



TECHNICAL WHITE PAPER:

# Delightful dairy desserts

*Creating dairy dessert joy for everyone*

Dairy desserts are a staple in many consumers' refrigerators — offering a treat, and a moment to indulge. Unsurprisingly, taste is the top purchase driver for the category.\*

With consumer household budgets being stretched, category lines blurring and more attention being paid to how the products look inside and out (packaging, ingredients list, nutritional profile, etc.) perfecting your offering to address consumer needs has never been more important.

While dessert recipes may seem “simple,” in themselves, there are endless possibilities when it comes to tailoring finished products. To do so, you need a partner with the expertise to understand and deliver towards your processes and requirements. At the same time, you want a supplier that will offer you the critical ingredients to help deliver the pleasing products that your consumers have come to know and love.

In this white paper, Cargill R&D experts, Caroline, Robert and Stéphane, shed some light on the challenges faced when creating dairy desserts and the solutions that we can provide to overcome them.

## A “dairy desserts” definition

The dairy desserts category includes ready-to-eat dairy desserts that are manufactured industrially (e.g., flans, crème caramels, mousses, and cream desserts etc.).

It covers both **chilled** (must be chilled to prevent spoilage) and **shelf-stable** desserts (do not need to be chilled to prevent spoilage).

## MEET OUR CARGILL EXPERTS



**Caroline Delabrousse**

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\*Source: Innova Market Insights category survey 2025, European average.

# Critical elements for dairy desserts

For this white paper, we are primarily focusing on “neutral dairy desserts.” This includes many regional preferences such as “vla” (popular in Benelux), “crème caramel” (popular in France), and “crema catalana” (popular in Spain). The type of dessert determines the textural needs, which can range from “thick,” to “creamy,” to “gelled,” and to “airy.”



## The type of dessert defines the type of texture:



Thick & creamy



Gelled



Multi-layered



Airy

## Key elements to understand:



### Formulation parameters

Fat percentage, proteins, sugars, stabilizers, etc.



### Flavoring

Chocolate, vanilla, coffee, caramel, etc.



### Texture

Strong gel, thick, creamy, etc.



### Shelf life

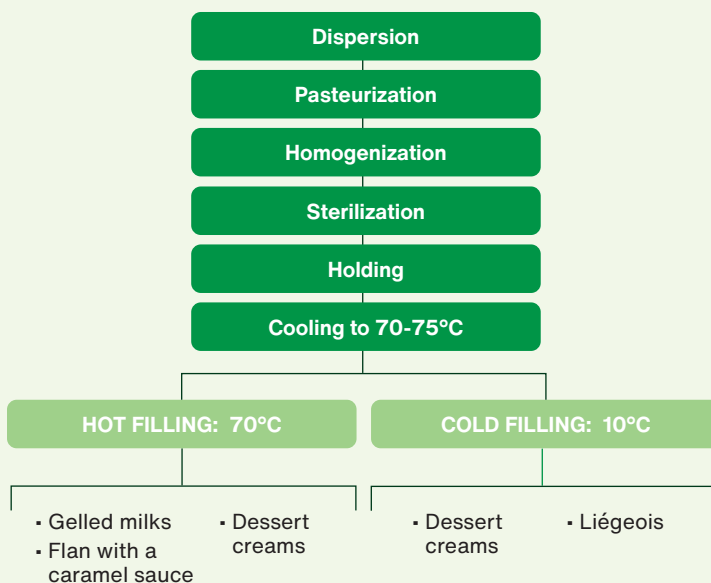
Short (4-6 weeks) to long (12-18 months)



### Processing

Type of sterilization (UHT, can retort, oven, etc.)

## Neutral desserts production process conditions are critical



### Main points:

- Homogenization temperature and pressure
- Homogenization place (Up or Down stream)
- Filling temperature

### Requested characteristics:

- Gelling agent: Unctuous – brittle
- Thickening: thixotropic or not
- Post gelation Kinetic (for topping addition)

### Texturizing systems:

- Carrageenan – others
- Starches (native, modified)

### Flavoring/color:

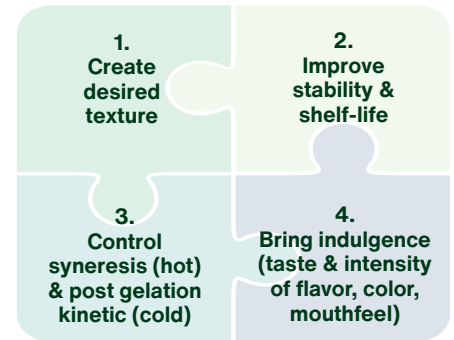
- Cocoa powder

## Stepping up to the challenge

The key challenges faced when creating delightful neutral dairy desserts can be summarized under four challenges. The good news is that Cargill is your one-stop-shop to address all of them.

