

Palsgaard®

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The challenges in developing plant based frozen desserts

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Agenda

- Introduction to Palsgaard
- What is Ice Cream ?
- Plant based frozen desserts
- Palsgaard® Extrulce 305
- Q&A



Palsgaard in numbers



208 MILLION
USD turnover in 2019
(1.4 billion DKK)



572 EMPLOYEES
in 17 countries, 328
work at our global
headquarters in
Denmark



275+ EMPLOYEES
have received a medal
for 25 years of service



6 APPLICATION CENTRES
in 6 countries



6 FACTORIES
in 4 continents



120 + COUNTRIES
sold to

Plant-based emulsifiers and stabilisers for



CAKE PREMIXES



CAKE GELS



CONDIMENTS



CONFECTIONERY



DAIRY



ICE CREAM



INDUSTRIAL BAKERY



OILS & FATS



PLANT-BASED PRODUCTS



PROCESSED MEAT

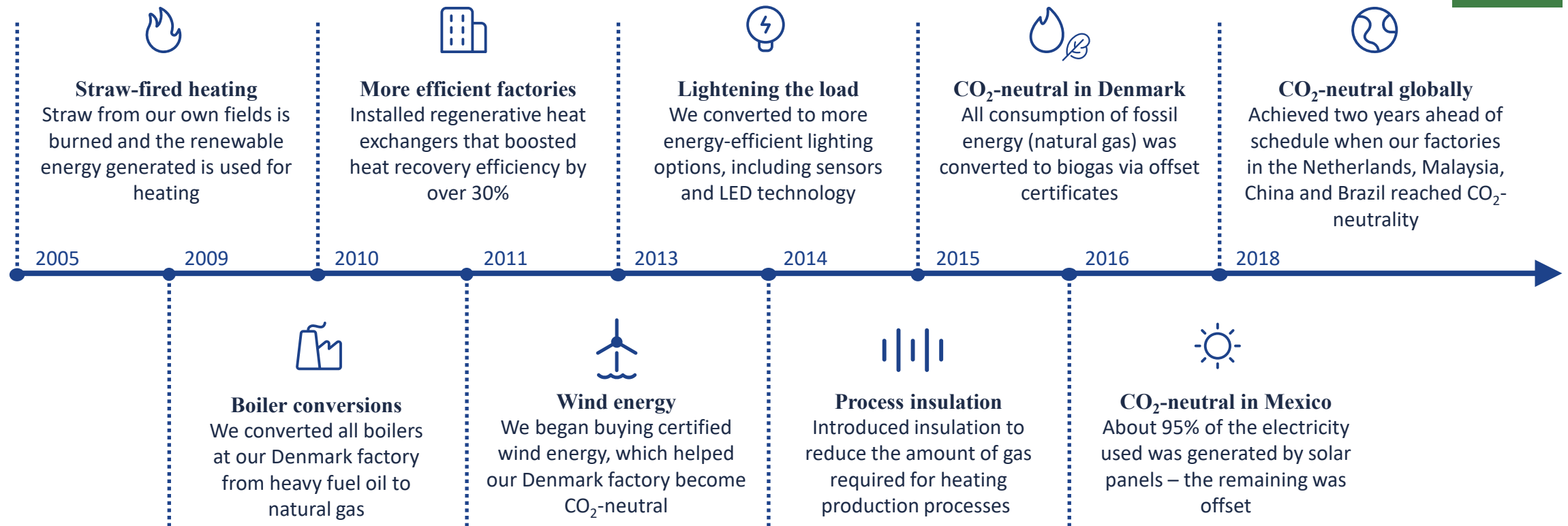


PERSONAL CARE

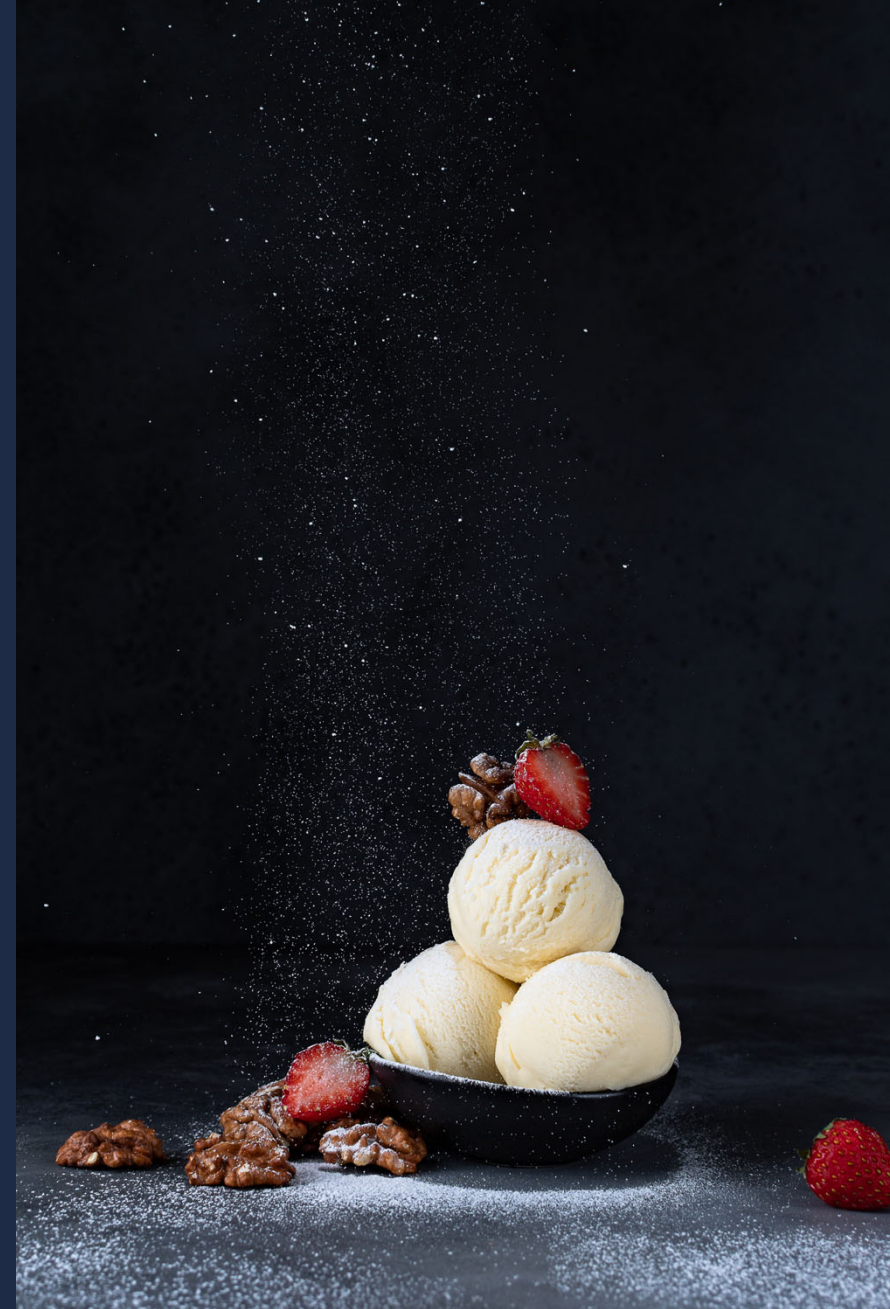


POLYMERS

Our remarkable journey to CO₂-neutrality



What is Ice Cream ?



What characterises a good ice cream?

- **Smooth texture**
- **Creamy mouth-feel**
- **Excellent melt-down properties**
- **No sensation of crystals**
- **Good shelf-life stability**



