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## Product Review: *Magnesium and Calcium-Magnesium Supplements Review*

Initial Posting: 6/6/15 | Last Update: 2/28/17

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Photo: ConsumerLab.com



### Summary: What You Need to Know About Magnesium Supplements

- Magnesium is an essential mineral which can be easily obtained through the diet and only a small percentage of people in the U.S. have a magnesium deficiency requiring supplementation. However, supplementing with magnesium may be helpful for conditions such as migraines and menstrual pain and it is an effective laxative and antacid. It may also improve glucose status in people with prediabetes -- particularly if they are low in magnesium. Maintaining adequate magnesium intake also has cardiovascular benefits. (See "[What It Does](#)")
- When used as a treatment, magnesium is often recommended at doses of 250 to 600 mg daily (which is similar to the daily intake requirement in adults of about 400 mg). Be sure to check that supplements list the amount of *elemental* "magnesium" and not the amount of the total compound (i.e. magnesium oxide), as this could cause you to get much less magnesium than you think (See "[What to Consider When Using](#)").
- Among the products ConsumerLab.com selected for review, three failed testing because they contained far too little or too much magnesium, or other key ingredient, than listed on the label (see [What CL Found](#)).
- Magnesium oxide tends to be less expensive than other forms, but may also be less well absorbed and more likely to cause diarrhea. Forms such as citrate and chloride may be better absorbed. Magnesium chloride is also less likely to cause diarrhea and is recommended if you are taking a higher dose. See [What to Consider When Buying](#) for more about the different forms.
- Among the products which passed testing and were "Approved" for their quality, i.e., containing their listed ingredients, lacking heavy metal contamination, and, if tablets, properly breaking apart, there were several [top choices](#) which were also very economical, costing as little as 3 cents per dose.
- Magnesium supplements may cause upset stomach, nausea or diarrhea in some people. Although rare, excessive intake can cause thirst, low blood pressure, drowsiness, muscle weakness and slowed breathing (See "[Concerns and Cautions](#)").

### Update:

**ReMag Magnesium Solution** (1/23/16): A CL member contacted the company which sells this product, RnA ReSet, for a response to the fact that the product was "Not Approved" by ConsumerLab.com because it contained only 61.5% of its listed magnesium (as noted in the Review below) -- a deficiency was confirmed in two independent laboratories prior to publication. The response was forwarded to us and found to contain false and misleading information, including the following:

"When we confronted them [ConsumerLab.com] about how they did their 'testing' they have refused to give us any information about the bottles they tested, how it was tested, etc. etc."

ConsumerLab.com was never contacted by RnA ReSet or any company representing it about the findings. Had we been contacted, a summary of the lab results and details of the product purchased would have been promptly provided at no cost, as per our [posted policy](#). Furthermore, our testing methods are [freely available](#). Also per our policy we retain an unopened sample of the product which we are willing to ship, at no cost, for re-testing to a mutually acceptable independent laboratory should the RnA ReSet wish, so long as it promises to publicly post the results, which we will also post.

RnA ReSet also included a statement from its contract manufacturer which included the following statements:

"In house testing is done. Once it passes all tests, only then will it be bottled. This means that we use a third party, licensed FDA lab to "prove" our testing is accurate." "I am confident that what we put on the label is actually in the product."

It is not possible that the contractor uses a "licensed FDA lab" as the FDA does not license laboratories nor allow its own labs to be used by manufacturers.

ConsumerLab.com has no reason to believe that its results in this Review are incorrect and it remains willing to provide a report of its results and send an unopened sample for further re-testing upon request, as noted above.

The CL member who brought this information to our attention noted that ReMag is promoted by Dr. Carolyn Dean. According to the [Casewatch.com website article about Carolyn Dean, M.D.](#), the College of Physicians of Ontario (Canada) concluded in 1995 that Dr. Dean was unfit to practice and revoked her registration certificate.

### What It Is:

Magnesium is an essential mineral for the body. It has been estimated that 15% of adults in the U.S. take a supplement containing magnesium (see [ConsumerTips™: What to Consider When Using](#) for more information about daily requirements and magnesium in foods). In addition to magnesium-only supplements, supplemental magnesium can be obtained from laxatives, antacids, multivitamin/multimineral products (see [Multivitamin/Multimineral Product Review](#)) and calcium supplements containing magnesium (some of which are included in this Review as well in as the [Calcium Product Review](#)).

Magnesium comes in a variety of chemical forms, including magnesium oxide, magnesium chloride, magnesium gluconate, magnesium citrate, magnesium orotate and many others. (See [ConsumerTips™: What to Consider When Buying](#) for more information about forms of magnesium).

#### What It Does:

##### Magnesium deficiency:

Magnesium is needed for proper metabolism and nervous system functioning. While sufficient magnesium can be obtained easily from the diet, magnesium deficiency may affect a small percentage of the population, in whom it may modestly elevate blood pressure and increase the risk of osteoporosis. Low serum magnesium levels can also result in serious adverse events including muscle spasm (tetany), irregular heartbeat (arrhythmias), and convulsions (seizures); however, patients do not always have these symptoms. Early signs of magnesium deficiency include loss of appetite, nausea, vomiting, fatigue, and weakness. Severe magnesium deficiency is rare.

Conditions that may deplete magnesium include alcohol abuse, diabetes, diseases of the digestive tract (such as ulcerative colitis, Crohn's disease and celiac sprue), and use of medications such as cisplatin, certain diuretics, and certain acid blocking drugs (e.g., proton pump inhibitors).

The FDA in 2011 [warned](#) that proton pump inhibitor (PPI) medications (used to reduce stomach acid) may also cause low serum magnesium levels if taken for prolonged periods of time (in most cases, longer than one year). Examples of PPIs are Nexium, Dexilant, Prilosec, Prevacid, Protonix, AcipHex, Vimovo, and Zegerid. Treatment of hypomagnesemia generally requires magnesium supplements. However, in approximately one-quarter of the cases reviewed, magnesium supplementation alone did not improve low serum magnesium levels and the PPI had to be discontinued.

##### Magnesium for other conditions:

Use of magnesium supplements may help prevent a number of conditions including: **hearing loss** from excessive noise, **migraine** headaches (including menstrual migraines), **menstrual pain** and **PMS**. Magnesium is also an effective **laxative** and **antacid**. Intravenous magnesium (as opposed to oral magnesium supplementation), is sometimes used in hospitals to treat acute asthma, arrhythmias, overdoses of certain drugs, osmotic coma, diabetic ketoacidosis, pancreatitis, hyperthyroidism, hepatitis, and other conditions.

As mentioned earlier, magnesium deficiency can modestly elevate blood pressure. Not surprisingly, an analysis of clinical studies involving magnesium supplementation found that people receiving about 368 mg of magnesium for about three months had modest overall reductions in systolic **blood pressure** of 2 mm Hg and diastolic blood pressure of 1.78 mm Hg. The study also found that magnesium might only be effective among people with magnesium deficiency or insufficiency ([Zhang, Hypertension 2016](#)).

Interestingly, a study which followed thousands of older men and women in the Netherlands for about 9 years found that those with the lowest blood serum magnesium levels (0.8 mmol/L and below) were 36% more likely to die from **coronary heart disease** and 54% more likely to experience sudden **cardiac death** over the course of the study than those with moderate levels (0.81 and 0.88 mmol/L) ([Kieboom, J Am Heart Assoc 2016](#)). High levels (above 0.89 mmol/L) were associated with a 6% lower risk of coronary heart disease but a 35% greater risk of sudden cardiac death than moderate levels. (Note: Normal magnesium levels range from 0.7 to 0.91 mmol/L or, using units more common in the U.S., 1.7 to 2.2 *mg/dL*). A study of middle-aged men in Finland followed for around 25 years also found lower serum magnesium to be associated with greater risk of future heart failure ([Kunutsor, Eur J Epidemiol 2016](#)).