The main challenges are to achieve the right texture and enhance shelf-life stability and ensure that it is maintained during storage and transportation. The processing conditions are critical to define the texturizing system that is best suited to customer needs. For example, for hot-filled products like flans, syneresis control is a key challenge. On the other hand, when it comes to cold-filled products, post-gelation kinetic factors must be controlled to enable the deposition of toppings.

### Key challenges manufacturers face in creating delightful neutral dairy desserts:



### Gelled or creamy/spoonable desserts are typically stabilized with carrageenan and starch:

- Carrageenan helps to thicken, gel, and stabilize. This is because carrageenan has a positive protein interaction at neutral pH.
- Starch helps to thicken and bind the water.

### So essentially, challenges 1-3 boil down to:

- Select the appropriate stabilizer & starch according to process and texture needs.
- Achieve the optimum synergy between carrageenan and protein.

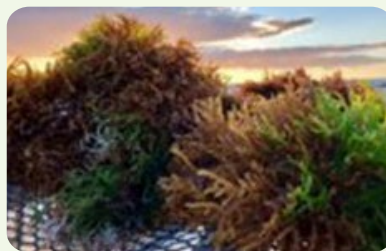
Once these challenges are overcome, challenge 4 (“bring indulgence”) can be met by selecting the right cocoa powder to deliver the desired taste, color, and mouthfeel. This can potentially be complemented by chocolate.\*

### A snapshot of Cargill hero ingredients for dairy desserts



#### Cocoa powder

Brings indulgence through taste, color and mouthfeel, and the desired intensity of flavor.



#### Carrageenan

This ingredient’s thickening, stabilizing and gelling properties, and strong synergy with proteins, make it an attractive cost-in-use stabilizer.

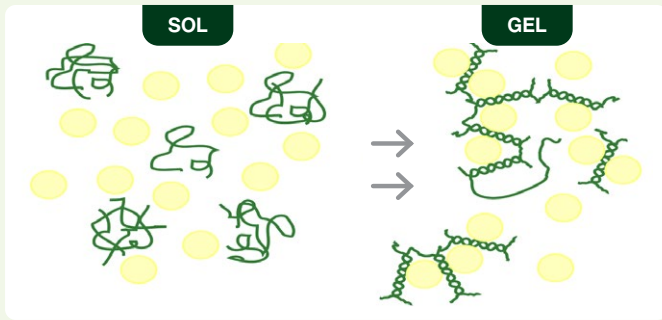


#### Starch

Its ability to create creamy, viscous textures while having a “clean” taste makes it a key ingredient. Furthermore, starch can prolong shelf-life and offer process stability.

\*Depending on the market or type of offering there can be a greater dosage of chocolate next to cocoa powders. In France, for example, a “crème dessert au chocolat” classification requires a minimum dosage of 2% chocolate. More premium branded products would typically have a combination of chocolate and cocoa powders, whereas more economical offerings would often solely use cocoa powder.

## Carrageenan-milk interaction



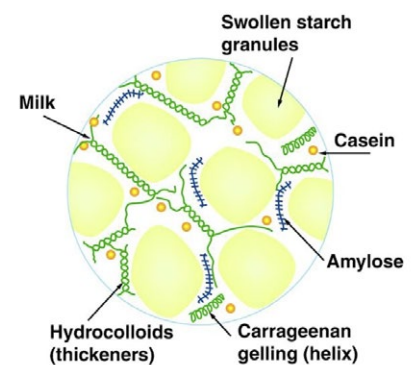
Carrageenan has a special ability to interact with milk proteins, and particularly casein. This interaction helps form a network that thickens and stabilizes the milk and reduces the formulation dosage.

The gelling carrageenan/casein interaction is due to the formation of an electrostatic complex which leads to the adsorption of kappa or iota carrageenan onto the casein micelle surface.

## Stabilizers

*The synergistic effect of starch and carrageenan in dairy desserts*

Stabilizers need to be efficient at low dosage. Furthermore, they need to be adapted to industrial dairy processing conditions and remain stable over time. Starch and carrageenan work well together, since starch swells and absorbs a large quantity of water. This results in the remaining soluble components (proteins, sugars and hydrocolloids) being concentrated in the remaining water. An increased texturizing effect is observed in thickening or gelling properties. This enables the creation of a wide range of dairy desserts and textures.



