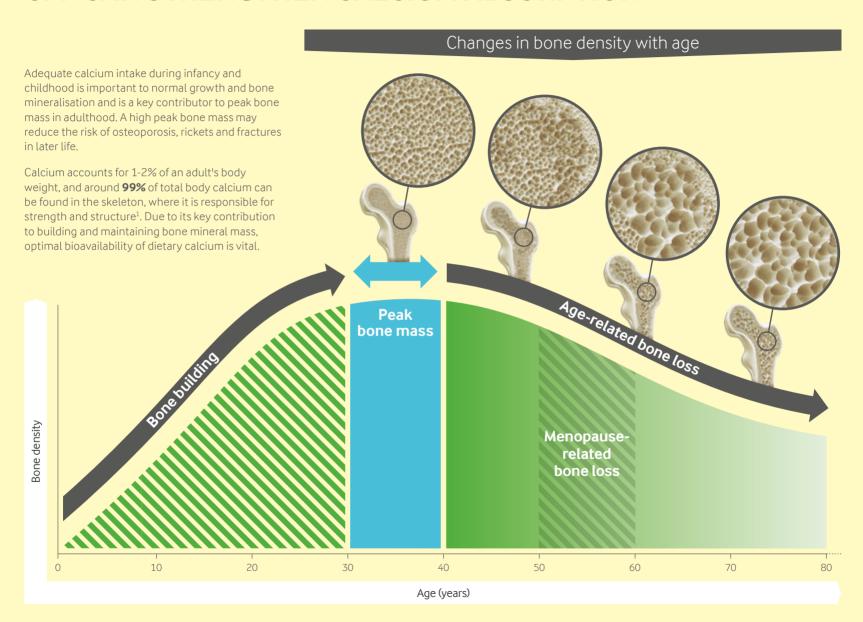


CPP CAN STRENGTHEN CALCIUM ABSORPTION



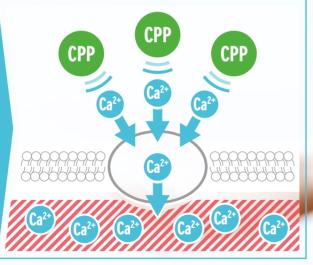
LACPRODAN® DI-2021 IS A HYDROLYSATE RICH IN BIOACTIVE PEPTIDES

Lacprodan® DI-2021 is a hydrolysate that contains at least **22%** casein phosphopeptides (CPP). A natural component of milk casein, these bioactive peptides are known to influence calcium absorption. The high CPP concentration of Lacprodan® DI-2021 makes it ideal for promoting calcium bioavailability.

The CPP in Lacprodan® DI-2021 contain phosphorous bonds via monoester linkages to seryl residues, forming phosphoserines². Due to their highly negatively charged structures, which arise from the phosphorylation of serine, CPP have the ability to fix positive calcium ions in a soluble form. CPP are also biocarriers of zinc and iron, which resist proteolysis in the gastrointestinal tract³.

In the intestinal environment CPP fixes calcium ions, preventing the formation of insoluble compounds.

The CPP-calcium complex keeps calcium in a soluble state and escorts calcium ions to the epithelial cells of the small intestine, where the calcium enters

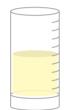


USING LACPRODAN® DI-2021 TO INCREASE CALCIUM ABSORPTION

Studies of CPP have documented this high capacity to form soluble complexes with calcium at lumen pH² and the ability to **increase calcium absorption** from some diets.⁴



More than
97% of Chinese children consume



50% of the daily calcium requirements

A national survey has found that **97%** of Chinese children consumed less than **50%** of the recommended daily calcium intake⁵. This low intake may retard growth and cause low peak bone mass. A study of Chinese girls found that school milk supplementation (560mg Ca) resulted in higher growth (+8cm) and higher bone mineral density (+80%) after a two-year intervention⁶.

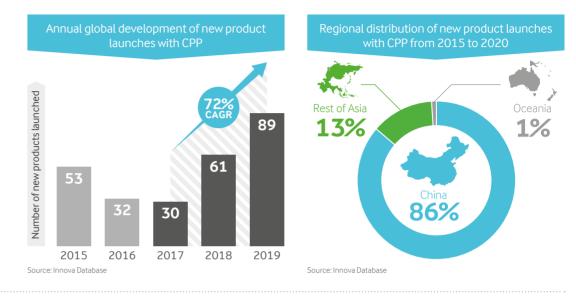
In vitro and in vivo studies (in rats) have found that CPP are beneficial for:

- Bone calcification and health⁷
- Increased calcium absorption⁸⁻¹¹
- Increased calcium availability in bone^{10,11}
- Reduced bone degradation¹²



NEW STAGE 1-3 FORMULAS – PRODUCT LAUNCHES WITH CPP

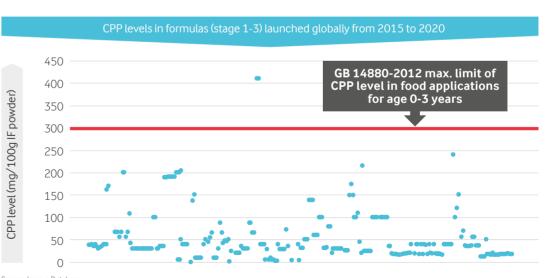
Against this backdrop, China has become the major market for new product launches with CPP. Growth has been particularly fast over the past three years. reaching a CAGR of 72%. Today, China accounts for 86% of CPP-containing launches worldwide.