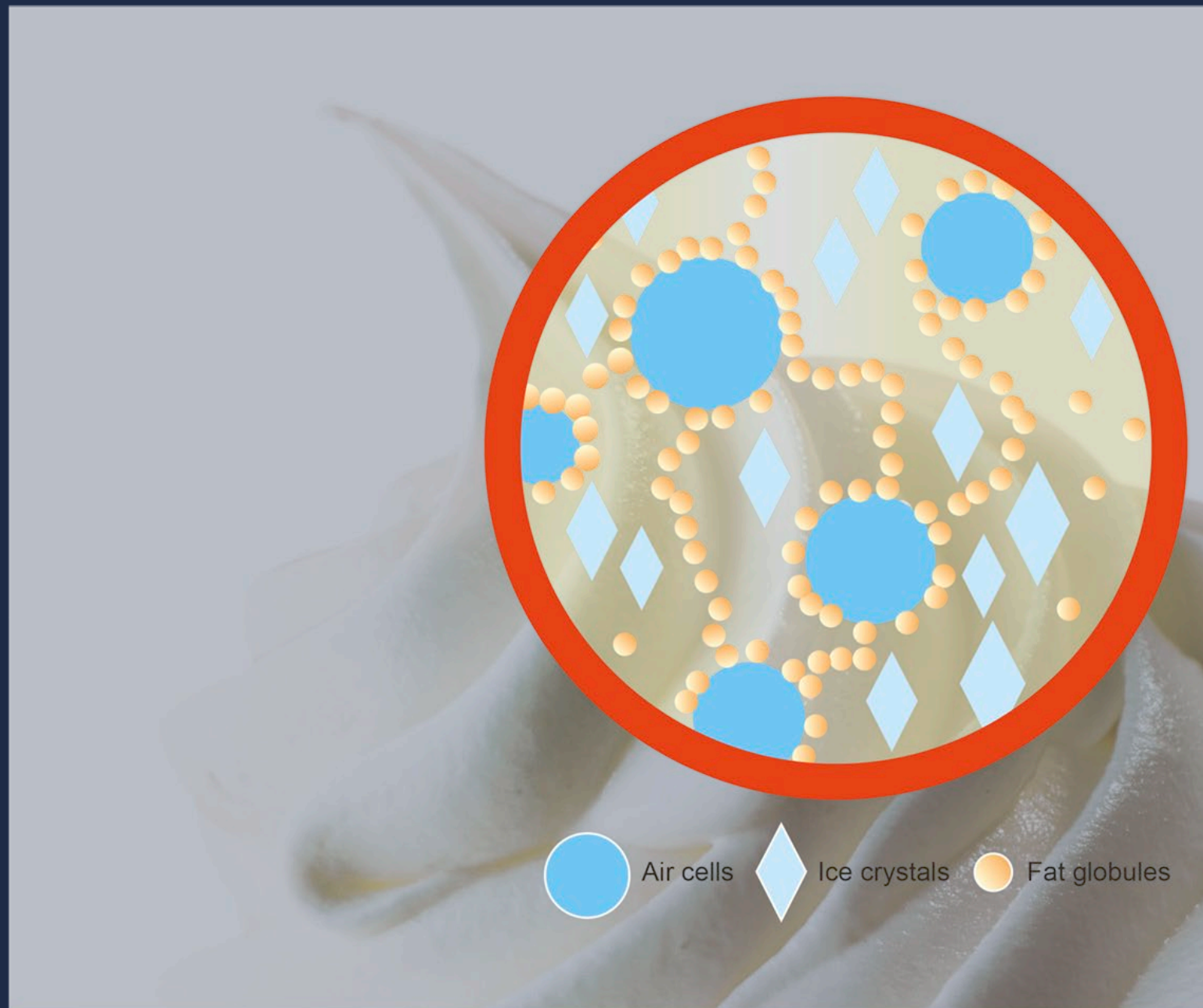
It's frozen foam!