### Synergies between starch and carrageenan are realized in:

- **Gelling and texture enhancement:** Starch and carrageenan work well together in dairy desserts thanks to their complementary properties.
  - *Carrageenan acts as a thickening and gelling agent.* It forms a network with milk casein, which reduces the formulation dosage, and improves texture. This is particularly beneficial in creating creamy textures which are especially critical in low fat or low sugar applications, for example.
  - *Starches like C\*PolarTex® (a highly stable texturizing hydroxypropylated starch) provide a short and creamy texture, which complements the gelling properties of carrageenan.*
- **Thixotropic properties:** The combination of starch and carrageenan allows for thixotropic properties. This means that the mixture can rebuild its creamy texture after shearing. This factor is particularly relevant in processes like cold filling, where maintaining texture is crucial.



# The power of cocoa powder

In neutral dairy desserts, cocoa powder brings indulgence through taste, color and mouthfeel. However, there are some considerations, such as switching the cocoa powder and with that the alkalinity content (pH), that can lead to changes in the structure of the final product.

Non-alkalized powders should be avoided as they may present a sour taste which can make dairy products seem spoiled. Additionally, strongly alkalized powders may be too dark and grayish, which can result in a muddy color in dairy products.

## Key quality parameters for cocoa powders in neutral dairy desserts



### Color

*Intense and bright colors are typically desired*



### Flavor

*High quality flavors with no off-flavors are desired*



### Fineness

*Finer products are desired. Coarse cocoa powder might lead to problems such as dark spots in dairy desserts*



### Moisture

*A minimal moisture level is desired, as a high moisture content might lead to the growth of microorganisms*



### Microorganisms

*A minimal microorganism level is desired, especially heat-resistant spores forming bacteria in dairy applications*



## How Cargill can help

*In Europe, Cargill has a long-standing expertise in everything dairy.*

Cargill's R&D teams support our customers from two locations (Baupte (France) and Vilvoorde (Belgium)) which have fully equipped pilot plant facilities (incl. UHT, freezer, and fermentation tanks).

Moreover, our facilities feature a whipping machine to create mousses (Mondomix) and benchtop capabilities (<5kg). Furthermore, they house a wide range of analytical tools to measure anything from pH, viscosity, gel strength, firmness and whippability, to moisture and accelerated aging analysis.

Combined with our broad portfolio of high-quality ingredients for dairy, plant-based & hybrid alternatives, and our sensory expertise, these capabilities enable us to offer technical assistance as well as co-create new concepts and/or reformulate existing recipes. Whether you're innovating or reformulating for cost, health, label-friendliness or indulgence, we are your partner across dairy applications.



### **Cargill can support you across all dairy applications:**

- Fermented products
- Dairy desserts
- Dairy beverages
- Creams
- Processed & spreadable cheese
- Dairy powders & creamers
- Dairy dry mixes

Our application teams can also support hybrid or plant-based alternatives to dairy.

### **With high-quality ingredients:**

- Texturizers
- Functional systems
- Fibers
- Sweeteners
- Cocoa & chocolate
- Decorations & inclusions
- Edible oils & fats
- Plant proteins

## A delightful, label-friendly dessert:

### Vanilla Creamy Dessert



At Cargill, we truly understand dairy formulations, ingredient interactions & our customers' processes. This is why our dairy & dairy alternatives application team has the expertise to produce finished product prototypes. We also have the know-how to control and characterize (rheology & panel tasting) and design specific ranges of solutions per sub-application.

It is this combination of expertise and unparalleled solutions portfolio that ensures that you have all the tools at hand to help meet the distinct needs of your consumers.

To demonstrate the possibilities, our application experts have succeeded in creating a creamy, vanilla, label-friendly dessert. It's made by using only nature-derived ingredients.

- **SimPure® functional waxy maize starch** provides shelf-life stability, a clean taste and creamy texture in processes with moderate to high shear. We've used SimPure® 99405 – a waxy maize starch that is suitable for moderate processing. For more severe processing, SimPure® 99408 would be the best option.
- **WavePure® seaweed powder** contributes to body and mouthfeel, while stabilizing, without compromising on taste. This prototype is made using WavePure® ADF 8360, which is designed for creamy desserts.

The result is a label-friendly, yet indulgent, creamy product that is targeted to consumers who value transparency and simple recipes with nature-derived ingredients. And we can safely state that it's indulgent and tasty. After all, when trialing prototypes from our latest 'dairy joy for everyone' campaign this prototype consistently received great liking rating in customer tastings.

