

## A Comprehensive Review on Vital Mineral Calcium: Enriched Food and Grains

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### Abstract

Calcium is one of the vital mineral need in the body for normal and healthy bones, teeth and other important body processes. The authors searched and collected information about the calcium importance in the body, quantity needed daily for all age ranges and the food materials rich in calcium for their healthy lifestyle. Calcium is essential in support of life and is originate and rich in many foods/vegetables. The authors conclude that calcium intake is required for the body to keep well-built skeleton plus to hold out numerous vital functions in the body.

**Key Words:** calcium; food; age group; body

### Introduction

Calcium is a key mineral for the body. It helps in building bones, teeth, aid blood clot and maintenance them well. Calcium enables the blood clot, supports nerve activities, muscles to bond and the heart to beat (Waugh & Grant, 2014). Nearly 99% of the calcium in the body is existing in bones and teeth. In addition to calcium, vitamin D is also an essential nutrient for bone health in association with calcium (Gennari, 2001). Calcium is a mineral that is essential in support of life and is originates in many foods (Beto, 2015). The body requires calcium to keep a well-built skeleton plus to hold out numerous vital functions. Approximately every bit of calcium is preserved in the skeleton and teeth, where it helps their arrangement and stability. Calcium is significant for overall health (Dorozhkin, 2007). Approximately every cell in the body uses calcium in a numeral of ways. A various area where the body exploits calcium is in the nervous system, muscles, heart and bone (Grygiel-Gorniak & Puszczewicz, 2017; Harsha et al., 2020). The body needs calcium for the muscles to be in motion and for nerves to transmit communication among the brain and every body part. Also, calcium is used to facilitate blood vessels to be in motion blood through the body and to help liberate hormones and enzymes that influence approximately every utility in the human body. Besides building bones and maintain them well, calcium enables the blood to clot, muscles to indenture and heart to beat (Ahad *et al.*, 2010; Potts Jr & Jüppner, 1998). This range allows the cells in the body to stay healthy and achieve job necessary for life. When blood calcium levels are short the quantity of calcium in the blood goes lower than standard, the parathyroid glands liberate a hormone called parathyroid hormone (PTH). Even though this sounds related to thyroid hormone, PTH is dissimilar. PTH tells the bones to liberate more calcium into the bloodstream. PTH as well helps stimulate vitamin D which sequentially raises intestinal calcium absorption (Engelking & Rebar, 2012). Deficiency of these nutrients emits short-term to long-term disorders like osteomalacia/rickets/osteoporosis. The national Academy of sciences directs that what one can eat holding <50 mg calcium/100Kcal gives rise to osteoporosis (Love, 2003). A minute quantity of calcium is dissolved in the blood, which plays a crucial role in the sound functioning of the heart, muscles, blood, and nerves. Ample dietary calcium is a precondition for augmenting peak bone accumulation throughout the first 3 decades of life and for minimizing subsequent bone loss (Clanton, 2007). Calcium intakes do not normally change among vegetarians and non-vegetarians; however, the dietary calcium intake of vegans has not been well distinguished. In life, we



lose calcium through the skin, nails, hairs, sweat, urine and faeces (Urist, Zaccalini, MacDonald, & Skoog, 1962). The anatomical frame does not yield calcium, on its own. Therefore, it's vital to acquire sufficient calcium as of the food which we eat. If we won't consume calcium as per demand, then the bones to be eroded. Bones get weak and uncomplicated to fragile if it occurs too often and this is well once in a while. Deficient levels of calcium, high risk of blood pressure. Lactose intolerance is generally caused by a lack of an enzyme in the body called lactase. Lactose intolerance genesis of cramping, gas, or diarrhoea when dairy products are ingested. Intolerants can prefer lactose-free milk, almond, or rice milk. These people can also opt for non-dairy foods such as broccoli, dried peas, and beans, kale, collard, dark green leafy vegetables, etc. Calcium demands for an individual are categorized based on age and sex. According to USFDA, the endorsed dietary indorsed for adults 18 years and older is 1000 to 1200 mg of calcium daily (Acosta-Estrada, Lazo-Vélez, Nava-Valdez, Gutiérrez-Urbe, & Serna-Saldívar, 2014; Apkon, Fenton, & Coll, 2009). Calcium is required for people of all age groups (Table 1) (Weaver, 2000; Zhu & Prince, 2012).