Magnesium supplements may increase insulin sensitivity in people with type 2 **diabetes**, many of whom have hypomagnesemia (low blood levels of magnesium). Increased intake of magnesium from the diet and supplements has generally been associated with a decrease in the risk of developing type 2 diabetes — particularly among people with magnesium intakes below the Recommended Daily Allowance (RDA) ([Larsson, J Intern Med 2007](#)). A study of people with hypomagnesemia and prediabetes in Mexico found that, after 4 months of taking 382 mg of magnesium daily (as a magnesium chloride liquid supplement), 50.8% had improved glucose status versus 7% of those receiving placebo. On average, those taking magnesium had a 22% improvement in fasting glucose levels. During the study, both groups were advised to follow a balanced diet and to engage in physical activity for at least 30 minutes three times a week ([Guerrero-Romero, Diab & Metab 2015](#)). A study among obese, insulin insensitive people with *normal* magnesium plasma levels, showed that daily magnesium supplementation improved insulin sensitivity. A 7% improvement in fasting plasma glucose levels was observed among those taking 365 mg of magnesium (as magnesium-aspartate-hydrochloride) daily for 6 months -- a significant improvement compared those taking placebo ([Mooren, Diab Obes Metab 2010](#)).

An analysis of several studies concluded that magnesium may help reduce the risk of **stroke**. People who consumed 100 mg of magnesium more per day than average (the average being about 300 mg) had an 8% lower risk of strokes of any kind and a 9% lower risk of ischemic stroke ([Larsson, Am J Clin Nutr 2012](#)). This finding is based on total magnesium in the diet -- it does not mean that 100 mg of magnesium from a supplement will necessarily have the same risk-lowering effect, but getting a total of at least 400 mg of magnesium from your diet per day may be beneficial. **Similarly, an analysis of 40 observational studies ranging from 4 to 30 years in length and involving a total of 1 million participants found that each 100 mg/day increase in dietary magnesium intake (up to about 500 mg total daily intake) is associated with a 7% decrease in the risk of stroke, as well as 22%, 19% and 10% decreases in the risks of heart failure, type 2 diabetes, and all-cause mortality, respectively** ([Fang, BMC Medicine 2016](#)).

Magnesium supplements, especially those containing magnesium-L-threonate (such as *Jarrow Formulas MagMind* in the [Results Table](#) below), are sometimes promoted for improving **memory** or preventing memory loss. However, there appears to be only one, small clinical study of magnesium's effects on memory in people and it was funded by the makers a magnesium-L-threonate supplement called **Magtein** (now also sold as **Clarimem** from Neurocentria, Inc.). The study found that men and women with self-reported memory and concentration impairment, anxiety, and difficulty sleeping who received between 1.5 and 2 grams of magnesium-L-threonate daily for three months had an average 10% increase in the speed of performance on an executive function task, while those who took a placebo showed much smaller improvement. There was no improvement, however, in working memory, episodic memory, attention, anxiety or sleep, relative to placebo. No serious adverse events were reported and there were no significant changes in blood pressure or heart rate ([Liu, J Alzheimer's Dis 2015](#)). Other research of magnesium's possible effects on memory and cognition has been limited to studies in animals ([Slutsky, Neuron 2004](#); [Hoane, Magnes Res 2008](#); [Abumaria, J Neurosci 2011](#)), including one funded by the makers of Magtein which found that rats given magnesium-L-threonate performed significantly better on tests of long and short term memory ([Slutsky, Neuron 2010](#)). Magnesium-L-threonate also enhanced signaling of a specific part of brain receptors associated the ability to store information. Other forms of magnesium tested, including magnesium chloride, magnesium citrate, magnesium glycinate, and magnesium gluconate, were not as efficient at raising magnesium levels in the central nervous system (as measured by levels in cerebrospinal fluid) and did not improve memory as well as magnesium-L-threonate.

In a study of elderly men and women aged 70-79 years, magnesium intake from food and supplements was associated with a significant increase in **bone mineral density (BMD)** in white men and women, but not in black men and women. Most people in this study did not have adequate magnesium intake. In white women, getting the recommended amount of 320 mg daily of magnesium was associated with a 2% higher BMD compared to intakes 220 mg or lower. Similarly, in men, intake levels meeting the recommended amount of 420 mg daily was associated with a 1% higher BMD compared intakes of 320 mg or lower ([Ryder, J Am Geriatr Soc 2005](#)). This does not, however, indicate that getting more than the daily requirement is beneficial, nor that a supplement is necessary if you get sufficient magnesium in your diet. Similarly, a recent study in children aged 4-8 years showed that dietary intake of magnesium was associated with significant increases in bone mineral content, but, for most children, daily intake was adequate to meet growth-related needs ([Abrams, Pediatric Academic Societies 2013](#)).

A study in healthy women older than 65 involved in a mild, weekly exercise program found that **physical performance** improved for those who were given a daily magnesium supplement (300 mg from magnesium oxide) for 12 weeks, compared to those given placebo ([Veronese, AJCN 2014](#)). Improvements were

seen with activities such as the speed of walking and rising from a chair. Although all the women had normal blood levels of magnesium, improvements in physical performance were more evident in participants with magnesium dietary intake lower than the RDA (320 mg for women 31 years and older), which is common among older women, suggesting that some women may still be "deficient" despite normal blood levels.

Magnesium supplements are sometimes promoted to help relieve symptoms of **restless leg syndrome (RLS)** but this effect is not well established. One study in 10 men and women with insomnia related to RLS found a dose of 301.38 mg of magnesium (as magnesium oxide) taken in the evening for 4-6 weeks significantly reduced leg movement associated with waking, however, this study was not blinded or placebo-controlled ([Hornyak, Sleep 1998](#)).

Similarly, there is little evidence that magnesium supplementation reduces **leg cramps** or **nighttime leg cramps** in most people, although there may be a small benefit in pregnant women who experience leg cramps ([Garrison, Cochrane Database Syst Rev 2012](#); [Sebo, Fam Pract 2014](#)). **Most recently, a study among 88 older men and women (average age 64) in Israel who regularly experienced nighttime leg cramps found that 520 mg of magnesium (as magnesium oxide) taken at bedtime for one month did not decrease frequency, severity or duration of the cramps compared to placebo (Maor, JAMA Intern Med 2017).**

Among pregnant women with leg cramps, a study using 300 mg of magnesium (as magnesium bisglycinate chelate) daily showed significant reductions in the intensity and frequency of leg cramps compared to placebo ([Supakatisant, Matern Child Nutr 2012](#)), while a study using 360 mg of magnesium (from a combination of magnesium lactate and magnesium citrate) showed no effect on leg cramps ([Nygaard, Eur J Obstet Gynecol Reprod Biol 2008](#)).

Magnesium supplements do not appear to help prevent **kidney stones**.

For more information about the clinical findings with magnesium, see the [Magnesium](#) article in our Encyclopedia.

#### Magnesium orotate

Magnesium orotate is a complex of magnesium plus orotic acid. Although it has been promoted to improve athletic performance, there is no reliable evidence to support this. However, a preliminary clinical study in people with heart failure found that giving 6,000 mg of magnesium orotate daily for one month, followed by 3,000 mg daily for 11 months reduced the risk of dying during the study by about 25%. It also improved heart failure symptoms in about 40% of patients ([Stepura, Int J Cardiol 2009](#)). However, there are potential safety concerns with magnesium orotate (see [Concerns and Cautions](#)).

#### Magnesium Creams and Sprays

There is some evidence that magnesium may be absorbed through the skin when magnesium creams or sprays are applied, however, these approaches have generally not been shown to be effective and may cause irritation. In one study, applying a cream containing magnesium (form not known) and **MSM (MagPro)** on the leg before stretching and exercise had no effect on **flexibility or endurance** compared to a placebo cream ([Gulick, J Strength Cond Res 2012](#)). A pilot study (no placebo control) sponsored at the Mayo Clinic investigated the use of a magnesium chloride spray (*Fibro Flex*, Magnesium Direct, Inc. — 31% MgCl<sub>2</sub>) on the quality of life in women with **fibromyalgia**. Participants were asked to apply (and rub in) 4 sprays per limb 2 times daily for 4 weeks, showering it off before bedtime to avoid transfer to bed sheets. Forty percent of participants dropped out of the study, with 22.5% being due to skin irritation. Overall, the women reported modest improvements cramps and fatigue but no statistically significant improvement in quality of life ([Engen, J Integr Med 2015](#)).

For more information about the clinical uses of magnesium see the excellent [article](#) in the Encyclopedia on this website.