## SimPure®

*"SimPure® starch enables you to easily reformulate while maintaining product quality, texture and manufacturing methods."*

**SimPure®:** This range of functional label-friendly waxy maize and tapioca starches is designed for different processing conditions with excellent viscosity, texture stability and sensorial performance. The SimPure® portfolio is primarily built according to the desired texture functionality and type of process. As a result, it offers both solutions for viscosity (994 series), gelling (996 series) and creaminess (999 series).

### NEW!

Cargill's new SimPure® Bright 99406 brings enhanced color performance versus existing SimPure® starches. This makes it more suited for color-sensitive applications like vanilla creamy desserts.



## WavePure®

*WavePure® – whole, not-transformed seaweed, reproducible thanks to Cargill's expertise is your solution for label-friendly, high-quality formulations!*

**WavePure®:** This label-friendly, unique ingredient is based on seaweed that can be labeled as \*: "(Red) Gracilaria Seaweed Powder" or "(Whole) Gracilaria Seaweed." It can contribute to mouthfeel and consistency in dairy & non-dairy desserts and help to develop versatile textures. As a result, it enables the development of innovative, label-friendly recipes. Cargill currently offers two WavePure® products:

- ADF 8360 (for creamy desserts)
- ADG 8250 (for gelled desserts)

\*The labeling, substantiation and decision making of all claims is the customers' responsibility. We recommend you consult regulatory and legal advisors familiar with applicable laws, rules and regulations prior to making labeling claims decisions for your products.

## VANILLA CREAMY DESSERT

### Ingredients

Skimmed Milk

Sugar

Cream 35%

**SimPure® 99405**

Skimmed milk powder

**WavePure® ADF 8360**

Vanilla flavor

Beta-Carotene

### Amount per serving (100g)

Energy (kJ) 469

Energy (kcal) 112

Fats 2.9

*of which saturated* 1.9

Carbohydrates 18.0

*of which sugars* 15.0

Proteins 3.5

Salts 0.1

### Standard cold-filled creamy dessert process

1. Pre-blend all the dry ingredients
2. Disperse into milk & cream
3. Hydrate for 30 minutes
4. Pre-heat at 63°C
5. Homogenize at 80 Bars
6. Pasteurize at 95°C for 2 minutes
7. Sterilize at 135°C for 15 seconds
8. Pre-cool at 75°C
9. Cool at 10°C
10. Fill in a "buffer tank" for 4 hours
11. Fill in pots



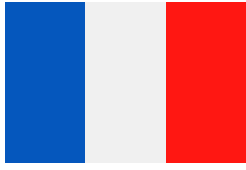
**When tasting our label-friendly vanilla creamy dessert with SimPure® and WavePure® with one of my customers, they were amazed that it is possible to make a creamy dessert with label-friendly, familiar texturizers, with a shiny appearance and nice, creamy dessert texture."**

*Stephane Mauduit, R&D Senior Technical Account Manager, Dairy & Dairy Alternatives*



## Tailor to local tastes

Stéphane and Robert elaborate on regional preferences in their respective markets (France and Germany), which, when combined make up half of the European dairy dessert volumes.\*



### France

The French market has a rich heritage of both creamy and gelled desserts. You will typically find dessert recipes with a higher carrageenan dosage here (lower in starch). These desserts tend to have a clean, non-sticky mouthfeel, medium body, and thinner texture.



### Germany

Germany has a tradition for “sahne” (whipped cream) desserts. These are high fat, indulgent desserts, with typically a higher starch dosage (and lower carrageenan dosage). Recipes can be as high as 3% starch and just 0.1% carrageenan. German desserts therefore have more body, some stickiness, and a thick, creamy mouthfeel.



**In Germany a creamy dessert is an indulgent product with a rich mouthfeel. The premium segment has a higher fat content due to cream (“Sahne”) addition.”**

*Robert Kampmann,  
R&D Senior Technical Account  
Manager, Dairy & Dairy Alternatives*

Regional preferences, but also differences in machinery, can impact recipes. However, while some customers prefer to solely work with starch, our experience has shown that this tends to develop too much viscosity in hot conditions and may clog up the equipment.

To offer solutions to customers who prefer to formulate without carrageenan — next to WavePure® —we also have a second solution: **UniPECTINE® pectin**. Pectin is a highly familiar ingredient among consumers.\* While pectin is unable to deliver the same texture variety that carrageenan can, and while it is unsuitable for multi-layered or high protein desserts (due to the strong reaction with calcium), in cold-filled desserts we can achieve good results.

