ROQUETTE
Offering the best of nature™

Glucidex® plus

QUALITY CONTROL • APPROVED

SAFE ENERGY

HELPS HYDRATION

HIGH QUALITY

TASTY TO USE

Offering **safe** and **high tolerance energy** to enjoy a healthy and active lifestyle

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Why is GLUCIDEX® Plus the right answer for your energy and safety needs?

Pregnant Women

The nutritional status of pregnant women can have significant influence on both fetal, infant and maternal health outcomes. Pregnant women need to stay active. **GLUCIDEX® Plus** helps women to enjoy a healthy and active lifestyle everyday.

Toddlers

GLUCIDEX® Plus range of **dry-mix** carbs provides safe energy to toddlers (1-3 years), together with excellent digestive tolerance, for the healthy growth of these babies.

Adult Nutrition

GLUCIDEX® Plus provides powerful and healthy energy, hydration and recovery, the most efficient energy substrate for muscles, brain and recovery.

GLUCIDEX® Plus also serves as the fuel for muscle function – the body's "engine" resulting in optimum performance levels.

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Why do our toddlers need plant-based carbs?

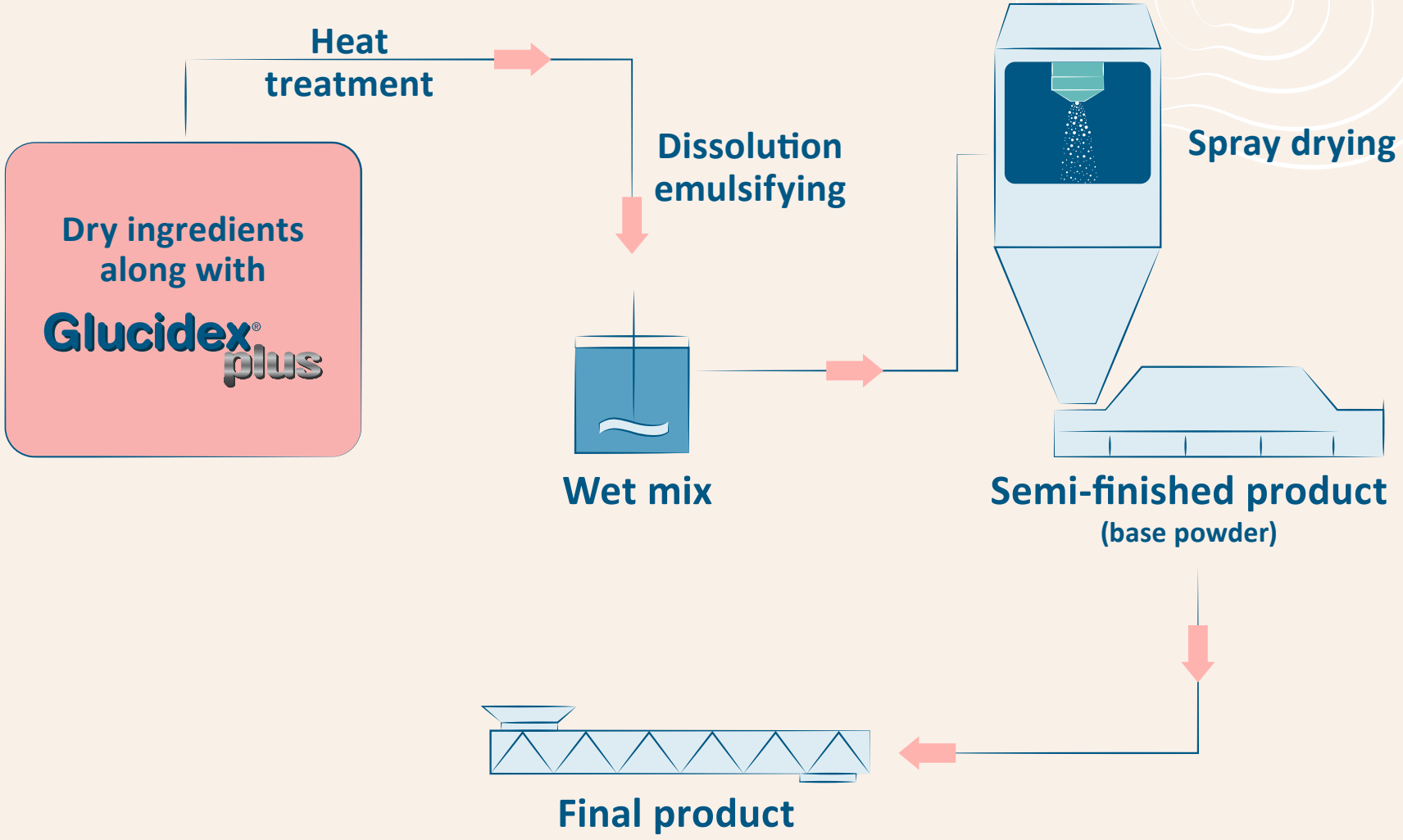
Incredible Growth

- **Height x2, weight x3** during the first 2 years of life
- **1000 kcal/d:** energy requirement at 1 y.o. (x4 vs. birth) (AFSSA, RDA, 2009)

What about Carbs?

- **Carbs** are energy providers in baby formula: lactose and maltodextrins can be used
- **Lactose-free:** first dietetic intervention in case of diarrhea in infants

GLUCIDEX® Plus range of carbs: how do you ensure the highest quality for dry mix process?



How does GLUCIDEX® Plus meet energy needs?

Need

Glucose: energy for the muscles

- During effort, glucose is taken up from bloodstream by muscular cells to be turned into energy.
- After effort, glucose is turned into glycogen to replenish muscles energy stores.

