

A Tale of Two Magnesium's - How to Utilize Different Types of Magnesium to Their Full Potentials

Clinical Applications of Magnesium:

- **Support muscle** (ie. cardiac, smooth, skeletal) function[2]
 - » Migraine/Tension Headache
 - » Hypertension
 - » Congestive Heart Failure
 - » Muscle tension/stiffness
- **Energy/Mitochondria Support**
 - » Fibromyalgia
 - » Chronic Fatigue Syndrome
- **Neurotransmitter/ Hormone Imbalances**
 - » Pre-menstrual syndrome
 - » Menopausal syndrome
- **Prevention of estrogen-induced thrombosis** [3]
- **Increase insulin sensitivity** [4]
- **† Stool Softener/Osmotic Laxative - Mg Salts**

Magnesium is involved in more than 300 metabolic reactions in our body including the metabolism of macronutrients, the synthesis of neurotransmitters, energy production and storage, cell growth etc. Therefore, magnesium can be easily depleted when the body is under chronic mental and/or physical stress, making its supplementation a crucial part in the maintenance of our health in modern era.

Prevalence of Magnesium Deficiency

Currently, the RDA recommends daily intakes of at least 320 mg (female) and 420 mg (male). However, the mean intakes for females and males in the U.S.A., according to the Department of Agriculture, are only 228 and 323 mg, respectively. In fact, **more than 75% of North American population fall far short of the daily magnesium requirements.** [1]

Magnesium Amino Acid (Bisglycinate) Chelate - The Most Absorbable Form of Magnesium

Magnesium Bisglycinate Chelate (Mg-BC) is a unique chelate form of magnesium that is readily absorbed into the blood stream. Its absorption rate is about 228% of that of Magnesium Citrate [5], which is considered one of the better absorbable magnesium salts.

Due to the fact that **our body recognizes Mg-BC as food (peptides) and absorbs it via a different pathway from**

that of the ionic Mg, Mg-BC's absorption rate is independent of the stomach pH and specific food intakes.

In addition, due to the fact that serum Mg²⁺ ion levels are highly regulated by the body via globulin-binding, **Mg-BC's absorption mechanism enables better incorporation of itself into the targeted tissues**, such as muscles and bones.

Truth/Myth: Magnesium Supplements = Stool Softener?

Magnesium is often viewed as a stool softener and given to patients with hard stools or constipation. However, this understanding is partially incorrect. It is not the elemental magnesium itself that acts this way, but the types of anions to which it is bound.

† What Happens When Magnesium Is Not Absorbed in Our Gut?

Magnesium supplements are available in a variety of salt forms, each with different absorption rates. When magnesium salt is not readily absorbed in the colon, **it can draw water from the interstitial space into the lumen resulting in softened stool/diarrhea** (Picture 1).

Magnesium oxide (MgO), for instance, is often used in conventional medicine as a stool softener, as the fractional absorption rate is only 4%.

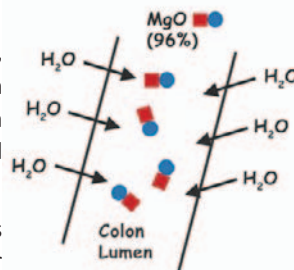
Other magnesium salts, such as citrate and sulfate, have higher absorption rates, (30-40%) but will still draw water into the lumen and result in loose stool.

Osmotic Laxative (Magnesium Salts) vs. Stimulating Laxative

One merit of using osmotic laxatives (eg. magnesium salts) over stimulating laxatives – such as Senna and Cascara – is that it does not cause dependence.

Using stimulating laxatives long-term desensitizes the colon linings, and consequently, requires higher and higher dosages over time.

Magnesium salts, on the other hand, can be used on daily basis without causing dependence, as it depends on a simple physics phenomenon – osmosis – to draw water into the lumen to soften the stool.



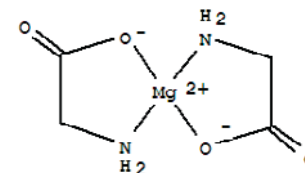
Picture 1. Unabsorbed ionic Mg in the intestinal lumen draws water from the interstitial space.

Magnesium salts are indicated for elderly patients with decreased bowel muscle tone, especially those with high risk of stroke, due to that fact that straining to defecate is one of the leading causes of hemorrhagic stroke in the elderly.

How to Determine the Purity of Your Magnesium Bisglycinate Chelate (Mg-BC) Supplement

“Why is my patient still experiencing the unwanted laxative effect even though I prescribed him/her a magnesium bisglycinate supplement?” some of you may be wondering. **The key here is PURITY.**

Mg-BC is a large molecule and contains only **~13-14% of elemental magnesium**. Therefore, the chelating ratio of magnesium bisglycinate is inversely proportional to its percentage of magnesium content.