#### **Quality Concerns and What CL Tested for:**

Like other supplements, neither the FDA nor any other federal or state agency routinely tests magnesium products for quality prior to sale. However, quality issues for magnesium supplements can include the following:

- **Labeled Amount** — Does the product really contain the labeled amount of magnesium? Too little magnesium in a supplement is a problem if relying on it to prevent or correct a deficiency. Excessive consumption of oral magnesium frequently causes diarrhea. While it is unlikely that an individual with healthy kidneys can take enough magnesium orally to elevate blood levels, if this does occur, potentially dangerous heart and nerve-related symptoms may develop. (Individuals with severe kidney disease should not take magnesium supplements.)
- **Purity** — Many sources of magnesium, like other minerals, may naturally contain amounts of heavy metals such as lead, cadmium or arsenic. In 2005 and 2009, for example, ConsumerLab.com found magnesium supplements contaminated with lead, and, in 2012, found a combination product containing magnesium, calcium, vitamin D and vitamin K to exceed limits for lead contamination. In children, infants, and fetuses, even low levels of lead can adversely affect neurobehavioral development and cognitive function. In adults, lead at somewhat higher levels can cause elevated blood pressure, anemia, and adversely affect the nervous and reproductive systems. Lead is of particular concern during pregnancy as the mother can transfer it to the fetus.
- **Ability to Break Apart for Absorption** — Will pills break apart properly so they can release their ingredients in the body? For a tablet to be most useful, it must fully disintegrate prior to leaving the stomach, delivering its contents for absorption in the gut. Some tablets and caplets are not properly made and can pass through your body completely or partially intact, depriving you of its ingredients. Remnants of such products are sometimes found in the stool. This happens, for example, when a tablet is too tightly compressed (too "hard") or is too thickly coated.
- **Side Effects at Suggested Dosage** — ConsumerLab.com reviewed the levels of magnesium to determine if any product provided doses high enough so as to carry a risk of adverse side effects. Those that exceeded upper tolerable limits (ULs — see discussion below) are footnoted.

ConsumerLab.com, as part of its mission to independently evaluate products that affect health, wellness, and nutrition, purchased many leading magnesium supplements products sold in the U.S. and tested them to determine whether they 1) possessed the claimed amount of magnesium, 2) could disintegrate properly in order to be available for absorption, and 3) were free of unacceptable levels of lead (see [Testing Methods and Passing Score](#)).

#### **What CL Found:**

Among the 18 magnesium-containing supplements that ConsumerLab.com selected for testing, three products failed to meet our quality criteria. The 15 products that passed are listed as Approved in the table below. Also listed as Approved are 19 products that passed the same testing through CL's voluntary [Quality Certification Program](#), bringing the total number of Approved magnesium supplements in this report to 32.

The three products which were Not Approved are described below. The problems found were confirmed in a second independent laboratory:

- *ReMag Magnesium Solution* contained only 61.5% of its claimed amount of magnesium. Instead of providing 150 mg of magnesium per ½ teaspoon, it provided just 92.3 mg.
- *Country Life Bone Solid*, a combination product, contained its claimed amount of magnesium, but did not contain its claimed amounts of vitamin K1 and K2. It was found contain only 76.2% (127 mcg) of the 166.67 mcg vitamin K1, and none (0 mcg) of the 1.67 mcg of vitamin K2 (MK-7) listed per capsule.
- Another combination product, *Shaklee OsteoMatrix* also contained its claimed amount of magnesium, but was found to contain much more vitamin D than listed. These caplets contained 182.7% of the listed amount of D3. So the suggested daily dose of 4 caplets would provide 1,096 IU of vitamin D rather than 600 IU. There are potential risks with getting too much (over 4,000 IU per day) vitamin D from supplements (see [Vitamin D Product Review, Concerns and Cautions](#)).

#### Top choices among "Approved" supplements

Among the products which were Approved for their quality (i.e. contained their listed ingredients, lacked heavy metal contamination, and, if tablets, broke apart properly), the following are top picks:

**Magnesium-only:**

Products which provide magnesium at lowest cost are those containing **magnesium oxide**, of which the most economical are *TwinLab Magnesium Caps* (3 cents per capsule providing 400 mg of magnesium), *Finest Nutrition [Walgreens] Magnesium*, and *Nature Made Magnesium* -- the latter two each provide 250 mg of magnesium per 3 cent capsule. Be aware that although magnesium oxide is less expensive, it may not be absorbed as well as other forms, and may be more likely to cause diarrhea.

The following options were found to be the most economical among products providing forms of magnesium which may be better absorbed:

- *Kirkland Signature [Costco] Magnesium* is the lowest cost **magnesium citrate** product. Two softgels provide 250 mg of magnesium and cost 11 cents. [Note: Costco has discontinued this product.] *Solgar Magnesium Citrate* provides 200 mg of magnesium per 12 cent tablet.
- *NutriCology Magnesium Chloride Liquid* provides 200 mg of magnesium per 1 ½ teaspoons for 26 cents. Although more expensive than citrate, the **chloride** form of magnesium is less likely to cause diarrhea, and therefore is recommended for people taking high doses. *Piping Rock Magnesium Chloride* costs about the same per mg of magnesium — each capsule provides 62.17 mg of magnesium for 8 cents.

**Magnesium combination supplements:**

These products typically contain magnesium oxide, or a combination of oxide and other forms. *Nature Made Calcium Magnesium Zinc* is least expensive among products containing calcium and vitamin D. Two tablets provide 266 mg of magnesium (as magnesium oxide) for about 9 cents. Among products that contain vitamin K as well as calcium and vitamin D, *Jarrow Formulas Bone-Up* is lowest in cost, with 3 capsules providing 250 mg of magnesium (as magnesium oxide) for 29 cents. Two tablets of *Nature's Way Alive! Calcium Bone Formula* provides 240 mg of magnesium from citrate, oxide and Aquamin® (derived from red algae) for 40 cents.

**Test Results by Product:**

Listed below are the test results for 37 supplements containing magnesium. Products are grouped by main ingredients, with sub-grouping for children's products. Within each group, products are listed alphabetically. ConsumerLab.com selected 18 of these products. Nineteen other products (each indicated with a CL flask) were tested at the request of their manufacturers/distributors through CL's voluntary [Quality Certification Program](#) and are included for having passed testing. Also listed are two products similar to ones that passed but sold under different brand names.

Shown for each product is the labeled amount and form of magnesium (and vitamins D and K and calcium) and the serving size recommended on the label. Products listed as "Approved" met their label claim and ConsumerLab.com's quality criteria (see [Passing Score](#)). Those that did not are listed as "Not Approved" with an explanation of the problem found. The full list of ingredients is available for each product by clicking on the word "Ingredients" in the first column. A cost comparison is provided in the last column.

RESULTS OF CONSUMERLAB.COM TESTING OF MAGNESIUM SUPPLEMENTS (INCLUDING COMBINATIONS WITH CALCIUM, VITAMIN D AND/OR VITAMIN K) <a href="#">Click on \$ Price Check beneath a product name to find a vendor that sells it.</a> To find retailers that sell some of the listed products <a href="#">click here</a> .							
Product Name, Amount of Magnesium per Unit, Serving Size, and Suggested Daily Serving on Label  Click on "Ingredients" for Full Listing	Claimed Amount of Magnesium, Calcium and Vitamins D & K Per Suggested Daily Serving on Label (Form of Magnesium)	--TEST RESULTS--				Cost for Daily Suggested Serving on Label  [Cost for 200 mg of Magnesium]  Other Notable Features <sup>1</sup>  Price Paid	
		OVERALL RESULTS:  APPROVED or NOT APPROVED	Contained Listed Amounts of Magnesium, Calcium and Vitamins D & K	Did Not Exceed Contamination Limits for Lead, Cadmium and Arsenic	Disintegrated Properly  (NA=Not Applicable)		
<b>Magnesium Only:</b>							
Cardiovascular Research Ltd. Magnesium Taurate (125 mg per capsule; 1 capsule, twice daily)  Dist. by Cardiovascular Research, LTD <a href="#">Ingredients</a> <a href="#">\$ Price Check</a>	250 mg <sup>9</sup>  (magnesium taurate)	APPROVED	✓	✓	N/A	\$0.32  [\$0.26]  \$28.80/180 capsules	
Carlson® Chelated Magnesium (200 mg per tablet; 1 tablet, once daily)  Dist. by Carlson Division of J.R. Carlson Laboratories, Inc. <a href="#">Ingredients</a> <a href="#">\$ Price Check</a>	200 mg <sup>9</sup>  (magnesium chelate and magnesium oxide)	APPROVED	✓	✓	✓	\$0.12  [\$0.12]  <i>Gluten free</i>  \$21.71/180 tablets	
Doctor's Best® High Absorption 100% Chelated Magnesium (100 mg per tablet; 2 tablets, twice daily)  Dist. by Doctor's Best, Inc. <a href="#">Ingredients</a> <a href="#">\$ Price Check</a>	400 mg <sup>10</sup>  (magnesium glycinate and magnesium lysinate chelate)	APPROVED	✓	✓	✓	\$0.33  [\$0.17]  <i>Suitable for vegans, non-GMO, gluten free</i>  \$9.99/120 tablets	
Finest Nutrition [Walgreens] Magnesium (250 mg per tablet; 1 tablet, once daily)  Dist. by Walgreen Co. <a href="#">Ingredients</a>	250 mg <sup>9</sup>  (magnesium oxide)	APPROVED	✓	✓	✓	\$0.03  [\$0.02]  <b>Lowest cost for magnesium (oxide)</b>  <i>Contains no wheat, gluten free, yeast free</i>  \$8.49 <sup>11</sup> /300 tablets	

