Name(s): Magnesium sulphate, magnesium gluconate, magnesium fumarate, magnesium citrate, magnesium malate, magnesium oxide, magnesium chloride

Description: Magnesium is important for many metabolic processes. This mineral is responsible for the muscle contractions of the heart, regulating nerve transmission, synthesizing protein and nucleic acids (RNA & DNA), and for activating a variety of enzymes for the metabolism of carbohydrates and amino acids. The absorption of calcium, phosphorous, sodium, and potassium is enhanced by magnesium. The sources of this nutrient include green vegetables because it is found in chlorophyll, soybeans, milk, seafood, tofu, peaches, lima beans, and corn.¹

Absorption/Storage: This mineral is absorbed in the small intestine in good portions (30-40% absorption). For magnesium to be utilized properly, vitamin D must be present. Magnesium is excreted in the urine; however, the amount and rate that it flows through the kidneys is regulated by a hormone, aldosterone, which is secreted by the adrenal gland.¹

Recommended Dietary Allowance/Dietary Reference Intake:²

Persons	U.S. (mg)
Birth to 3 years of age	30-80
4 to 8 years of age	130
9 to 13 years of age	240
Adolescent and adult males	410-420
Adolescent and adult females	310-360
Pregnant females	350-400
Breast-feeding females	310-360

Optimum Daily Allowance (Adult): 750-1,000 mg.³

Tolerable Upper Intake Levels:²

Persons	U.S. (mg)
Birth to 3 years of age	ND-65
4 to 8 years of age	110
9 to 18 years of age	350
Adult males	350
Adult females	350
Pregnant females	350
Breast-feeding females	350

Principal Uses: Cardiovascular disease, cardiomyopathy,

arrhythmias and angina,⁴⁻¹³ diabetes,¹⁴⁻²¹ dysmenorrhea,²²⁻²⁶ fatigue,²⁷⁻³¹ heart attack (intravenous magnesium),³²⁻³⁵ hypertension,³⁶⁻⁴⁰ kidney stones (magnesium citrate with vitamin B6 supplementation),⁴¹⁻⁵² migraine headaches,⁵³⁻⁶² osteoporosis,⁶³⁻⁶⁷ pregnancy-induced hypertension,⁶⁸⁻⁷¹ and premenstrual syndrome (with vitamin B6 supplementation).⁷²⁻⁸⁰

Proposed Uses: ADHD, asthma, celiac disease (for deficiency only) and urinary urgency (women).⁸¹

Traditional Uses: Alcohol withdrawal support, anxiety, athletic performance, autism, chronic fatigue syndrome, chronic obstructive pulmonary disease (COPD), cluster headache (intravenous), fibromyalgia, glaucoma, heart attack (oral magnesium), high cholesterol, hypoglycaemia, insomnia, insulin resistance syndrome (Syndrome X), intermittent claudication, multiple sclerosis, preeclampsia, Raynaud's disease, retinopathy, sickle cell anaemia and stroke.⁸¹

Healthy Sources:

High (40%+ US DRI): Dried agar, amaranth, boiled artichoke, buckwheat flour (whole groat), low fat cottonseed flour, partially defatted cottonseed meal, boiled catjang cowpeas, boiled moth beans, quinoa, rice bran, brown rice flour, dark rye flour, soy flour, soy meal, dry roasted soybean nuts, dried spirulina, whole grain triticale flour, raw wakame, wheat bran, whole wheat flour and boiled yard long beans.⁸²

Medium (25-39% US DRI): adzuki beans, raw Florida avocado, homemade baked beans, boiled black beans, cooked roasted buckwheat groats, whole grain corn flour, whole grain corn meal, dried figs, raw Irish moss, raw kelp, cooked millet, boiled mung beans, boiled navy beans and sprouts, canned great northern beans, oat bran cereal, old fashioned oatmeal, defatted peanut flour, boiled pink beans, dried or roasted pumpkin and squash seeds, dried safflower seed kernels, partially defatted and high-fat sesame flour, toasted and roasted whole sesame seeds, roasted soybean nuts, boiled soybeans, dried sunflower seeds, raw tamarind, raw regular and firm tofu, sun dried tomatoes, dried watermelon seeds, boiled and canned white beans.⁸²

Contraindications: If you are taking this dietary supplement without a prescription, carefully read and follow any precautions on the label. For magnesium supplements,

the following should be considered:

Allergies--Tell your health care professional if you have ever had any unusual or allergic reaction to magnesium. Also tell your health care professional if you are allergic to any other substances, such as foods, preservatives, or dyes.

Pregnancy--It is especially important that you are receiving enough vitamins and minerals when you become pregnant and that you continue to receive the right amount of vitamins and minerals throughout your pregnancy. The healthy growth and development of the foetus depend on a steady supply of nutrients from the mother. However, taking large amounts of dietary supplements during pregnancy may be harmful to the mother and/or foetus and should be avoided.

Breast-feeding--It is especially important that you receive the right amount of vitamins and minerals so that your baby will also get the vitamins and minerals needed to grow properly. However, taking large amounts of a dietary supplement while breast-feeding may be harmful to the mother and/or baby and should be avoided.

Children--Problems in children have not been reported with intake of normal daily-recommended amounts.

Older adults--Problems in older adults have not been reported with intake of normal daily-recommended amounts.

Studies have shown that older adults may have lower blood levels of magnesium than younger adults. Your health care professional may recommend that you take a magnesium supplement.