1 continuous phase

- Unfrozen water

3 discontinuous phases

- Air cells
- Ice crystals
- Fat globules



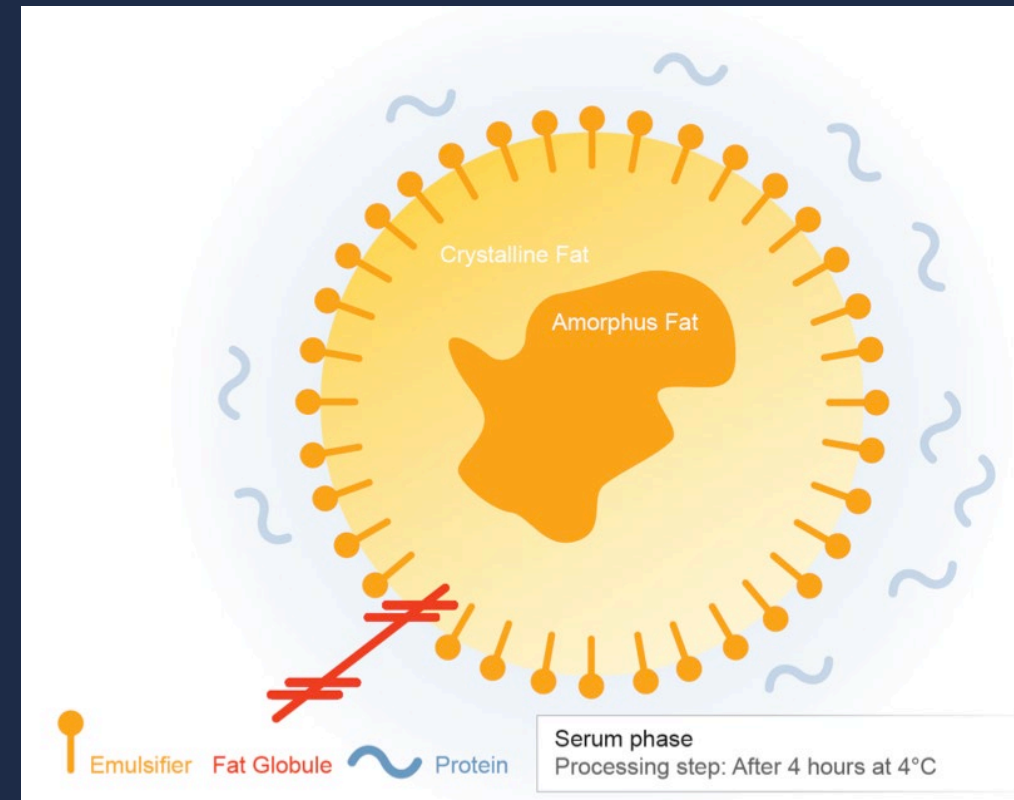
What's important in production?

- Mix preparation
 - Homogenization
 - Pasteurization
 - Aging
- Fast freezing (hardening)
 - To maintain shape
 - To maintain small ice crystals



Functionality of emulsifier

- Fat globular membrane composition
- Improves churning out in the freezer
- Control form stability
- Influence meltdown properties
- Improve creaminess



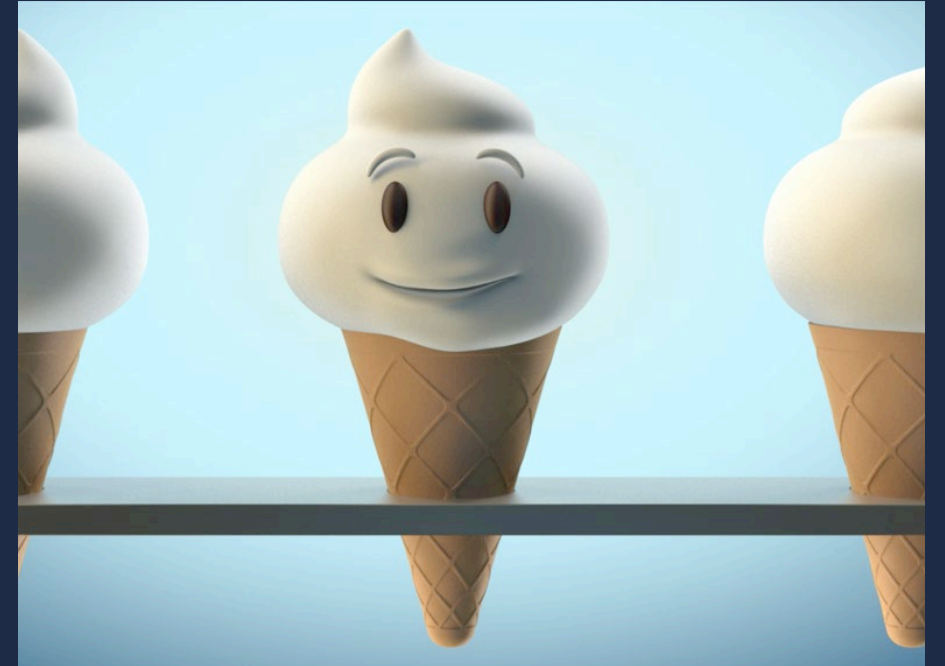
Ice cream's key ingredients

Ingredient	Source	Functionality
Milk solids	From cream, milk or whey Liquid or powder	Melting properties Sensory attributes
Fat	From milk fat or vegetable fat	Structure building Melting resistance
Sugar	Sucrose, dextrose, glucose syrup, fructose syrup, maltodextrin	Melting properties Sweetness
Emulsifiers & stabilizers	Vegetable origin	Stronger foam structure Reduced ice crystal growth Smooth and creamy texture Maintaining smoothness and creaminess