| Life-stage group | Daily intake (mg/d) |
|------------------|---------------------|
| 0-6 months       | 210                 |
| 6-12 months      | 270                 |
| 1-3 y            | 500                 |
| 4-8 y            | 800                 |
| 9-13 y           | 1300                |
| 14-18 y          | 1300                |
| 19-30 y          | 1000                |
| 31-50 y          | 1000                |
| 51-70 y          | 1200                |
| >70 y            | 1200                |
| Pregnancy        |                     |
| ≤18 y            | 1300                |
| 19-50 y          | 1000                |
| Lactation        |                     |
| ≤18 y            | 1300                |
| 19-50 y          | 1000                |
| Mo- months       |                     |

**Table 1: calcium intake on daily basis for different age groups**

The FDA says, during pregnancy, lactation and teenage years' calcium intake should be expanded, this is relevant in postmenopausal women also (Wu *et al.*, 2013).

#### Deficiency Causes

Calcium deficiency have these issues (Aslam & Varani, 2016; Ritchey, Silva, & Costa, 1982).

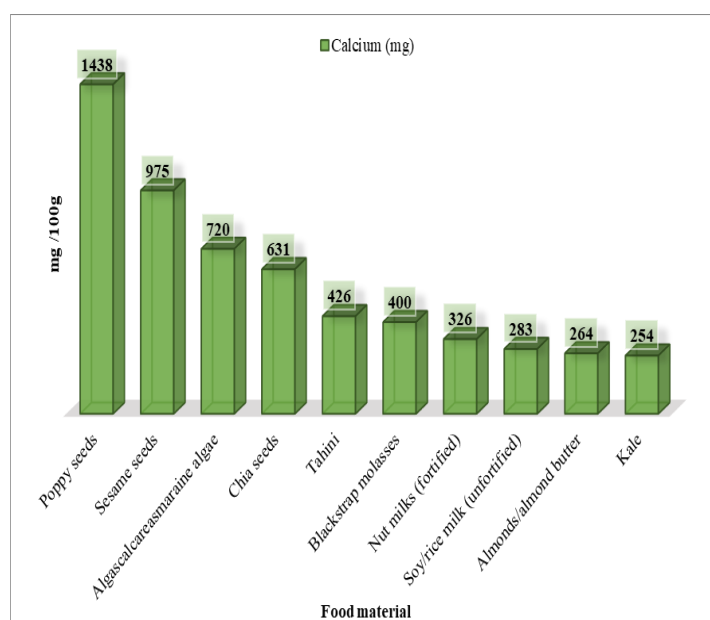
- Breast cancer
- Chronic pain in the legs, knees, and arms.
- Colon cancer
- Mood disorders
- Osteopenia
- Osteoporosis
- Tooth decay

Although, overdosing on calcium can enhance the risk of prostate cancer and ovarian cancers, according to Harvard School of

Public Health.

#### Calcium Rich Food Sources

The credible source of calcium is food. Calcium-rich dairy-based products, such as milk, yogurt, and cheese. Defined green vegetables and other food contain calcium infractions. Calcium has been adjoined in food products like juices, breakfast foods, soymilk, cereals, snacks, bread, and bottled water (Adams *et al.*, 2011). While consuming the following products like soymilk or other fluid that is fortified with calcium, make sure that the container to be shaken well to prevent calcium sedimentation. The easiest way to put in calcium to a lot of foods is to include the only a tablespoon of non-fat powdered milk, which carries about 50mg of calcium. The following plant-based sources including greens, legumes, nuts, and seeds. Some of the favourite foods are probably on this list (Table 2, Fig. 1) (Choy, Prasad, Wu, & Ramanan, 2015; Marsh, Zeuschner, & Saunders, 2012):