Medicines or other dietary supplements--Although certain medicines or other dietary supplements should not be used together at all, in other cases they may be used together even if an interaction might occur. In these cases, your health care professional may want to change the dose, or other precautions may be necessary. When you are taking magnesium, it is especially important that your health care professional know if you are taking any of the following:

• Cellulose sodium phosphate--Use with magnesium supplements may prevent cellulose sodium phosphate from working properly; magnesium supplements should be taken at least 1 hour before or after cellulose

sodium phosphate

- Magnesium-containing preparations, other, including magnesium enemas--Use with magnesium supplements may cause high blood levels of magnesium, which may increase the chance of side effects
- Sodium polystyrene sulfonate--Use with magnesium supplements may cause the magnesium supplement to be less effective
- Tetracyclines, oral--Use with magnesium supplements may prevent the tetracycline from working properly; magnesium supplements should be taken at least 1 to 3 hours before or after oral tetracycline

Other medical problems--The presence of other medical problems may affect the use of magnesium. Make sure you tell your health care professional if you have any other medical problems, especially:

- Heart disease--Magnesium supplements may make this condition worse
- Kidney problems--Magnesium supplements may increase the risk of hypermagnesaemia (too much magnesium in the blood), which could cause serious side effects; your health care professional may need to change your dose.⁸³

Interactions:

	Albuterol, amphotericin B, cycloserine,
	docusate, epinephrine, erythromycin,
	felodipine, hydroxychloroquine,
	isoniazid, nitrofurantoin, ofloxacin, oral
	contraceptives, quinidine, risedronate,
	sulfamethoxazole, sulphonamides,
	tobramycin, warfarin, ⁸¹
	aminoglycosides, cisplatin,
Decreases	cyclosporine, digoxin, oral
Mineral	corticosteroids, loop diuretics,
Availability:	tetracyclines, thiazides, ^{81,84} black teas,
_	calcium (high dose), caffeine,
	carbonated beverages, coffee,
	disopyramide, eggs, fibre
	supplementation, fish, fluoride, high fat
	diet, high sugar diet, iron, lithium,
	meat, phosphorus, potassium,
	quinidine, riboflavin, sodium channel
	blockers, strophanthin and sulphate. ⁸⁴
Increases	Calcium, vitamins C & D, ³
Mineral	metformin, ⁸¹ vitamins B6, D & E, ^{3,84}
Availability:	and conjugated oestrogens. ^{81,84}

Is Decreased By Mineral Availability:	Alendronate, azithromycin, cimetidine, ciprofloxacin, doxycycline, famotidine, levofloxacin, nizatidine, sotalol side effects, ⁸¹ tetracyclines, ^{81,84} etidronate, fluoride and penicillamine. ⁸⁴
Is Increased By Mineral Availability:	Fentanyl, glipizide, ⁸¹ calcium channel blockers, oral anticoagulants, potassium, thiamine and zinc. ⁸⁴
Adverse Reactions	Amiloride, misoprostol, mixed amphetamines, spironolactone, triamterene, ⁸¹ polymyxins and sulfonylureas. ⁸⁴

Deficiency: A deficiency in magnesium is easy to come by because it is either destroyed in the processing of foods or it is bound in the body due to oxalic acid which is found spinach and phytic acid found in cereals. A deficiency is detected by signs such as disorientation, muscle twitches, irregular heartbeats, irritation, and depression. Pregnant women that are deficient at the time of labour may experience painful uterine contractions. Prolonged deficiency may lead to tetany, swollen gums, abnormal eye and face movement, and baldness.¹

Toxicity/Side Effects: Along with its needed effects, a dietary supplement may cause some unwanted effects. Although not all of these side effects may occur, if they do occur they may need medical attention.

Check with your health care professional immediately if any of the following side effects occur:

Rare (with injectable magnesium only)

• Dizziness or fainting; flushing; irritation and pain at injection site--for intramuscular administration only; muscle paralysis; troubled breathing

Symptoms of overdose (rare in individuals with normal kidney function)

• Blurred or double vision; coma; dizziness or fainting; drowsiness (severe); increased or decreased urination; slow heartbeat; troubled breathing

Other side effects may occur that usually do not need medical attention. These side effects may go away during treatment as your body adjusts to the medicine. However, check with your health care professional if the following side effect continues or is bothersome: Less common (with oral magnesium)

• Diarrhoea

Other side effects not listed above may also occur in some individuals. If you notice any other effects, check with your health care professional.⁸³

Treatment for Overdose: The only treatment available is the immediate cessation of Mg^{2+} administration. If renal failure is not evident, dilution by IV fluids followed by furosemide (40 to 80 mg IV) may be helpful. In symptomatic patients, 1 ampule (10 mL of 10%) calcium gluconate or 5 mL of 10% IV CaCl₂ (given over 5 to 10 minutes is appropriate). Patients with renal failure may benefit from dialysis against a decreased Mg²⁺ bath that lowers serum Mg²⁺ levels.⁸⁵

Storage: To store this dietary supplement:

- Keep out of the reach of children.
- Store away from heat and direct light.
- Do not store in the bathroom, near the kitchen sink, or in other damp places. Heat or moisture may cause the dietary supplement to break down.
- Keep the dietary supplement from freezing. Do not refrigerate.
- Do not keep dietary supplements that are outdated or are no longer needed. Be sure that any discarded dietary supplement is out of the reach of children.⁸⁴

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