A typical dairy recipe

- **10.00% fat**
- **11.40% skim milk powder**
- **11.50% sugar**
- **2.50% glucose syrup, 42 DE, powder**
- **0.50% Palsgaard® Extrulce 305**
- **65.10% water**



Functionality of SMP

- **11.4% skim milk powder**
- 3.65% Protein
- Emulsification, viscosity, taste, solids
- 6.16% Lactose
- Freezing point depression, sweetness, solids



Functionality of SMP

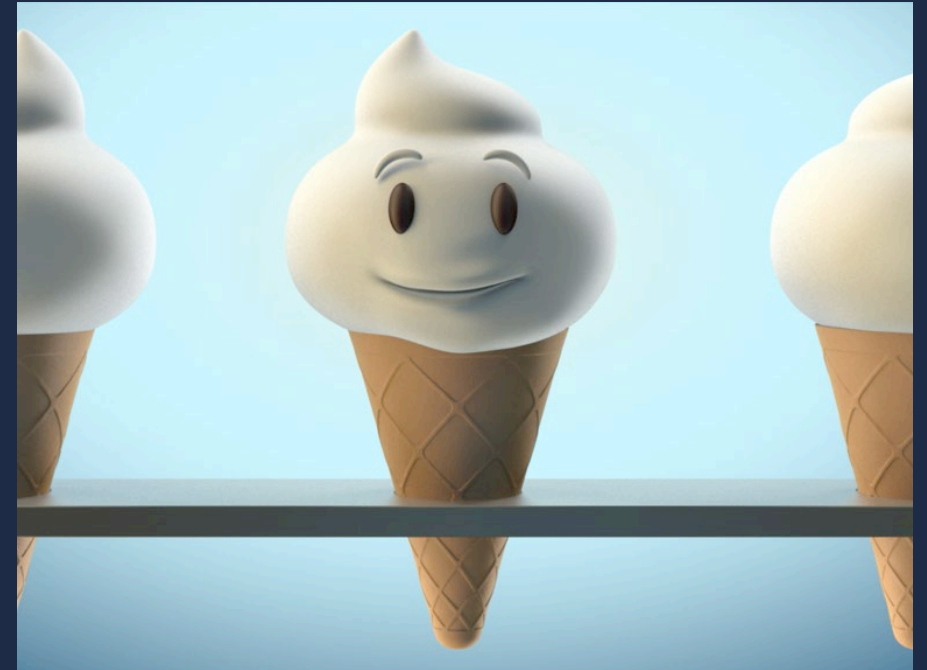
- **11.4% skim milk powder**
- 0.90% Milk salts and minerals
- Freezing point depression, solids

- 0.16% Fat
- Structure, taste, solids



Functionality of SMP to be replaced

- **11.4% skim milk powder**
- Emulsification
- Viscosity
- Freezing point depression
- Sweetness
- Solids
- “Taste”



Plant based frozen desserts



Plant based raw materials

- Soy, protein, drink
- Coconut, cream, milk
- Pea, protein
- Oat, drink, paste, flour
- Rice, drink, paste, flour
- Almond, paste



Plant based raw materials – challenges

- **Solubility**
- **High viscosity**
- **Functionality**
- **Flavour, sweetness**
- **Colour,**
- **Heavy body**



Plant based raw materials – challenges

- **Different quality between suppliers**
- **Hydration time**
- **Freezing point depression**
- **Overrun**
- **Melting resistance**
- **Organoleptic properties**



Plant based recipe

- **Plant based raw material**
- **Fat**
- **Sweeteners (sucrose, dextrose,...)**
- **Bulking agent (fiber, polydextrose)**
- **Colour / Flavour**
- **Emulsifier-stabilizer system**
- **Water**



Plant based recipe – Coconut based 8% fat

- **0.55% Palsgaard® Extrulce 305**
- **34.80% Coconut cream, 23% fat**
- **13.50% Sugar**
- **8.00% Glucose syrup, 42DE, powder**
- **6.00% Inulin**
- **q.s. Colour / Flavour**
- **37.15% Water**