**RESULTS OF CONSUMERLAB.COM TESTING OF MAGNESIUM SUPPLEMENTS  
(INCLUDING COMBINATIONS WITH CALCIUM, VITAMIN D AND/OR VITAMIN K)**  
[Click on \\$ Price Check](#) beneath a product name to find a vendor that sells it.  
 To find retailers that sell some of the listed products [click here](#).

Product Name, Amount of Magnesium per Unit, Serving Size, and Suggested Daily Serving on Label  Click on "Ingredients" for Full Listing	Claimed Amount of Magnesium, Calcium and Vitamins D & K Per Suggested Daily Serving on Label (Form of Magnesium)	--TEST RESULTS--				Cost for Daily Suggested Serving on Label  [Cost for 200 mg of Magnesium]  Other Notable Features <sup>1</sup>  Price Paid
		OVERALL RESULTS:  APPROVED or <b>NOT APPROVED</b>	Contained Listed Amounts of Magnesium, Calcium and Vitamins D & K	Did Not Exceed Contamination Limits for Lead, Cadmium and Arsenic	Disintegrated Properly  (NA=Not Applicable)	
GNC Magnesium 500 mg (500 mg per capsule; 1 capsule, once daily) <sup>17</sup>   Dist. by General Nutrition Corporation <a href="#">Ingredients</a>	500 mg <sup>10</sup>  (magnesium oxide)	APPROVED	✓	✓	NA	\$0.07  [\$0.03]  <i>Contains no wheat, gluten free, yeast free</i>  \$8.99/120 capsules
GNC Super Magnesium 400 mg (200 mg per caplet; 2 caplets, once daily) <sup>17</sup>   Dist. by General Nutrition Corporation <a href="#">Ingredients</a>	200 mg <sup>10</sup>  (magnesium aspartate, magnesium lactate and magnesium citrate)	APPROVED	✓	✓	✓	\$0.33  [\$0.33]  <i>Contains no wheat, gluten free, yeast free</i>  \$14.99/90 caplets
Jarrow Formulas® MagMind® (48 mg per capsule; 3 capsule, once daily <sup>2</sup> )   Dist. by Jarrow Formulas® <a href="#">Ingredients</a> <a href="#">\$ Price Check</a>	144 mg <sup>9</sup>  (Magtein® magnesium L-threonate)	APPROVED	✓	✓	NA	\$0.80  [\$1.11]  <i>Contains no wheat, gluten free</i>  \$23.96/90 capsules
Jigsaw Health® Magnesium w/SRT® (125 mg per tablet; 4 tablets, once or twice daily <sup>3</sup> )   Dist. by Jigsaw Health, LLC <a href="#">Ingredients</a> <a href="#">\$ Price Check</a>	500 mg <sup>10</sup> to 1,000 mg <sup>10</sup>  (dimagnesium malate)	APPROVED	✓	✓	NA	\$0.77-\$1.53  [\$0.31]  Vitamins B6, B12 & C, folic acid, malic acid  Sustained release technology  \$22.97/120 tablets
Kirkland Signature™ [Costco] Magnesium Citrate (125 mg per softgel; 2 softgels, once daily)   Dist. by Costco Wholesale Corporation <a href="#">Ingredients</a> <b>DISCONTINUED</b>	250 mg <sup>9</sup>  (magnesium citrate)	APPROVED	✓	✓	NA	\$0.11  [\$0.09] <b>Lowest cost for magnesium citrate</b>  <i>Gluten free, yeast free</i>  \$15.99 <sup>12</sup> /300 softgels
LifeExtension® Magnesium Caps (500 mg per vegetarian capsule; 1 vegetarian capsule, once to three times daily)   Dist. by Quality Supplements and Vitamins, Inc. <a href="#">Ingredients</a>	500 mg <sup>10</sup> to 1,500 mg <sup>10</sup>  (magnesium oxide, magnesium citrate, magnesium succinate and TRAACS® magnesium lysyl glycinate chelate)	APPROVED	✓	✓	NA	\$0.09-\$0.27  [\$0.04]  Vitamin C  \$9.00/100 vegetarian capsules
Nature Made® Magnesium (250 mg per tablet; 1 tablet, once daily)   Dist. by Nature Made Nutritional Products <a href="#">Ingredients</a>	250 mg <sup>9</sup>  (magnesium oxide)	APPROVED	✓	✓	✓	\$0.03  [\$0.02] <b>Lowest cost for magnesium (oxide)</b>  <i>Gluten free, yeast free</i>  \$5.91/200 tablets
Nature's Bounty® High Potency Magnesium (500 mg per tablet; 1 tablet, once daily)   Mfd. by Nature's Bounty, Inc. <a href="#">Ingredients</a>	500 mg <sup>10</sup>  (magnesium oxide)	APPROVED	✓	✓	✓	\$0.08  [\$0.03]  <i>Suitable for vegetarians, contains no wheat, gluten free, yeast free</i>  \$7.99/100 tablets

**RESULTS OF CONSUMERLAB.COM TESTING OF MAGNESIUM SUPPLEMENTS  
(INCLUDING COMBINATIONS WITH CALCIUM, VITAMIN D AND/OR VITAMIN K)**  
[Click on \\$ Price Check](#) beneath a product name to find a vendor that sells it.  
 To find retailers that sell some of the listed products [click here](#).

