ISSN: 2470-4539

Gratis

Journal of Bone Biology and Osteoporosis

Short Communication

# Nano Calcium Supplements: Friends or Foes?

**Patricia Khashayar[1,2], Abbasali Keshtkar[3], Mehdi Ebrahimi[1] and Bagher Larijani[4*]**

[1]Osteoporosis Research Center, Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, Iran

[2]Center for Microsystems Technology, Imec and Ghent University, Gent-Zwijnaarde, Belgium

[3]Department of Health Sciences Education Development, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran

[4]Endocrinology and Metabolism Research Center, Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, Iran

Received: June 05, 2015; Accepted: June 22, 2015; Published: June 25, 2015

Despite the concerns about the possible link between calcium supplementation and cardiovascular disease and kidney stones, the products are widely used all around the world. This comes as calcium plays a vital role in the body, ranging from the formation of bone to cell division, electric stimulation and hormone secretion.

Proper calcium supplementation is determined by the products solubility, ability to dissociate, absorption rate from the digestive tract into the circulation, degree of contamination particularly with lead, phosphate content and its degree of ionic exchange.

Nowadays a new brand of calcium supplements is being marketed by certain pharmaceutical companies: Nano Calcium. According to these companies, nanotechnology has overcome some of the worries associated with the use of these supplements, resulting in the development of a new product that can help body work more efficiently.

The nano size calcium particles are believed to easily be absorbed, leading to a nearly 100% absorption rate. This is while the rate is reported to be as low as 10% to 15% for the normal products. This high absorption is also believed to reduce the production of undigested calcium and thus kidney-related side effects and stones commonly reported in certain calcium supplement consumers.

Some companies claim their products dissociate before entering the body. In other words, instead of being dissolved in the stomach, these products are ingested in solution as they are already ionized (calcium ions and negative hydroxyl (OH-)) and therefore can permeate intra-cellular membranes, bypassing normal channels that might be compromised due to underlying diseases. Their uniform shape also helps with them becoming dissolved and ionized more rapidly.

There is growing reason to suspect that the intake of large amounts of this product, as it precipitates calcium ions and absorbable alkali phosphate in the GI tract, over a period of weeks or months may contribute to the development of Milk-alkali syndrome. The condition characterized by hypercalcemia can lead to metastatic calcification and renal failure if unrecognized and untreated.

It is also plausible that, among other concerns, the increased intake of calcium through supplementation

***Correspondence:** Bagher Larijani, Endocrinology and Metabolism Research Center, Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, Iran, Tel/Fax: 00982188220037; E-mail: emrc@tums.ac.ir

with these products, due to their superior absorption rate, could have a detrimental effect on health, particularly cardiovascular system.

This is while to our knowledge there are no published clinical trials confirming the advantage of nano calcium supplements over the simple marketed products. The published animal studies however have approved that taking the nano size calcium as supplements or in fortified milk can help improve calcium and phosphorous content in bones and consequently may have a potential role for preventing bone loss [1,2]. The unpublished human studies similarly show that consuming nano calcium supplements can help improve bone mass content. These short-term studies conducted on a small group of healthy individuals revealed that the consumption of these products for several months can improve T-score values.

Given these concerns and the fact that the negative effects of these products on health are not well studied, we would suggest that more studies should be shifted towards the safety and efficacy of these supplements that until recently has escaped attention.

## References


1. Huang S, Chen JC, Hsu CW, Chang WH (2009) Effects of nano calcium carbonate and nano calcium citrate on toxicity in ICR mice and on bone mineral density in an ovariectomized mice model. Nanotechnology 20: 375102·

2. Park HS, Jeon BJ, Ahn J, Kwak HS (2007) Effects of Nanocalcium Supplemented Milk on Bone Calcium Metabolism in Ovariectomized Rats. Asian-Aust J Anim Sci 20: 1266-1271.



**Copyright: © Khashayar et al**. This is an Open Access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.