Calculations:
The molecular weight of
Bisglycino-Mg = 180.42 g/mole;
Mg % = Mg Atomic Wt. /
Bisglycino-Mg Molecular Wt. =
24.30 / 180.42 = 13.5%

Bisglycino-Mg utilizes the largest capsule size (“00”) commonly used in the market to accommodate a maximum of 150 mg elemental Mg from 1,200-1,300 mg of pure Mg-BC.

Therefore, when you see a **Mg bisglycinate product in capsule form containing more than 150 mg of elemental Mg**, it is likely **mixed with other Mg salts (ie. non-chelated)** with lower molecular weight, such as **MgO**, and may still cause loose stool or diarrhea.



Actual “00”
Capsule Size

Reference:

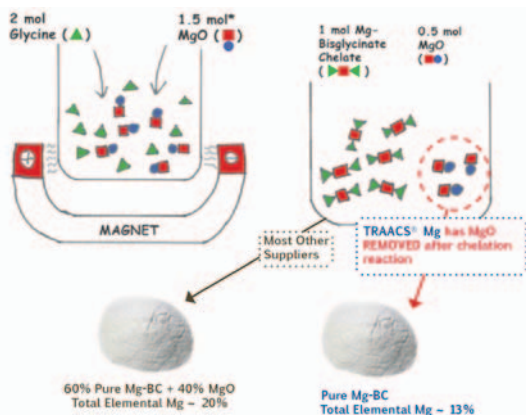
1. Alaimo K, McDowell MA, Briefel RR, et al. Dietary intake of vitamins, minerals, and fiber of person ages 2 months and over in the United States: Third National Health and Nutrition Examination Survey, Phase 1, 1988-91 Adv Data. 1994;(258):1-28.
2. Guerrero MP, Volpe SL, Mao JJ. Therapeutic Uses of Magnesium. Am Fam Physician. 2009; 80(2): 157-162.
3. Seelig MS. Interrelationship of magnesium and estrogen in cardiovascular and bone disorders, eclampsia, migraine and premenstrual syndrome. J Am Coll Nutr. 1993. 12(4): 442-458.
4. Takaya J, Higashino H, Kobayashi Y. Intracellular magnesium and insulin resistance. Magnesium Research 2004. 17(2): 126-136.
5. Supakatisant C, Phupong V. Oral magnesium for relief in pregnancy-induced leg cramps: a RCT. Maternal & Child Nutrition (2012).



How is Magnesium Bisglycinate Chelate Made?

During the chelation process, excessive magnesium oxide (MgO) is usually added to glycine to ensure all glycine molecules are bound (Picture 2). Ideally, the remaining MgO should be removed from the end product.

However, most suppliers do not invest in such a technique to completely remove MgO, which may appear to increase Mg dosage in the supplement while really decreasing the overall absorption rate.



Picture 2. Chelating Reaction of Magnesium Bisglycinate

Vita Aid chooses the highest purity magnesium bisglycinate from **Albion Laboratories**; with their patented technique, they are capable of **removing MgO to yield a highly purified Mg bisglycinate - TRAACS®** (The Real Amino Acid Chelate System).



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Toll-Free (US&Canada): 1-800-490-1738 | F: 604-465-1299
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Bisglycino-Mg

- **Magnesium bisglycinate is the most bioavailable form of magnesium** that is readily up-taken into the blood stream and able to participate in the vital reactions of the body.
- Its **absorption rate is more than twice that of mineral salts** and not dependent on the pH in the stomach or food intake.
- High purity of magnesium bisglycinate with patented technique to **remove the impurities (ie. MgO) and maximize the bioavailability.**

Ingredients (per capsule):

Magnesium TRAACS®.....150 mg
(from 1200 mg of magnesium bisglycinate)

Non-medicinal Ingredients: L-leucine, silicon dioxide, pullulan/ hypromellose (capsule)

Suggested Use: Adults - Take 1 capsule 3 times per day, or as directed by a health care practitioner.

Mg-Lax

Specifically formulated to promote regular bowel movements, loosen stools, and aid in constipation.

- Contains **magnesium oxide and citrate, which act as an osmotic laxative, increasing stool volume while also making stools softer.**
- A **safe and gentle alternative to stimulating laxatives.**
- Magnesium citrate helps relax bowel spasms and prevent cramping.
- Useful in elderly patients to prevent straining and promote healthy bowel movements.

Ingredients (per capsule):

Magnesium (from Mg oxide & Mg citrate).....150 mg

Non-medicinal Ingredients: L-leucine, microcrystalline cellulose, silicon dioxide, hypromellose/ pullulan (capsule)

Suggested Use: Adults - For constipation, take 1-3 capsules at bed time, or as directed by a health care practitioner.

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