Product Name, Amount of Magnesium per Unit, Serving Size, and Suggested Daily Serving on Label  Click on "Ingredients" for Full Listing	Claimed Amount of Magnesium, Calcium and Vitamins D & K Per Suggested Daily Serving on Label (Form of Magnesium)	--TEST RESULTS--				Cost for Daily Suggested Serving on Label  [Cost for 200 mg of Magnesium]  Other Notable Features <sup>1</sup>  Price Paid
		OVERALL RESULTS:  APPROVED or <b>NOT APPROVED</b>	Contained Listed Amounts of Magnesium, Calcium and Vitamins D & K	Did Not Exceed Contamination Limits for Lead, Cadmium and Arsenic	Disintegrated Properly  (NA=Not Applicable)	
NutriCology® Magnesium Chloride Liquid (66.5 mg per ½ teaspoon; ½ teaspoon, twice or three times daily)   Dist. by NutriCology® <a href="#">Ingredients</a>	133 mg <sup>9</sup> to 199.5 mg <sup>9</sup>  (magnesium chloride)	APPROVED	✓	✓	NA	\$0.17-\$0.26  [\$0.26] <b>Lowest cost for magnesium chloride</b>  <i>Hypoallergenic</i>  \$7.99/8 fl. oz. (236 ml) bottle (approx. 94 servings)
  PipingRock.com® Magnesium Chloride (62.17 mg per tablet; 1 tablet, once to three times daily)  Dist. by Piping Rock Health Products <a href="#">Ingredients</a>	62.17 mg to 186.51 mg <sup>9</sup>  (magnesium chloride)	APPROVED	✓	✓	✓	\$0.08-\$0.24  [\$0.26] <b>Lowest cost for magnesium chloride</b>  \$7.99/100 tablets
Pure   Encapsulations® Magnesium (Glycinate) (120 mg per capsule; 1 capsule, once to four times daily)  Mfd. by Pure Encapsulations, Inc. <a href="#">Ingredients</a> <a href="#">\$ Price Check</a>	120 mg <sup>9</sup> to 480 mg <sup>10</sup>  (magnesium glycinate)	APPROVED	✓	✓	NA	\$0.18-\$0.71  [\$0.30]  Vitamin C  <i>Non-GMO</i>  \$32.00/180 capsules
ReMag Magnesium Solution (150 mg per ½ teaspoon; ½ teaspoon, once to twice daily <sup>4</sup> )   Dist. by New Capstone, Inc. <a href="#">Ingredients</a>	150 mg <sup>9</sup> to 300 mg <sup>9</sup>  (ionized magnesium chloride)	<b>NOT APPROVED</b>	Found only 92.3 mg per ½ teaspoon (61.5% of listed amount)	✓	NA	\$0.31-\$0.62  [\$0.42 based on amount claimed] [\$0.68 based on amount found]  <i>Suitable for vegetarians/vegans, hypoallergenic</i>  \$29.99/8 fl. oz. (240 ml) bottle (approx. 96 servings)
Rexall® Magnesium (500 mg per tablet; 1 tablet, once daily)   Mfd. by Rexall, Inc. <a href="#">Ingredients</a>	500 mg <sup>10</sup>  (magnesium oxide)	APPROVED	✓	✓	✓	\$0.07  [\$0.03]  <i>Contains no wheat, gluten free, yeast free</i>  \$2.05/30 tablets
Solgar® Magnesium Citrate (200 mg per tablet; 2 tablets, once daily)   Mfd. by Solgar, Inc. <a href="#">Ingredients</a> <a href="#">\$ Price Check</a>	400 mg <sup>10</sup>  (magnesium citrate)	APPROVED	✓	✓	✓	\$0.25  [\$0.12]  <i>Kosher, suitable for vegetarians, contains no wheat, gluten free, yeast free</i>  \$7.36/60 tablets
Source Naturals® Magnesium Malate (70.83 mg per capsule; 6 capsules, a third to once daily <sup>13</sup> )   Dist. by Source Naturals, Inc. <a href="#">Ingredients</a> <a href="#">\$ Price Check</a>	141.67 mg <sup>9</sup> to 425 mg <sup>10</sup>  (magnesium malate)	APPROVED	✓	✓	NA	\$0.14-\$0.43  [\$0.20]  <i>Contains no wheat, gluten free, yeast free, hypoallergenic</i>  \$7.09/100 capsules
Spring Valley™ [Walmart] Magnesium 	300 mg <sup>9</sup>  (magnesium citrate)	APPROVED	✓	✓	NA	\$0.18  [\$0.12]

**RESULTS OF CONSUMERLAB.COM TESTING OF MAGNESIUM SUPPLEMENTS  
(INCLUDING COMBINATIONS WITH CALCIUM, VITAMIN D AND/OR VITAMIN K)**  
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 To find retailers that sell some of the listed products [click here](#).

Product Name, Amount of Magnesium per Unit, Serving Size, and Suggested Daily Serving on Label  Click on "Ingredients" for Full Listing	Claimed Amount of Magnesium, Calcium and Vitamins D & K Per Suggested Daily Serving on Label (Form of Magnesium)	--TEST RESULTS--				Cost for Daily Suggested Serving on Label  [Cost for 200 mg of Magnesium]  Other Notable Features <sup>1</sup>  Price Paid
		OVERALL RESULTS:  APPROVED or <b>NOT APPROVED</b>	Contained Listed Amounts of Magnesium, Calcium and Vitamins D & K	Did Not Exceed Contamination Limits for Lead, Cadmium and Arsenic	Disintegrated Properly  (NA=Not Applicable)	
Citrate (100 mg per capsule; 1 capsule, three times daily)   Dist. by Wal-Mart Stores, Inc. <a href="#">Ingredients</a>						<i>Contains no wheat, gluten free, yeast free</i>  \$6.00/100 capsules
Trace Minerals Research® ConcenTrace® Trace Mineral Drops (250 mg per ½ teaspoon; ½ teaspoon, a quarter to twice daily <sup>2</sup> )   Dist. by Trace Mineral Research <a href="#">Ingredients</a> <a href="#">\$ Price Check</a>	62.5 mg to 500 mg <sup>10</sup>  (ionic sea minerals from the Great Salt Lake in Utah, USA)	APPROVED	✓	✓	NA	\$0.09-\$0.72  [\$0.29]  Chloride, sodium, potassium, sulfate, lithium, boron  <i>Kosher, suitable for vegans, non-GMO, gluten free</i>  \$8.69/2 fl. oz. (59 ml) bottle (approx. 24 servings)
TwinLab® Magnesium Caps (400 mg per capsule; 1 capsule, once daily)   Dist. by TwinLab Corporation <a href="#">Ingredients</a> <a href="#">\$ Price Check</a>	400 mg <sup>10</sup>  (magnesium oxide)	APPROVED	✓	✓	NA	\$0.03  [\$0.02] <b>Lowest cost for magnesium (oxide)</b>  <i>Contains no wheat</i>  \$8.39/240 capsules
Vitacost® Magnesium Ultra (300 mg per capsule; 1 capsule, once daily)   Dist. by Vitacost <a href="#">Ingredients</a>	300 mg <sup>9</sup>  (magnesium oxide, magnesium amino acid chelate, magnesium malate and magnesium taurinate)	APPROVED	✓	✓	NA	\$0.04  [\$0.03]  <i>Gluten free</i>  \$7.99/180 capsules
The Vitamin Shoppe® Calm Zone Magnesium™ - Raspberry Lemon Flavor (162.5 per rounded teaspoon; 2 rounded teaspoons, half to one and a half times daily <sup>6</sup> )   Dist. by Vitamin Shoppe, Inc. <a href="#">Ingredients</a>	162.5 mg <sup>9</sup> to 487.5 mg <sup>10</sup>  (magnesium carbonate)	APPROVED	✓	✓	NA	\$0.10-\$0.30  [\$0.12]  <i>Contains no wheat, gluten free</i>  \$19.99 <sup>14</sup> /16 oz. (450 g) bottle (approx. 100 servings)
<b>Similar to Approved Products*:</b>						
Puritan's Pride® High Potency Magnesium (500 mg per tablet; 1 tablet, once daily)  Mfd. by Puritan's Pride, Inc. <a href="#">Ingredients</a>	Similar to Nature's Bounty® High Potency Magnesium.					\$0.08  [\$0.03]  <i>Contains no wheat, gluten free, yeast free</i>  \$20.99 <sup>15</sup> /250 tablets
Vitamin World® High Potency Magnesium (500 mg per coated caplet; 1 coated caplet, once daily)  Mfd. by Vitamin World, Inc. <a href="#">Ingredients</a>	Similar to Nature's Bounty® High Potency Magnesium.					\$0.06  [\$0.02]  <i>Contains no wheat, gluten free, yeast free</i>  \$5.98 <sup>16</sup> /100 coated caplets
<b>Magnesium, Calcium &amp; Vitamin D:</b>						
Bayer Citracal® Slow Release 1200 (40 mg per coated tablet; 2 coated tablets, once daily)  Dist. by Bayer HealthCare LLC <a href="#">Ingredients</a>	80 mg <sup>8</sup> (magnesium hydroxide, magnesium silicate and magnesium stearate)  1,200 mg (calcium carbonate and calcium citrate)  1,000 IU (D3)	APPROVED	✓	✓	NA	\$0.27  [\$0.68]  Sodium  Slow Release  \$10.92/80 coated tablets