Glucose: energy for the brain

- It's the only energy substrate that is used by the central nervous system.

Challenge

Fructose: also provides energy but…

- Fructose has been shown to elevate blood triglycerides and LDL (bad cholesterol) after a meal. This effect is higher than what is observed with glucose (Sievenpiper et al., 2014; Havel, 2005; Aeberli et al., 2011).

Solution

Glucidex® plus

100% glucose for 100% energy!

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How is GLUCIDEX® Plus the right solution for tolerance needs?

Maltodextrins vs. lactose in growing-up milk: fully digested for a high tolerance!

Challenge

- Lactose may not be completely digested in small intestine by young babies
  - ▶ May lead to fermentation in gut: gas, discomfort
  - ▶ May be linked to colic and crying

Solution

Fructose: also provides energy but…

- Clinical evaluation showed significant improvement of crying and digestive discomfort.
- The level of hydrogen in babies breath was decreased by 70% following the intervention ($p<0.01$).
  - ▶ Partial replacement of lactose by maltodextrins led to a decrease in lactose malabsorption.
  - ▶ Consequently, discomfort and crying were significantly decreased.

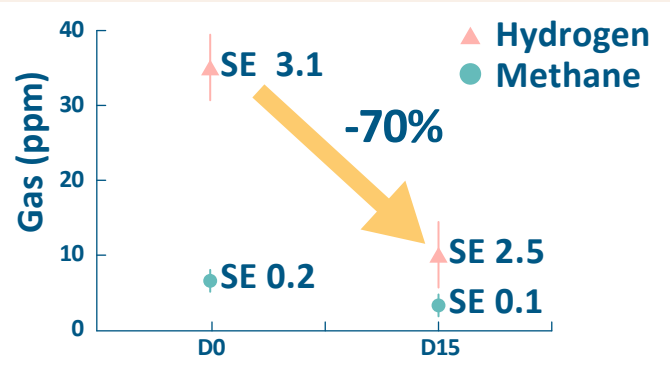

Figure 1: Evolution of breath hydrogen and methane before (D0) and after 15 d (D15) of consumption of low-lactose formula. Values are expressed as mean ± SE. Only the change in expired hydrogen was significant ($P < 0.01$).

20 infants, 3 wk old, with reported excessive crying, 15 d, Spain, switch from a full lactose to a 50:50 lactose:maltodextrin formula
From Infante et al. – Dietary treatment of colic caused by excess gas in infants: Biochemical evidence – 2011, World Journal of Gastroenterology (impact factor = 2,4)

How is GLUCIDEX® Plus beneficial for hydration in adults?

