

## **Calcium: a key nutrient for healthy bones**

**With an increasingly ageing global population, maintaining bone health for as long as possible is becoming a critical issue. This opens up excellent prospects for calcium supplements and fortified foods.**

Calcium is one of the most abundant minerals in the body. Healthy bones and teeth, and properly functioning muscles and nerves, are all directly linked to an adequate calcium intake. When dairy products are not part of the diet and therefore don't supply this valuable mineral, calcium supplements and fortified foods provide a viable alternative. Calcium carbonate from Omya is a versatile and efficient fortification ingredient for a wide variety of applications.

### **Ever-increasing risk**

Daily calcium intake is a key factor for the proper development of bones in children, as well as the preservation of bone mass in adults. Thus, a low dietary calcium intake has often been linked to skeletal disorders such as osteopenia or osteoporosis. With a high worldwide prevalence and affecting more than 200 million people, osteoporosis is currently considered to be a serious public health issue. It is estimated that, in the US and Europe alone, approximately 30% of postmenopausal women are affected. In addition, it is documented that an osteoporosis-derived fracture occurs every three seconds, causing patient disability and incurring a significant economic burden. [1] Furthermore, owing to ageing populations and changing lifestyles, the global incidence of osteoporosis is set to increase dramatically in the coming decades. In fact, by 2050, the worldwide prevalence of hip fractures is projected to increase by 310% in men and 240% in women, compared with 1990 data. [2] Omya, a leading manufacturer of calcium carbonates, has proactively promoted its products for bone health supplements that target the growing needs of today's consumers.

### **Adequate daily intake essential**

An adequate daily calcium intake throughout life is essential for preventing osteoporosis. Calcium can be ingested from regularly consumed food sources such as milk and dairy derivatives, canned fish with edible bones such as sardines, and green vegetables such as broccoli. Calcium requirements vary according to age and gender: they are higher in

teenagers owing to rapid skeletal growth, and in later life because of less efficient calcium absorption.

Recommended daily intakes differ in many countries. The European Food Safety Authority (EFSA) assesses the population reference intake for adults of both genders to be 950 mg/day. According to a systematic review by the International Foundation of Osteoporosis, calcium consumption around the world fluctuates from region to region. [3] For instance, the study indicates that countries in Asia have an average dietary calcium intake of less than 500 mg/day, followed by African and South American countries with a calcium intake of 400-700 mg/day. Regions in Europe and North America are those with the highest calcium intake (680-1100 mg/day), with only Northern European countries demonstrating an average national calcium intake of more than 1000 mg/day. So, when calcium requirements aren't being met by dietary regimes, supplement consumption offers a convenient way to fill the gap.

### **Dietary supplements**

Most of the marketed calcium food supplements are tablets (swallowable, chewable, effervescent), capsules or stickpacks. For tablet manufacturing, direct compression is often the preferred option because of faster processing speeds and increased efficiencies. When it comes to hard capsules and stickpacks, the most critical processing property is the flowability of the powder to be filled.

Omya manufactures calcium carbonate, an excellent source of elemental calcium that is frequently used in calcium-containing food supplements. The company has recently developed a new Calcipur® DC range of products containing high purity, direct compressible and free-flowing natural calcium carbonates. Thanks to improved processing properties, the products are ideally suited for the production of various calcium-enriched dietary supplements. In fact, by turning the powdered calcium carbonate into a granulate, Omya developed a full range of products offering improved flow and compactability properties. The range can be used in nutraceutical formulations and as an excipient in pharmaceutical dosage forms. Starting materials for Calcipur® DC products are food (FCC compliant) and pharma grade (EP/USP).

Calcipur® DC is an excellent source of elemental calcium, providing a similar level of oral calcium bioavailability compared with other calcium salts. [4] It contains a bioavailable calcium content of at least 36% which is derived from its active ingredient, calcium carbonate. Upon ingestion, calcium carbonate is solubilised into calcium ions in the acidic environment of the stomach and then absorbed through the intestine.

### **Bone health claims**

Regulations concerning the use of calcium in foods and supplements may vary according to specific regions. In the EU, the recommended daily intake of calcium (RDA), regardless of gender or age, is set at 800 mg/day. In this region, calcium can be claimed for bone health or as a “source of calcium”. To do so, the calcium levels have to be higher than 120 mg (15% of the RDA) per dose, which equates to 316-333 mg depending on the grade of Calcipur® DC selected for a specific formulation. For claiming to be a “high in calcium” food supplement, the finished product must contain at least 240 mg of calcium, corresponding to 632-667 mg depending on the grade of Calcipur® DC. With its experienced and interdisciplinary team, Omya is able to provide expert advice and keep the time between initial concept and final product launch as short as possible.

Besides its portfolio of proprietary calcium carbonate products, Omya also distributes different vitamin D<sub>3</sub> grades, such as vegan and non-vegan types. Vitamin D<sub>3</sub> enhances calcium absorption through the small intestine while ensuring the correct renewal and mineralisation of the bone. Such combinations of calcium and vitamin D<sub>3</sub> are often found on the food supplements market.

### **Fortified foods**

Another promising approach to achieve sufficient calcium intake is the fortification of foods. For example, calcium carbonate can be used to enrich breads, beverages, cereals, snack bars, fine baked goods, infant nutrition and vegan dairy alternatives. In particular, there’s great potential for products that are already perceived to be healthy, such as breakfast cookies, which are designed to be eaten on-the-go and provide both valuable nutrients and

satiety. Omya has developed a broad calcium carbonate brand portfolio with different products and ranges, which offer the perfect functionality for each specific application.

#### References

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3. E.M. Balk, et al., "Global Dietary Calcium Intake Among Adults: A Systematic Review," *Osteoporos. Int.* **28**(12), 3315–3332 (2017).
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