**RESULTS OF CONSUMERLAB.COM TESTING OF MAGNESIUM SUPPLEMENTS  
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Product Name, Amount of Magnesium per Unit, Serving Size, and Suggested Daily Serving on Label  Click on "Ingredients" for Full Listing	Claimed Amount of Magnesium, Calcium and Vitamins D & K Per Suggested Daily Serving on Label (Form of Magnesium)	--TEST RESULTS--				Cost for Daily Suggested Serving on Label  [Cost for 200 mg of Magnesium]  Other Notable Features <sup>1</sup>  Price Paid
		OVERALL RESULTS:  APPROVED or <b>NOT APPROVED</b>	Contained Listed Amounts of Magnesium, Calcium and Vitamins D & K	Did Not Exceed Contamination Limits for Lead, Cadmium and Arsenic	Disintegrated Properly  (NA=Not Applicable)	
<a href="#">\$ Price Check</a>						
Caltrate® 600 + D Plus Minerals (50 mg per tablet; 1 tablet, once to twice daily)  Dist. by Pfizer <a href="#">Ingredients</a> <a href="#">\$ Price Check</a>	50 mg to 100 mg <sup>8</sup> (magnesium oxide and magnesium stearate)  600 mg to 1,200 mg (calcium carbonate)  800 IU to 1,600 IU (D3)	APPROVED	✓	✓	✓	\$0.13-\$0.27  [\$0.53]  Zinc, copper, manganese, boron  \$15.99/120 tablets
GNC Calcium Plus® 1000 With Magnesium & Vitamin D-3 (166.67 mg per caplet; 3 caplets, once daily)  Dist. by General Nutrition Corporation <a href="#">Ingredients</a> <a href="#">\$ Price Check</a>	500 mg <sup>10</sup> (magnesium oxide)  1,000 mg (calcium carbonate)  800 IU (D3)	APPROVED	✓	✓	✓	\$0.22  [\$0.09]  <i>Contains no wheat, gluten free, yeast free</i>  \$12.99/180 caplets
Kirkland Signature™ [Costco] Calcium Citrate Magnesium And Zinc (40 mg per tablet; 2 tablets, once daily)  Dist. by Costco Wholesale Corporation <a href="#">Ingredients</a>	80 mg <sup>8</sup> (magnesium oxide and magnesium stearate)  500 mg (calcium citrate)  800 IU (D3)	APPROVED	✓	✓	✓	\$0.05  [\$0.12]  Vitamin B6, zinc, copper, manganese, boron  <i>Gluten free</i>  \$12.49/500 tablets
Nature Made® Calcium Magnesium Zinc (133 mg per tablet; 1 tablet, once to three times daily)  Dist. by Nature Made Nutritional Products <a href="#">Ingredients</a> <a href="#">\$ Price Check</a>	133 mg <sup>9</sup> to 399 mg <sup>10</sup> (magnesium oxide)  333 mg to 999 mg (calcium Carbonate)  200 IU to 600 IU (D3)	APPROVED (Also approved for Zinc)	✓	✓	✓	\$0.04-\$0.13  [\$0.07]  Zinc  <i>Gluten free, yeast free</i>  \$12.99/300 tablets
Nutrilite® Cal Mag D Advanced (66.67 mg per tablet; 3 tablets, once daily)  Dist. by Amway Corp. <a href="#">Ingredients</a>	200 mg <sup>9</sup> (magnesium oxide)  600 mg (calcium carbonate and calcified seaweed)  600 IU (D3)	APPROVED	✓	✓	✓	\$0.48  [\$0.48]  Zinc, manganese  <i>Kosher</i>  \$28.84/180 tablets
Rainbow Light® Food Based Calcium™ (250 mg per tablet; 1 tablet, once to twice daily)  Dist. by Rainbow Light Nutritional Systems® <a href="#">Ingredients</a> <a href="#">\$ Price Check</a>	250 mg <sup>9</sup> to 500 mg <sup>10</sup> (magnesium oxide and magnesium aspartate)  500 mg to 1,000 mg (calcium carbonate, calcium amino acid chelate and calcium citrate-malate)  500 IU to 1,000 IU (D3)	APPROVED	✓	✓	✓	\$0.33-\$0.67  [\$0.27]  Betaine HCl, stinging nettle, horsetail, organic spirulina  <i>Gluten free</i>  \$59.97/180 tablets
<b>Children's Products Containing Magnesium, Calcium &amp; Vitamin D:</b>						
ChildLife® Liquid Calcium With Magnesium - Natural Orange Flavor (115 mg per tbspc.; 1 tbspc, 1/3 to twice daily?)  Dist. by ChildLife <a href="#">Ingredients</a> <a href="#">\$ Price Check</a>	38.3 mg to 230 mg <sup>9</sup> (magnesium citrate)  84 mg to 504 mg (calcium citrate)  33.3 IU to 200 IU (D3)	APPROVED	✓	✓	NA	\$0.18-\$1.06  [\$0.92]  Zinc  <i>Contains no wheat, gluten free, yeast free</i>  \$16.99/16 fl. oz. [474 mL] bottle (approx. 32 servings)
<b>Magnesium, Calcium, Vitamin D &amp; Vitamin K:</b>						

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Product Name, Amount of Magnesium per Unit, Serving Size, and Suggested Daily Serving on Label  Click on "Ingredients" for Full Listing	Claimed Amount of Magnesium, Calcium and Vitamins D & K Per Suggested Daily Serving on Label (Form of Magnesium)	--TEST RESULTS--				Cost for Daily Suggested Serving on Label  [Cost for 200 mg of Magnesium]  Other Notable Features <sup>1</sup>  Price Paid
		OVERALL RESULTS:  <b>APPROVED</b> or <b>NOT APPROVED</b>	Contained Listed Amounts of Magnesium, Calcium and Vitamins D & K	Did Not Exceed Contamination Limits for Lead, Cadmium and Arsenic	Disintegrated Properly  (NA=Not Applicable)	
Country Life® Bone Solid® (83.3 mg per capsules; 6 capsules, once daily)  Mfd. by Country Life, LLC <a href="#">Ingredients</a>	500 mg <sup>10</sup> (magnesium oxide, magnesium ascorbate, magnesium alpha-ketoglutarate, magnesium aspartate, magnesium citrate, magnesium taurinate)  1,011 mg calcium (microcrystalline hydroxyapatite and calcium fructoborate)  1,000 IU (D3)  1,000 mcg (K1)  10 mcg (MK-7 K2)	<b>NOT APPROVED</b>	Found only 127 mcg vitamin K1 (76.2% of labeled amount) and 0 mcg vitamin K2 (MK-7) per capsule	✓	NA	\$0.60  [\$0.24]  Phosphorus, zinc, copper, manganese, chromium, potassium, microcrystalline hydroxyapatite (MCHA), calcium fructoborate (FruiteX-B®)  <i>Contains no wheat, gluten free, yeast free</i>  \$17.99/180 capsules
Jarrow Formulas® Bone-Up (83.3 mg per capsule; 6 capsules, once daily)  Dist. by Jarrow Formulas® <a href="#">Ingredients</a> <a href="#">\$ Price Check</a>	500 mg <sup>10</sup> (magnesium oxide)  1,000 mg calcium (StimuCal™ microcrystalline hydroxyapatite)  1,000 IU (D3)  45 mcg (MK-7 K2)	<b>APPROVED</b>	✓	✓	NA	\$0.59  [\$0.24]  Vitamin C, zinc, copper, manganese, potassium, boron  <i>Non-GMO, contains no wheat, no gluten</i>  \$11.89/120 capsules
Nature's Way® Alive!® Calcium Bone Formula (125 mg per tablet; 4 tablets, once daily)  Dist. by Nature's Way Products, LLC <a href="#">Ingredients</a> <a href="#">\$ Price Check</a>	500 mg <sup>10</sup> (magnesium citrate, magnesium oxide and magnesium Aquamin® calcified mineral source Red Algae <i>Lithothamnion sp.</i> )  1,000 mg calcium (Aquamin® calcified mineral source Red Algae <i>Lithothamnion sp.</i> , organic kale, organic spinach and organic collard greens)  2,000 IU (D3)  100 mcg (MK-7 K2)	<b>APPROVED</b>	✓	✓	✓	\$0.80  [\$0.32]  Vitamin C, sodium, strontium, silica, boron, vanadium  <i>Contains no wheat, gluten free, yeast free</i>  \$23.99/120 tablets
Shaklee® OsteoMatrix® (100 mg per caplet; 4 caplets, once daily)  Dist. by Shaklee Corporation <a href="#">Ingredients</a>	400 mg <sup>10</sup> (magnesium oxide, magnesium citrate and magnesium gluconate)  1,000 mg calcium (calcium carbonate, calcium citrate and calcium citrate malate)  600 IU (D3)  40 mcg (K1)	<b>NOT APPROVED</b>	Found 274 IU vitamin D per caplet (182.7% of labeled amount)	✓	✓	\$0.56  [\$0.28]  Zinc, copper, manganese, sodium  <i>Kosher, gluten free</i>  \$16.75/120 caplets
USANA® Active Calcium™ (100 mg per tablet; 4 tablets, once daily)  Dist. by USANA Health Sciences, Inc. <a href="#">Ingredients</a>	400 mg <sup>10</sup> (magnesium citrate, magnesium amino acid chelate and magnesium oxide)  800 mg calcium (calcium citrate and calcium carbonate)  400 IU (D3)  60 mcg (K1)	<b>APPROVED</b>	✓	✓	✓	\$0.68  [\$0.34]  Boron  \$18.95/112 tablets

 Tested through CL's Quality Certification Program prior to, or after initial posting of this Product Review.