Need

Osmolarity influences hydration

- For optimum hydration, the drink osmolarity needs to be close to the body osmolarity (280-320 mOsm/kg).

Solution

Glucose as hydration booster

- Intestine: water is absorbed together with glucose and sodium

GLUCIDEX® maltodextrins

▶ May help **stimulate hydration**

Examples of products	Osmolality (mOsm/kg, 100g/kg water)
GLUCIDEX® 19	85
GLUCIDEX® 39	175
Sucrose	290
Dextrose	555
Lactose	315

A full GLUCIDEX® range: Fine-tune osmolarity to maximize hydration!

Where does GLUCIDEX® Plus play a role in our customers' portfolio?

1. Growing-up milk

- Long starch chains are difficult to digest, especially if the granular starch structure is maintained.
- Simple sugars (sucrose, dextrose, etc.) may cause intestinal tolerance problems.

  GLUCIDEX® Plus, having an average molecular size between that of starch and simple sugars, is the ideal carbohydrate for application in modified milk or growing-up milk.

  This ultra-sensitive application necessitates a product that complies with regulations and quality and safety standards.

2. Dietitic and nutraceutical foods

GLUCIDEX® Plus provides **excellent nutritive base.**

Thanks to fine-tuned **osmolarity** of GLUCIDEX® Plus, it can be used in dietetic drinks to maximize hydration and ease absorption.

GLUCIDEX® Plus is demineralized to ensure a controlled mineral content and good stability. This is particularly important for growing-up milk and similar applications.

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Early Life Nutrition – Sum-up

-9 to 0 months Maternal (Pre/Post Natal)	1 to 3 years GUM 1+	3 years and above GUM 3+	5 years and above Preschool 5+
Pre-Natal	Growing-Up Milk Stage 3 Toddler	Growing-Up Milk Stage 4 Kids	Stage 5 Preschool
• Vitamins and Nutrition fortification • Gestational Diabetes (Glucose mgt: Fiber + Inositol Active) • Digestion • Allergies	• Brain development/health – Cognitive • Allergy • Strong growth • Digestive health • Energy		

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Regular Maltodextrins vs. GLUCIDEX® Plus

GLUCIDEX® Range	Cronobacter Specs (product)	Entero Specs (product)	Internal Environmental Control	Environmental Specs	Application	Packaging
Standard	No	10 CFU/g maximum	✓	No	Food	Normal
Plus (NEW)	No	✓ Not detected in 50 g	✓	✓	Maternal Infant GUM Preschool	Strippable

GLUCIDEX® Plus Grades and Properties

Main characteristics of GLUCIDEX® products in relation to dextrose equivalent

- GLUCIDEX® 12 Plus – maltodextrin
- GLUCIDEX® 19 Plus – maltodextrin
- GLUCIDEX® 29 Plus – dried glucose syrup
- GLUCIDEX® 39 Plus – dried glucose syrup

- GLUCIDEX® Plus

Properties	Degree of hydrolysis (low D.E. → high D.E.)
Viscosity Binding power, cohesion ERH (A_w)/molecular weight Anti-crystallizing power Freezing temperature	
Sweet taste Hygroscopicity Reaction to heat, browning Flavor enhancement Fermentability	
Nuritive value	

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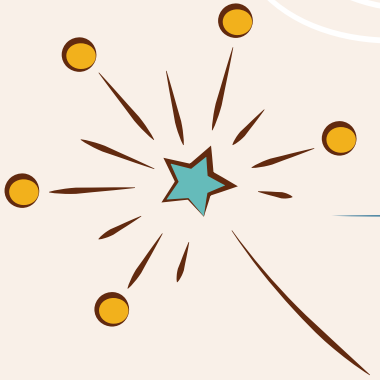
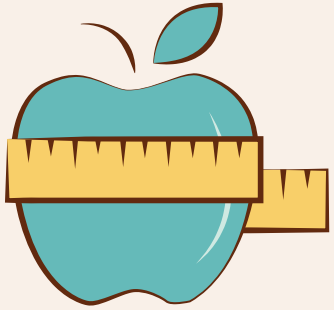
Meeting customer expectations



Make it
INDULGENT

Make it CLEAN for ME
and the PLANET



Make it
BETTER for ME

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