Plant based recipe – Rice drink based 8% fat

- **0.60% Palsgaard® Extrulce 305**
- **70.15% Rice Drink, Naturli**
- **7.25% Vegetable fat**
- **6.00% Sugar**
- **8.00% Glucose syrup, 42DE, powder**
- **5.00% Dextrose**
- **3.00% Inulin**
- **q.s. Colour / Flavour**



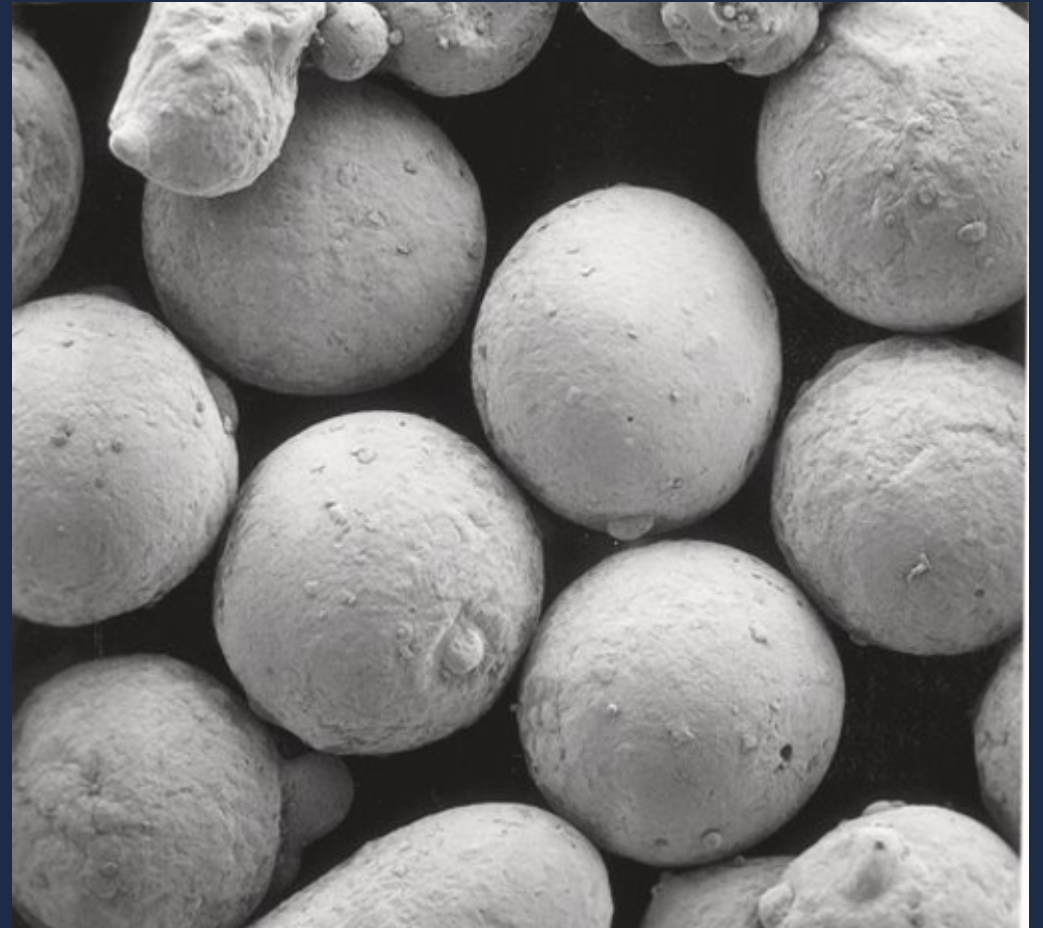
Plant based recipe – Pea protein 8% fat

- **0.55% Palsgaard® Extrulce 305**
- **3.50% Pea protein isolate**
- **8.00% Vegetable fat**
- **12.00% Sugar**
- **6.50% Glucose syrup, 42DE, powder**
- **6.00% Inulin**
- **q.s. Colour / Flavour**
- **63.45% Water**



Palsgaard® ExtrulIce 305

- Mono- & diglycerides, E471
- Tara gum, E417
- Creamy mouth feel
- Integrated product
- Lean label
- Palm free
- PHO / Trans free
- CO₂ neutral factory







Palsgaard®

 Heart working people

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