\* Product identical in formulation and manufacture to a product that has passed testing but sold under a different brand. For more information see CL's [Multi-Label Testing Program](#).

**RESULTS OF CONSUMERLAB.COM TESTING OF MAGNESIUM SUPPLEMENTS  
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Product Name, Amount of Magnesium per Unit, Serving Size, and Suggested Daily Serving on Label  Click on "Ingredients" for Full Listing	Claimed Amount of Magnesium, Calcium and Vitamins D & K Per Suggested Daily Serving on Label (Form of Magnesium)	--TEST RESULTS--				Cost for Daily Suggested Serving on Label  [Cost for 200 mg of Magnesium]  Other Notable Features <sup>1</sup>  Price Paid
		OVERALL RESULTS:  APPROVED or <b>NOT APPROVED</b>	Contained Listed Amounts of Magnesium, Calcium and Vitamins D & K	Did Not Exceed Contamination Limits for Lead, Cadmium and Arsenic	Disintegrated Properly  (NA=Not Applicable)	

- <sup>1</sup> Not tested but claimed on label.  
<sup>2</sup> Label states "Take 3 capsules per day, (2 capsules in the morning and 1 in the evening) with or without meals or as directed by your qualified healthcare professional."  
<sup>3</sup> Label states "As a dietary supplement, take 2 tablets twice daily; may take up to 4 tablets twice daily."  
<sup>4</sup> Label states "Adults; Maintenance dose: Take ½ capful twice daily in liquid. Use more for a therapeutic dose as needed or as recommended by your Health Care Provider. If you see, to be very magnesium deficient, begin very slowly to allow your body to adjust. Children: Ages 3-12 take ½ the adult dose."  
<sup>5</sup> Label states "Begin regimen by taking 10 drops for 3 consecutive days. Each day thereafter, increase by 10 drops up to ½ teaspoon (40 drops) once or twice daily. Children age 2-3: Take 1 drop for every 5 lbs of body weight."  
<sup>6</sup> Label states "Start with 1 teaspoon (or less) daily and gradually increase to 3 teaspoons (or more, as needed)."  
<sup>7</sup> Label states: "For infants 6 months - 1 year: 1 teaspoon daily. For children 1 - 3 years: 2 teaspoons daily. For children 4 - 8 years: 1 tablespoon daily. For children 9 - 12 years: 2 tablespoons daily."  
<sup>8</sup> Exceeds Upper Tolerable Limit (UL) from Magnesium for children 3 years of age and younger. The UL for children 1 to 3 years of age is 65 mg of magnesium.  
<sup>9</sup> Exceeds Upper Tolerable Limit (UL) from Magnesium for children 8 years of age and younger. The UL for children 1 to 3 years of age is 65 mg of magnesium, and the UL for children 4 to 8 years of age is 110 mg of magnesium.  
<sup>10</sup> Exceeds Upper Tolerable Limit (UL) from Magnesium for all ages. The UL for children 1 to 3 years of age is 65 mg of magnesium, the UL for children 4 to 8 years of age is 110 mg of magnesium, and the UL for children and adults 9 years of age or old is 350 mg of magnesium.  
<sup>11</sup> Purchased as a Buy One, Get One deal. Regular price for one is \$8.49.  
<sup>12</sup> Purchased while on sale. Regular price is \$20.99.  
<sup>13</sup> Label states "Suggested Use: 2 to 6 capsules daily with a meal."  
<sup>14</sup> Purchased as a Buy One, Get One Half Off deal. Regular price for one is \$19.99, and the second bottle was \$9.99.  
<sup>15</sup> Price based on listed price on puritan.com. Price is for a Buy One Get Two Free deal.  
<sup>16</sup> Price based on listed price on vitaminworld.com. Price is for a Buy One Get One Free deal.  
<sup>17</sup> Added through Quality Certification Program on 9/30/15.

Unless otherwise noted, information about the products listed above is based on the samples purchased by ConsumerLab.com (CL) for this Product Review. Manufacturers may change ingredients and label information at any time, so be sure to check labels carefully when evaluating the products you use or buy. If a product's ingredients differ from what is listed above, it may not necessarily be of the same quality as what was tested.

The information contained in this report is based on the compilation and review of information from product labeling and analytic testing. CL applies what it believes to be the most appropriate testing methods and standards. The information in this report does not reflect the opinion or recommendation of CL, its officers or employees. CL cannot assure the accuracy of information.

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**ConsumerTips™:**

**What to Consider When Buying:**

In the products evaluated, the labeled amounts of magnesium ranged from 38 milligrams to 500 milligrams per recommended daily serving. This large range should be considered when comparing the cost of products and choosing the right dose.

Look carefully at labels

Product labels should indicate the amount of actual magnesium (or "elemental" magnesium) per dosage unit. This is important because magnesium often makes up less than half of the weight of magnesium compounds. For example, the amount of magnesium in magnesium gluconate is only 5.8%, and it is 12% in magnesium chloride hexahydrate, 11.2% in magnesium citrate (or 16.2% if in the form of trimagnesium dicitrate), 14.1% in magnesium glycinate, and 60.3% in magnesium oxide.

An example of an incorrectly labeled product identified in ConsumerLab.com's review in 2012 is shown below. At first glance, this label seems to contain "720 mg" of magnesium, but only a small amount of this (115 mg) was actually listed as elemental magnesium. Making matters worse, our testing showed that even that amount was not correct. We found only 52 mg of magnesium. If this product had been properly made and labeled and actually provided 115 mg of elemental magnesium, the label should have read: "Magnesium (as magnesium citrate)...115 mg" -- although since 115 mg is only about 16% of the claimed magnesium citrate, the form of magnesium would likely have been trimagnesium dicitrate, which was not specified.

**Misleading Label on *Tropical Oasis* Product**

Vitamin D (as Cholecalciferol)	400 IU	<div style="border: 1px solid black; padding: 5px; width: fit-content;">                     Lists 1,200 mg of calcium, but actually promises only 252 mg and testing found only 131 mg.                 </div>
Calcium (as Citrate) (252 mg elemental)	1200 mg	
Magnesium (as Citrate) (115 mg elemental)	720 mg	
Boron (as Citrate)	750 mcg	

Lists 720 mg of magnesium, but actually promises only 115 mg and testing found only 52 mg.

Choosing the right form of magnesium

Nearly all of forms of magnesium can act as laxatives. Magnesium hydroxide (milk of magnesia) is widely marketed for this purpose and is particularly fast acting. Magnesium citrate is also found in laxatives and magnesium sulfate is the most potent laxative. (The sulfate form may also be used intravenously under medical supervision for seizures, uterine tetany and other acute conditions.)

Magnesium gluconate and chloride are less likely to cause diarrhea than magnesium oxide, so they are generally preferred when high oral doses are given to treat magnesium deficiency. A branded product called *ReMag* is promoted on the Internet as a "picometer-ionic form of magnesium." It appears to be magnesium chloride dissolved in water. It is promoted as having no laxative effect, which, being magnesium chloride, should be essentially true. We are not aware, however, of any published studies with *ReMag*.

Magnesium hydroxide, oxide, carbonate and trisilicate are used in antacid products.

Magnesium orotate probably isn't the best choice for magnesium replacement because it doesn't appear to offer an advantage over others and it can cost up to 9 times more than other magnesium products. To get, for example, 200 mg of magnesium from magnesium orotate supplements you might spend 10 to 18 cents. In contrast, you can get the same amount of magnesium for as little as 2 cents. There are also potential safety concerns (see [Concerns and Cautions](#))

Magnesium taurate, a combination of magnesium and the amino acid taurine, has been proposed for the prevention of migraine ([McCarty Med Hypotheses](#))

1996), however, there are no published clinical studies on magnesium taurate for this use.

Magnesium malate is a combination of magnesium and malic acid. One study of people with fibromyalgia found that a branded version of this form of magnesium (Super Malic, Optimax Corp.) taken for 6 months (providing a total daily dose of 400 mg magnesium and 1,600 mg malic acid) was found to significantly reduce measures of pain and tenderness in people with fibromyalgia; however, this study was not properly blinded and/or placebo-controlled (Russell, *J Rheumatol* 1995).