**Fig1. Food material rich in calcium**

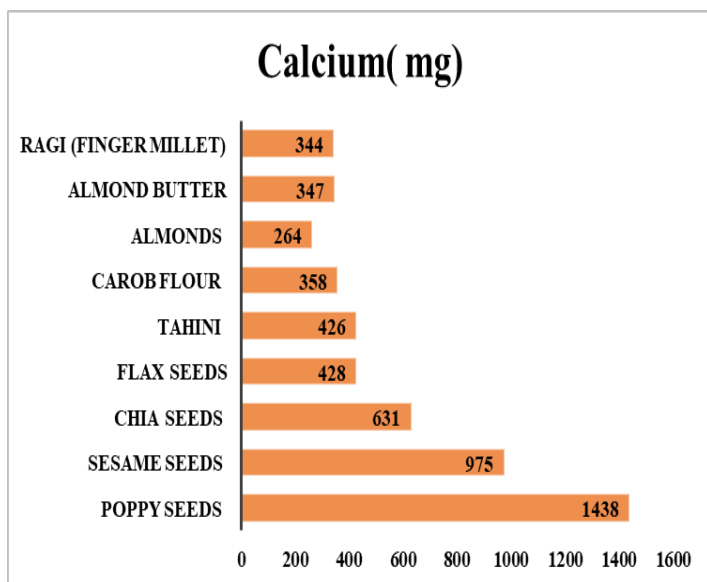
| Food                          | Calcium (mg) |
|-------------------------------|--------------|
| Poppy seeds                   | 1438         |
| Sesame seeds                  | 975          |
| Algae calcareas maraine algae | 720          |
| Chia seeds                    | 631          |
| Tahini                        | 426          |
| Blackstrap molasses           | 400          |
| Nut milks (fortified)         | 326          |
| Soy/rice milk (unfortified)   | 283          |
| Almonds/almond butter         | 264          |
| Kale                          | 254          |
| Collard greens                | 210          |
| Amaranath grains and leaves   | 209          |
| Turnip greens                 | 188          |
| Tofu                          | 176          |
| Dried figs                    | 162          |
| Soybeans                      | 145          |
| Soy yogurt                    | 132          |



|                  |     |
|------------------|-----|
| Mustard greens   | 118 |
| Tempeh           | 111 |
| Broccoli raab    | 108 |
| Bok choy         | 93  |
| Rhubarb          | 86  |
| Okra             | 77  |
| Navy beans       | 69  |
| Oats             | 58  |
| Broccoli         | 47  |
| Quinoa           | 47  |
| Cannellini beans | 46  |
| Oranges, navel   | 43  |

**Table 2: Food rich in calcium**  
**Calcium Rich Grains**

The dietary grains rich in calcium are illustrated in fig.2 and table 3.



**Fig.2. Top grains rich in calcium**

| Grains                       | Calcium (mg) |
|------------------------------|--------------|
| Poppy seeds                  | 1438         |
| Sesame seeds                 | 975          |
| Chia seeds                   | 631          |
| Flax seeds                   | 428          |
| Tahini                       | 426          |
| Carob flour                  | 358          |
| Almonds                      | 264          |
| Almond butter                | 347          |
| Ragi (finger millet)         | 344          |
| Kulthi (horse gram)          | 287          |
| Sesame seeds, whole, roasted | 280          |
| Kale                         | 254          |

|                               |     |
|-------------------------------|-----|
| Rajma (French beans)          | 260 |
| Soyabean (white) seeds        | 240 |
| Teff flour                    | 239 |
| Amaranth flour                | 207 |
| Matki (moth beans)            | 202 |
| Chana (Bengal gram)           | 202 |
| Tofu                          | 176 |
| Soy flour                     | 173 |
| Teff grains                   | 166 |
| Corn flour – yellow           | 161 |
| Udad (black gram)             | 154 |
| Soybeans                      | 145 |
| Hazelnut flour                | 128 |
| Garbanzo bean flour           | 126 |
| Moong (green gram)            | 124 |
| Soy nuts, roasted, salted     | 119 |
| Tempeh                        | 111 |
| Buckwheat bran                | 104 |
| Garfava flour                 | 104 |
| Potato flour                  | 104 |
| Bok choy                      | 93  |
| Rhubarb                       | 86  |
| Chavli (cows peas)            | 77  |
| Peas                          | 75  |
| Moong (green dal)             | 75  |
| Navy beans                    | 69  |
| Masur(lentil)                 | 59  |
| Oats                          | 58  |
| Chana (Bengal gram) (roasted) | 58  |
| Brazil nuts                   | 56  |
| Chana (Bengal gram) daal      | 56  |
| Brown rice, long-grain, raw   | 50  |
| Quinoa                        | 47  |
| Celery seeds                  | 46  |
| Cannellini beans              | 46  |
| Bajra (pearl millet)          | 42  |

**Table 3: Food grains rich in calcium**

## Conclusion

Calcium is the vital mineral for the many biochemical



processes in the body in addition to normal bone and teeth health. Daily dietary intake is required for a healthy and phosphorous life.

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