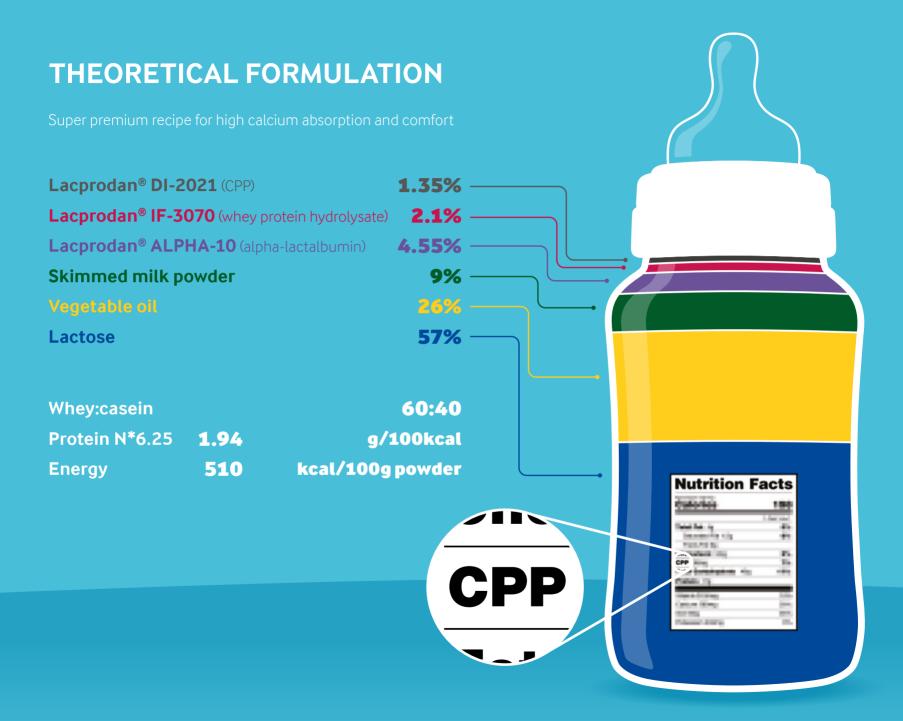
CPP content of stage 1-3 formulas

Most new product launches with CPP contain much less than the maximum limit set by GB (0.3%). CPP is used in formulas based on cow's milk and sheep/ goat's milk formulas. The latter represent around 24% of all formulas launched with CPP. Some manufacturers increase the CPP level in higher stage products.

CPP is a nutrient fortifier regulated by the Chinese food safety standard GB 14880-2012, which allows a maximum dosage of 0.3% for children up to three years of age.



Source: Innova Database



FREQUENTLY ASKED QUESTIONS

What is the minimum and maximum CPP dosage?

There is no minimum limit in China. The maximum limit is 0.3%.

Do you have examples of formulas that use CPP?

Yes – lots! CPP has been used for more than a decade in China (see page 5)

Do you have a test method for CPP in formulas?

We have a validated test method that can be implemented in customer labs

What is the typical dosage?

See page 5 and 6

Which are the main markets?

China and a few other Asian countries

Does CPP have a safe history of use?

CPP has been used for more than a decade with good experience

Does CPP affect processability?

Customers have reported no particular challenges



WHY CHOOSE ARLA FOODS INGREDIENTS?

Among the world's leading manufacturers of natural whey solutions

- Among the world's largest producers of alphalactalbumin, whey protein hydrolysates, MFGM, whey protein isolates, whey protein fractions and lactose
- Producing whey proteins since 1980
- State of the art production plant with possibilities to customise ingredients

R&D in our DNA

- Over 15% of our employees in Denmark work in R&D
- Collaboration with top universities worldwide
- Clinical and scientific documentation
- Application centres in two continents

Premium quality by design

- Our factories adhere to the strictest quality and safety standards
- Premium quality ingredient
- Kosher and Halal certification
- Free of annatto
- Non-GMC
- Vegetarian

Your trusted business partner

- Application support
- Business development support
- In-depth nutrition research and formulation support
- Technical know-how to implement products in customer's product line

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