Magnesium bicarbonate is a liquid formed through the reaction of carbonic acid and magnesium hydroxide. It is occasionally sold as a supplement, but more commonly, made from "home recipes" combining magnesium hydroxide (milk of magnesia) and seltzer water and described as a "health tonic" and/or less expensive alternative to mineral water.

Absorption of magnesium may vary based on the form magnesium. Magnesium carbonate is not recommended for magnesium replacement, as it is less soluble than other forms. Magnesium oxide has been found to be less well absorbed than magnesium chloride, magnesium citrate, magnesium aspartate, and magnesium lactate (Firoz, *Magnes Res* 2001; Walker, *Magnes Res* 2003). In fact, the study by Firoz found only 4% absorption of magnesium from magnesium oxide and the study by Walker found magnesium oxide (containing 300 mg of magnesium) to be no better at raising magnesium levels than a placebo which contained no magnesium. Some websites claim that magnesium orotate is better absorbed than other forms, however, research does not support this (Andermann, *Eur J Drug Metab Pharmacokin* 1982). A small, preliminary study found that magnesium diglycinate, a chelate of magnesium and glycine, was better absorbed than magnesium oxide in surgical patients who had impaired magnesium absorption due to intestinal resection (Schuette, *JPEN J Parenter Enteral Nutr* 1994).

Products that contain calcium in addition to magnesium are sometimes touted as improving the absorption of these minerals or to make up for decreased absorption of one due to the other. However, in a healthy individual, the two minerals (at moderate doses) do not appear to interact or interfere with one another and it is not necessary to take extra calcium when supplementing with magnesium, nor vice versa. Nor is a specific ratio of the two minerals known to produce superior absorption. However, people at high risk for magnesium deficiency should consider taking calcium at bedtime to avoid inhibiting dietary magnesium absorption.

#### What to Consider When Using:

One's daily requirement for magnesium can be obtained through food sources without much difficulty and it is thought that the great majority of individuals in developed countries have an adequate intake. Especially rich sources of magnesium include whole grains, nuts, beans, avocado, shellfish, green leafy vegetables, coffee, tea and chocolate. A cup of whole grain flour has nearly 200 mg of magnesium. A cupful of spinach or most beans, nuts, seeds or trail mix offers anywhere from 50 mg to 150 mg of magnesium. A cup of milk, orange juice, or grapefruit juice provides about 80 mg.

The recommended daily allowance (RDA) of magnesium is 80 mg for children 1 to 3, 130 mg for those 4 to 8, and 240 mg for those 9 to 13. For males 14 to 18 it is 410 mg, for those 19 to 30 it falls to 400 mg, and for those 31 years and older it is 420 mg. For females 14 to 18 it is 360 mg, for those 19 to 30 it falls to 310 mg, and for those 31 years and older it is 320 mg. However, for pregnant women it is 400 mg if 18 years or younger, 350 mg if 19 to 30, and 360 mg if 31 or older. For lactating women it is 360 mg if 18 years or younger, 310 mg if 19 to 30, and 320 mg if 31 or older.

Bear in mind that the recommended amounts noted above are for total daily magnesium intake. The average daily intake of magnesium from food sources in the United States is approximately 320 mg; thus supplementation is likely to increase magnesium intake above nutritional needs for many.

Magnesium is not normally part of routine blood tests and not considered the most reliable marker of magnesium sufficiency because levels in blood plasma do not necessarily reflect levels in tissues. However, a normal range in blood plasma is considered to be 1.7 to 2.2 mg/dL (NIH Fact Sheet; Medline Plus, NIH).

When used as a treatment, magnesium is often recommended at doses of 250 to 600 mg daily.

To reduce the frequency and severity of migraine headaches, 600 mg daily of magnesium citrate or trimagnesium dicitrate has been shown to be helpful (Koseoglu, *Magnes Res* 2008; Peikert, *Cephalalgia* 1996).

Magnesium specifically from supplements can often cause diarrhea — which is why it is an ingredient in many laxatives. Diarrhea is particularly common in products also containing aluminum. Taking magnesium with food can reduce the occurrence of diarrhea.

Excessive magnesium levels in the blood can cause dangerous side effects, but oral supplements taken as directed seldom dangerously raise blood levels in individuals with healthy kidneys -- which regulate magnesium status. Tolerable Upper Intake Levels (ULs) have been established for magnesium supplement intake. The UL is defined as "a level of chronic daily intake judged to be likely to pose no risk of adverse health effects to the most sensitive members of the healthy population." The UL recommendations (which apply specifically to magnesium consumed from supplements or other medications) are 65 mg for children 1 to 3 and 110 mg for those 4 to 8. For individuals 9 years and older the UL is 350 mg. Note that the ULs for supplements sometimes are actually lower than the respective RDAs, because side effects are not likely to occur from magnesium obtained from solely from foods.

Magnesium and calcium are "macrominerals:" meaning that their RDAs are relatively high compared to "microminerals," such as zinc, for which only a few milligrams or microgram amounts are needed. Both magnesium and calcium supplements can interfere with the absorption of "microminerals." As a result, it is probably best to take microminerals at a different time of day from a magnesium or calcium supplement. Because of the bulk of both magnesium and calcium, they are generally not found in multivitamin/multimineral products in doses equivalent to their RDAs and are often sold separately or combined.

Be aware that magnesium chloride is extremely hygroscopic — it attracts and holds water — even in moderate humidity, which can cause pills to become wet and disintegrate. Keep magnesium chloride pills in a sealed container, along with any desiccant packet with which they may have come. Also, keep magnesium chloride pills away from other pills, including softgels, because the absorbed water can cause disintegration of those pills (in addition to prematurely activating enzymes and probiotics). It is wise to keep all forms of magnesium out of humidity, although they can be stored with other pills.

#### Concerns and Cautions:

Magnesium supplements may cause stomach upset, nausea, vomiting and diarrhea. Although rare, excessive intake of magnesium (above the ULs) may result in too much magnesium in the blood causing thirst, low blood pressure, drowsiness, muscle weakness, slowed breathing, and even death.

Individuals with kidney disease cannot properly control levels of electrolytes in the body; for this reason, the use of magnesium (or any other mineral) can be very dangerous. There may be risks for people with severe heart disease or diseases of the intestines as well.

Magnesium interferes with the absorption of medications in the tetracycline family, and can also interfere with the effectiveness of cellulose sodium phosphate, and sodium polystyrene sulfonate.

Certain forms of magnesium which have an antacid effect (namely, magnesium hydroxide, oxide, carbonate, and trisilicate) may reduce drug levels of some cholesterol-lowering statin medications. This has been demonstrated for Crestor (rosuvastatin calcium) in a study which found that taking Crestor along with the antacid Maalox (which contains magnesium hydroxide and aluminum hydroxide) reduced blood levels of the drug by an average of 54% compared

to taking the drug alone. Taking the antacid two hours after the drug had a smaller effect, but still reduced drug levels by 22%. The study did not evaluate the effect of taking the antacid prior to the drug nor the effect of repeated, long-term antacid use (Martin, CMRO, 2008). Based on this study, the label on Crestor states that if using an antacid with aluminum hydroxide and magnesium hydroxide, the antacid should be taken at least 2 hours after Crestor. A preliminary study suggests a similar, although smaller effect (a 34% reduction in drug when taken with Maalox) for Lipitor (atorvastatin) (Yang, Pharm Res 1996 — not online).

Some concerns have been raised about the safety of magnesium orotate due to its orotic acid content. Research in animals shows that doses of 100 mg/kg/day or more of orotic acid have tumor promoting effects in experimental tumors. Lower doses of 50 mg/kg/day did not have this effect (Laconi, Carcinogenesis 1993, Laconi, Carcinogenesis 1993, Laconi, Carcinogenesis 1988). Based on these data, a panel of the European Food Safety Authority (EFSA) concluded that orotic acid-containing products, such as magnesium orotate, represent a safety concern when used in amounts of 100 mg/kg or more daily (e.g., 7,000 mg for a 70 kg [154 lb] adult) (EFSA Journal 2009). Until more is known about these potential risks, it may be best not to use magnesium orotate.

See the Encyclopedia for more information about clinical studies on [Magnesium](#).

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