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Optimize your calcium fortification

Calcium and health

Consuming an adequate amount of Calcium is essential for people with increased Calcium requirements like children of school age, pregnant women, athletes, seniors or people who have to take resorption-inhibiting medication. Calcium aids in preventing deformities and softening of the bones such as rickets, osteoporosis or bone fractures. Moreover, Calcium plays a role in muscle function, heart function and in the nervous system.¹

Calcium, together with magnesium, is the best-known mineral in public and is the most abundant mineral in the body. Calcium Citrate is the Calcium salt of citric acid. Citrates occur naturally in the metabolism and are part of every body cell. Thus, Calcium Citrate shows a high bioavailability.² It has no effect on stomach acid and is easy

to digest. Therefore, Calcium Citrate is considered to be one of the most usable forms of Calcium for the human body. With the latest launch of high performance *Tricalcium Citrate 4-hydrate superfine*, Dr. Paul Lohmann® introduced a new product to the dairy industry that delivers on taste, texture and nutritional value. Moving from a niche position as a health ingredient for nutritional supplements, Tricalcium Citrate 4-hydrate superfine has become a favorite of dairy food and milk substitute manufacturers.

Challenges and solutions

Product appearance and labelling give consumers a first indication about a product's taste and quality. Apart from that, more and more people are aware of the interactions between different nutrients and their benefits in health and well-being. As Innova Market Insights reveals, consumers are consciously looking for all-round solutions with added value, e.g. in regards of health benefits. The customer's desires are trending toward food to be healthy, easy to consume and tasty at the same time.

A growing number of consumers are relying on fortified foods and beverages. Dairy-based beverages, cream cheese, yogurt and even



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ice cream are in the focus as innovative delivery vehicles for a more nutritious treat. With those functional foods, they see the possibility to achieve the required amount of nutrients without having to consume additional portions or calories.

Yet, the main goal in marketing of a valuable product is not the fortification per se but to keep foods delicious and appealing at the same time. For dairy foods and dairy analogues foods, fulfilling these demands can be challenging. For example, the use of soluble Mineral Salts – especially Calcium – can lead to coagulation reactions with milk proteins. Insoluble salts, on the other hand, may lead to sedimentation or chalky taste. To overcome these challenges in creamy and solid products such as yoghurt, fromage frais and cream cheese, Dr. Paul Lohmann® has the solution: Tricalcium Citrate 4-hydrate superfine. This product offers food manufacturers unique advantages in terms of technical, sensory and nutritional parameters.

Super fine results in milk

With the newly developed Tricalcium Citrate 4-hydrate superfine, Dr. Paul Lohmann® found the answer to a high demand on a Calcium Citrate with a clearly reduced speed of sedimentation in dairy and plant milk products. With this superfine powder, customers will be able to fortify their dairy products with Calcium with a significant reduction of sedimentation during the production process.

The Research and Development department did a lot of application trials with Tricalcium Citrate 4-hydrate with different particle sizes like normal powder, micronized powder, fine powder and superfine powder. The products were tested on their performance in different kinds of dairy products, e.g. milk (1.5 % fat and 3.5 % fat), cream and oat milk. The test results showed that the superfine powder was the best performing product within this series of tests, with the slowest sedimentation velocity and the smallest amount of sediment at the

bottom of the testing tubes. Another positive effect is the improvement of taste and mouth feeling by using the superfine powder.

Nice in ice

The special particle design of this insoluble Mineral Salt enables the fortification of e.g. ice cream with a reasonable amount of Calcium, without compromising one bit of flavor! While increasing the nutritious value, Tricalcium Citrate 4-hydrate superfine enhances foam structure, volume and optimizes the stability of ice cream. Apart from superior appearance and texture, the taste profile is enhanced, too. A well-rounded sweetness in vanilla ice cream is topped off with less bitterness in chocolate ice cream. With a health claim approved ingredient and a creamy-as-can-be texture, the ice cream is deemed nothing less than delightful.

This is a novelty within the dairy foods world. While the consumer benefits from healthy and delicious products providing micronutrients to meet their nutrient requirements in alternative sources. The dairy industry as well as the dairy analogue industry benefit from the development of innovative and appealing products that can be marketed as having high mineral contents and at the same time are highly economic.

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Technical advantages

Tricalcium Citrate 4-hydrate superfine shows a significant technological advantage. In essence, the special Calcium Citrate grade enables ice cream to be fluffy, healthy and delicious at once:

- High creaminess
- No chalky taste
- No sedimentation
- No interaction with milk proteins
- Natural/neutral taste profile
- Well tolerated with good bioavailability
- Good source of calcium
- Taste improvement

The product shows a high content of elemental Calcium (21%). Even small amounts achieve a significant enrichment of foods. It is not soluble in liquids with neutral pH. In order to prevent sedimentation and not to influence the taste profile, Tricalcium Citrate 4-hydrate superfine forms a stabilization system intrinsically (micelle stabilization) due to specially adjusted particle sizes.

Regulatory status

Tricalcium Citrate 4-hydrate superfine is approved for the fortification of foods in accordance with Regulation (EU) No. 1925/2006. It is a health claim approved ingredient and can be used either for the fortification of food or due to technological improvements (E 330) of several food items like e.g. dairy, baby food, ice cream, beverages or fine food specialties.

According to EU guidance levels the intake recommendations for Calcium of 800 mg/day are sufficient to meet the nutrient requirements.³ For people with increased requirements like adolescents in the growth phase and pregnant women, 1200 mg is targeted and for breastfeeding women, 1300 mg daily should be consumed.

For a quick comparison, ice cream fortified with Tricalcium Citrate 4-hydrate superfine can boost Calcium levels from 50 mg (a scoop of vanilla ice cream of 50 grams) to 120 mg calcium. Therefore, one serving of ice cream (100 g) allows the nutrition claim “high in calcium” to be indicated on the label. Complimenting a healthy diet that contains other sources of Calcium, this provides a good basic supply when people splurge for a treat.⁴

References

1. http://ec.europa.eu/food/safety/labelling_nutrition/claims/register/public/?event=search (23.05.2019)
2. Sakhaee, K., Bhuket, T., Adams-Huet, B., & Rao, D. S. (1999). Meta-analysis of calcium bioavailability: a comparison of calcium citrate with calcium carbonate.
3. Regulation (EU) No 1169/2011 on the provision of food information to consumers
4. Regulation (Ec) No 1924/2006 of the European Parliament and of the Council on Nutrition and Health Claims made on foods

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