## UniPECTINE®

**UniPECTINE® ADF 660 C SB** (a low methoxyl pectin) is a label-friendly, water-soluble texturizer, derived from citrus peels that can deliver thickening properties. Typically, a slightly higher dosage versus carrageenan would be needed. *This impacts cost and hence makes it a more viable alternative in the German market.*

\*Source: Euromonitor database, desserts and chilled snacks total volumes, Europe, 2024.

## Dial up the indulgence

Even though vanilla is traditionally the most popular flavor in food, perhaps unsurprisingly the top flavor in dairy desserts remains milk chocolate.\* Other popular “brown” flavors include dark chocolate, caramel and, more recently, salted caramel.

Cargill's Gerkens® cocoa powder portfolio features a wide range of flavor and color profiles to ensure we can meet your most unique demands. It is built to cater to key customer needs such as cost, indulgence, functionality, and health.



Two distinct signature powders are particularly successful in chocolate dairy desserts:

**Gerkens® DP70 –  
a medium red brown powder**

- Great all-rounder.
- Traditional color and well-rounded chocolate flavor.
- Signature taste.
- Smooth mouthfeel.

**Gerkens® Sweety SRB200 –  
a medium red brown,  
low fat only powder**

- Can reduce sugars up to 30% without using any sweeteners.
- Stronger creaminess.
- Sweet, milk chocolate taste.
- Preferred by children.\*\*



## gerkens®

**Gerkens® cocoa powders** are world-class powders, made from the best beans for more than 50 years. Cargill has processing facilities in the Netherlands, Brazil, Ghana, Cote D'Ivoire and Indonesia – bringing our spectrum of powders closer to you and your consumers. Our cocoa powders offer endless possibilities to achieve alluring colors, stand-out signature tastes, different fat options and consistency across the board.

\*Source: Innova Market Insights product launch database, July 2022-June 2025, Europe, excluding dry desserts.

\*\*Consumer validation with 90 adults and 150 kids aged 6-16 in Germany, France and the UK showed:

- Adults overall liking score on par with the full sugar reference.
- Kids scored the SRB200 above the full sugar reference:
- Overall liking (88% vs. 83%).
- Sweetness perception (85% vs. 81%).
- Chocolatey taste (86% vs. 80%).

## What's next?



While the dairy desserts market remains resilient, brands must navigate changing consumer needs, reduced spending power, regulatory pressures (e.g. sugar reduction & sustainability), and increased consumer expectations around transparency.

With an expert partner by your side, finding innovation opportunities and executing them becomes much easier. Thanks to Cargill's dairy and ingredient formulation expertise and broad portfolio of critical ingredients like texturizers and cocoa & chocolate, we can help you find the right balance between taste, cost, health and indulgence.

**The future of dairy desserts looks bright.**

*Let's co-create it together!*

[MORE INFORMATION >](#)

## OUR CARGILL EXPERTS



### **Caroline Delabrousse**

*R&D Senior Application Specialist  
Dairy & Dairy Alternatives*

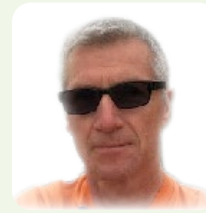
Caroline joined Cargill 9 years ago as Senior Dairy and Dairy Alternatives application specialist and works in the Cargill Dairy Application Center in Bauppte, France. During her 24 years of experience in the dairy and food ingredients industry for EMEA markets, she has developed a deep knowledge of texture for dairy and plant-based dairy alternatives and knows how to merge the voice of the customer with dairy science. She supports Cargill's customer facing teams to meet customer needs and overshoot their expectations.



### **Stéphane Mauduit**

*R&D Senior Technical Account Manager  
Dairy & Dairy Alternatives*

With over 30 years of experience in the specialty food industry, Stéphane is currently R&D Senior Technical Account Manager for Dairy & Dairy Alternatives in Europe, focused on providing value added solutions in the dairy and dairy alternatives industry. His role involves driving growth through innovative product solutions, managing projects, and building strong customer relationships. He has a broad range of experience especially around texturizers in dairy applications.



### **Robert Kampmann**

*R&D Senior Technical Account Manager  
Dairy & Dairy Alternatives*

With close to 38 years of experience in the food ingredients industry, Robert is currently R&D Senior Technical Account Manager for Dairy & Dairy Alternatives (including also fruit for dairy applications) in Europe, focused on providing value added solutions in the dairy and dairy alternatives industry. His role involves driving growth through innovative product solutions, managing projects, and building strong customer relationships. He has deep market insights and a broad range of experience, especially in texturizers and sweeteners in dairy applications.

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