

# A significant source of calcium compared to other foods

Dietary sources represent the preferred approach for achieving optimal calcium intake.

Dairy products have been identified as the ideal source of calcium in the diet,<sup>1</sup> but some debate may exist whether they present a biologically better source of calcium than other foods.<sup>2</sup>

## Introduction

Dairy is often – incorrectly – considered one of the main contributors to a high fat content in an unhealthy diet. Together with this myth, self-perceived ideas about lactose intolerance<sup>3,4</sup> and milk allergies, as well as taste preferences result in a decreased intake of dairy products.<sup>3,5,6,7</sup> Adequate dairy intake is, however, essential for attaining several health benefits of calcium, such as the accretion of peak bone mass during growth (which has been shown to protect against osteoporosis) and its cardio-protective role.<sup>8,9</sup>

## Advantages of dairy as a calcium source

### • Source of other essential nutrients

Dairy-free diets do not provide for the adequate intake of calcium, despite meeting other nutrient recommendations.<sup>4,6,10,11</sup> Milk provides a large variety of essential nutrients. The latter finding is corroborated by the 2005 US Dietary Guidelines for Americans, which concluded that in addition to calcium, dairy contributes more than 10% of the daily requirement for riboflavin, vitamin B12, phosphorus, magnesium, zinc, potassium, protein and carbohydrates.<sup>12</sup> Several studies show that respondents who consume less than one serving of dairy per day do not meet the adequate intake (AI) for calcium<sup>10,6</sup> set to achieve maximum protection against bone loss. A study by Nicklas *et al.*<sup>11</sup> further confirmed the importance of dairy calcium by illustrating the direct association between dairy consumption and calcium, potassium and magnesium intake.

### • Optimised bone health

Several studies have shown the detrimental effects of a low-dairy diet. Increasing evidence suggests that the development of osteoporosis relates, in part, to inadequate calcium intake and that high calcium intake may slow the loss of bone mass observed in postmenopausal women.<sup>13</sup> One study found that adolescent girls who perceived themselves to be milk intolerant, despite not being clinically classified as lactose maldigesters, consumed significantly less milk and calcium and presented with lower bone mineral content of the spine.<sup>4</sup> A longitudinal study by Rockell *et al.*<sup>14</sup> show that prolonged milk avoidance in young, growing children had lasting detrimental effects on height and weight and resulted in persistent osteopenia, despite modest increases in milk consumption during the follow-up period two years later.

### • Beneficial food matrix

The health benefits associated with dairy-derived calcium may not necessarily translate to equivalent efficacy in another food item or supplement, since various factors, e.g. the nature of the food matrix, influence the biological response to a bioactive component. Milk presents an easily accessible matrix, has a simple digestible protein with a balanced amino acid profile and is a rich source of several essential nutrients.<sup>12</sup> Also, scientific studies show that the specific combination of calcium, phosphorus and protein makes the dairy matrix an almost indispensable part of the diet for building and maintaining strong bones.<sup>12</sup> In addition to the benefits for bone health, dairy also promotes cardiovascular

health,<sup>8,12</sup> aids in weight control and bring about positive outcomes in metabolic syndrome and hypertension.<sup>12</sup>

### • Superior bioavailability

The bioavailability of a nutrient extends beyond the mere availability for absorption. For example, the bioavailability of calcium depends on the ability to absorb calcium as well as incorporating the mineral into bone. Hence, it also depends on urinary excretion and faecal loss of endogenous calcium. Certain types of food may increase the likelihood that absorbed calcium will be incorporated into bone, e.g. lactose and casein phosphopeptides present in milk, whilst others, such as excess animal

protein, result in calcium mainly being excreted in the urine. Comparisons between different calcium sources show that milk provides calcium with a “protected absorbability”, i.e. its absorption is not affected by external influences (see Table).<sup>2</sup>

Although calcium-fortified foods have been considered as an alternative calcium source in low-dairy diets, some concerns do exist. These include the lack of other bioactive nutrients (similar to those found in milk), the risk of excess energy intake and the bioavailability of the fortified calcium. Another risk associated with low-dairy diets is that individuals do not necessarily compensate for the low calcium intake with a higher intake of calcium from non-dairy food.<sup>4</sup>

## Absorbable calcium in milk compared to alternative food sources<sup>1,15</sup>

Food	Serving size (g)	Calcium content (mg)	Fractional absorption %	Estimated absorbable calcium*	Servings needed to equal 1 cup of milk
Milk	240.0	300.0	32.1	96.3	1.0
Beans Red	172.0	40.5	24.4	9.9	9.7
White	110.0	113.0	21.8	24.7	3.9
Broccoli	71.0	71.0	61.3	21.5	4.5
Spinach	85.0	85.0	5.1	5.9	16.3
Sweet potatoes	164.0	44.0	22.2	9.8	9.8
Rhubarb	120.0	174.0	8.5	10.1	9.5
Tofu with calcium	126.0	258.0	31.0	80.0	1.2
Sardines with bones	56.0	217.0	27.0	58.6	1.6
Salmon with bones	56.0	135.0	27.0	36.5	2.6

\*Calculated as the product of calcium content and fractional absorption

## Conclusion

Milk and other dairy products should be part of everyone's daily diet in order to meet calcium recommendations for good health, especially with regard to optimal skeletal development and maintenance of bone health.<sup>10</sup> Since milk provides calcium with “protected absorbability”, “prolonged absorption” and “extended bone deposition”, milk presents the most suitable dietary constituent for achieving optimal calcium intake.<sup>2</sup> However, the nutritional value of milk also extends beyond providing a readily available form of calcium since it has the added benefit of other bioactive constituents that provide a protective role against chronic disease.

“Milk and other dairy products should be part of everyone's daily diet in order to meet calcium recommendations for good health.”

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