 reduces the need for expensive skim milk powder in the yogurt recipe. The all-in-one culture FreshQ® Premium 11 has the same benefit.

The level of possible protein reduction depends on both the protein starting level and goals for texture outcomes.

Shear stress measured at 13 °C day +7 at shear rate 300 s⁻¹, with sample storage at 6°C.
Complex modulus extracted from oscillation measurements at 1.52 s⁻¹ measured at 13°C, day +7, with samples stored at 6°C.
Plain stirred yogurt: 1.5% fat and 3.4 - 4.0% protein (fresh milk and skim milk powder). Fermentation at 43°C, cut pH 4.55.
Chr. Hansen was the first to discover that the competition for manganese is a primary bioprotective mechanism that is mediated by a specific transporter (MntH).

**AN ESSENTIAL NUTRIENT**
Manganese is an essential nutrient required by bacteria, yeast and mold to grow. Manganese is available in fermented dairy products, such as yogurt, in very limited quantities. 1,2

**A SPECIFIC TRANSPORTER**
Certain lactic acid bacteria strains can absorb manganese through a transporter (MntH).

**FREE MANGANESE SCAVENGER**
Free manganese is taken up by the lactic acid bacteria within FreshQ, further reducing the availability of this essential nutrient to yeasts and molds which inhibits their growth.

1 Eurofins analysis
2 https://frida.fooddata.dk/
For FreshQ® cultures to perform optimally, the following conditions must be met:

- **THE INITIAL LEVEL OF MANGANESE IN THE PRODUCT IS LOW**
  Milk (cow, goat and sheep) contains sufficiently low levels of manganese to be effectively depleted by the FreshQ® culture.

- **FRESHQ® TAKES PART IN THE FERMENTATION WITH A STARTER CULTURE**
  Fermentation with a starter culture activates the MntH transporter of the FreshQ® culture.

- **FRESHQ® STAYS ALIVE IN THE FINAL PRODUCT**
  Activity of live FreshQ® cells will be needed to continuously take up manganese and protect the product.
FreshQ® Premium 11 demonstrates impressive growth delaying effect against yeast and molds

**EXAMPLE: GROWTH OF D. HANSENII YEAST**

Yogurt fermented with a starter culture alone or with FreshQ® Premium 11, added *D. hansenii* (50 cfu/mL) and stored at 7°C for 26 days.

**EXAMPLE: GROWTH OF THREE MOLD SPECIES**

Yogurt fermented with a starter culture alone or with FreshQ® Premium 11, solidified by agar and spiked with *P. brevicompactum*, *P. crustosum* and *P. solitum* (500 spores/spot) before storage at 7°C for 36 days.
A look at typical yogurt shelf life across markets underscores there is no “normal” shelf life

Including FreshQ® in fermentation can help extend shelf life

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Recent examples of how we partnered with fresh dairy producers to increase their margins
Dutch dairy wins market share and achieves higher margin with YoFlex® Premium 11 compared to competitor culture

**AMBITION**

The customer wanted to improve the texture and overall consumer preference of their stirred yogurt to match the market leader. In addition, they wanted to do this with as little milk protein as possible.

**RESULT**

According to the customer, YoFlex® Premium 11 culture gave higher texture and overall consumer preference tested by an independent institute. The result was equal to the market leader but obtained with only 4% milk protein instead of 5%. This corresponds to a cost reduction of €56 per ton yogurt with a potential cost saving of 2.8 m€\(^1\). This allowed the dairy to win market share with a reduced cost giving higher margins on their yogurt line.

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1. €56 per ton in a 50,000-ton per year yogurt plant.
FreshQ® helped a European dairy get in control of their spoilage quality

**THE CASE**
A dairy producing premium yogurt without artificial preservatives was facing a dramatic increase in consumer complaints on yeast and mold and experiencing high levels of returns from retailers.

**SUCCESS CRITERIA**
A minimum of 50% reduction of batches with consumer complaints related to yeast and molds.

**RELEVANT MEASURES**
Consumer complaints and internal shelf life analysis were registered during the field trial period for all batches.

**TIMELINE**
Data collected for all batches (with and without the addition of FreshQ®) produced for a period of 15 weeks.

**CONCLUSION:** Consumer complaints were significantly reduced in batches produced with FreshQ®, increasing brand loyalty from both consumers and retailers.
Example of how FreshQ® helped extend shelf life and keep product fresh during open shelf life

THE CASE
A dairy producer was interested in extension of shelf life of skyr from 33 to 45 days. Product is sold in large containers and shelf life is challenged by contamination and spoilage in open shelf life.

SUCCESS CRITERIA
Extension of shelf life from 33 to 45 days with focus on keeping a fresh flavor throughout the full and extended shelf life and avoiding visual growth of yeast and molds.

RELEVANT MEASURES
Batches with FreshQ® were followed over current and extended shelf life with evaluation of yeast and mold growth as well as weekly sensory evaluations. In addition a challenge test performed.

CONCLUSION
The dairy started using FreshQ® 12 and extended shelf life.

PRODUCT FAILURE RATES MEASURED ON ALL BATCHES PRODUCED FOR A PERIOD OF THREE MONTH

CHALLENGE TEST YEAST

CHALLENGE TEST MOLD

“A more mild and creamy flavor with FreshQ® 11 and FreshQ® 12 compared to reference with slightly more creamy flavor with FreshQ® 12”
Thank you