

Gadot Biochemical Industries



Marketing Information

Gadolin Magnesium

Soluble Magnesium Citrate/Dietary fiber combination

Why Magnesium?

Magnesium plays an essential role in a range of biochemical and physiological processes.

The human body contains about 25 grams of Magnesium from which 50-60% is in the skeleton and 25-30% in muscle.

One third of skeletal magnesium is exchangeable and it is this fraction that may serve as a reservoir for maintaining a normal extracellular magnesium concentration.

- It is required for both anaerobic and aerobic energy generation.
- ATP and ADP complexes of magnesium participates as the substrate for the phosphate transfer reaction.
- Magnesium is essential for protein synthesis in replicating cells.
- Principal mineral of bones.
- Is required as cofactor for over 300 enzyme systems.
- Magnesium deficiency has been linked to :
 - Several cardiovascular diseases including high blood pressure.
 - Abnormalities in neuromuscular and gastrointestinal symptoms.
 - Migraine
 - Coronary heart vessel spasms
 - Fatigue and sleep disorder.
 - Malabsorption syndromes.
 - Genetic disorders
 - Endocrine disorders

Why Dietary fibers?

Fructo-Oligo-Saccharides (FOS), otherwise referred to as ***fructans***, oligosaccharides, oligofructose and inulin, are complex carbohydrates found in several common foods and myriad medicinal herbs. ***Fructans*** taste sweet (1/4 the sweetness of sugar) however unlike sugar and starch, they add no calories to food because they are not digested by stomach enzymes or acids. ***Fructans*** actually increase mineral absorption within the digestive system, help the body to maintain a constant blood sugar level and support beneficial intestinal microflora (BIM).

Fructans, as a source of soluble fibre, support proper bowel habit in the following ways:

- 1) Aiding weight loss by reducing starch absorption;
- 2) Increase calcium, magnesium and other mineral absorption and thereby reduce bone loss and improve bone density.
- 3) Reduces cholesterol and triglycerides
- 4) Helps the body to maintain a constant blood sugar level;
- 5) Supports beneficial intestinal microflora;
- 6) Reduces intraluminal pH which helps to eliminate pathogenic bacteria and yeast;
- 7) Increases the production of short chain fatty acids that positively influence hormone balance;

Additional Health Benefits of Fructans:

Fructans such as inulin, are beneficial for weight management programs as they have the following physiological effects: ***Fructans*** suppress appetite, reduce low blood sugar levels that cause hunger, inhibit fat production, stimulate glycolysis, reduce lipids resulting in a healthier body and circulatory system, improve HDL/LDL ratios and help to maintain high energy levels while controlling caloric intake. ***Fructans*** also promote the re-absorption and re-use of female hormones, like estrogen, and have been shown to reduce tumor incidence, including from breast cancer.

Fructans have also been shown to be particularly beneficial for: kidney health (through reducing blood nitrogen); joint care and arthritis; colon health; sports nutrition; constipation; diarrhea; irritable bowel syndrome; reducing liver damage; immune stimulation; adult onset diabetes (type II) management; and prevention of vaginitis and other yeast infections.

Optimal Magnesium / Fructans intake

<i>Age</i>	<i>Magnesium RDA mg/day</i>	<i>Dietary Fiber RDA g/day</i>
<i>Less than 6 months</i>	30	
<i>6-12 months</i>	75	
<i>1-3 years</i>	65	19
<i>4-8 years</i>	110	25
<i>9-13 years</i>	200	26-31
<i>14-18 years</i>	300	26-38
<i>19-30</i>	265	25-38
<i>31-50 years</i>	300-350	25-38
<i>51-70 years</i>	270-280	21-30
<i>>70 years</i>	350	21-30
<i>Women Pregnancy or breast feeding</i>	330-350	28

An adequate intake for Total Fibers in foods is set at 25-38 g/day. The average consumption is approx 50% below this level. This means that in order to meet the Dietary Fiber's RDA, a supplement of approx 9-15 g/day is required

Based on that, the optimal Mg/ Fructans ratio in the supplement should be of at least:

1 parts of Magnesium per 30 part of Fructans.

How to choose the most suitable magnesium source?

There are different sources of Magnesium in various forms so how to choose the proper one?

Properties to be considered:

- Bioavailability
- Magnesium content
- Solubility
- Organoleptical characteristics
- Interaction with other ingredients

Commonly used Magnesium sources:

Organic Magnesium	Inorganic Magnesium
Magnesium Citrate	Magnesium Carbonate
Magnesium Lactate	Magnesium Oxide/Hydroxide
Magnesium Gluconate	Magnesium Phosphate
Magnesium Aspartate	

So, which is preferable? Organic Magnesium or Inorganic Magnesium?

Magnesium Bioavailability

It is generally agreed that the bioavailability of Organic salts is much higher than the bioavailability of Inorganic salts. From the literature it appears that the bioavailability of Organic Magnesium is higher that of Inorganic Magnesium.

Magnesium absorption measured as the increase in urinary Magnesium following intake of Magnesium oxide or magnesium citrate demonstrated a significantly higher absorption from citrate in normal volunteers.

Ref: "Magnesium biavailability from magnesium citrate and magnesium oxide"

Lindberg, J.S., Zobitz, M.M., Poindexter, J.R., Pak, C.Y.C.

Journal of the American College of Nutrition, 1990; 9; 48-55

The same study also state:

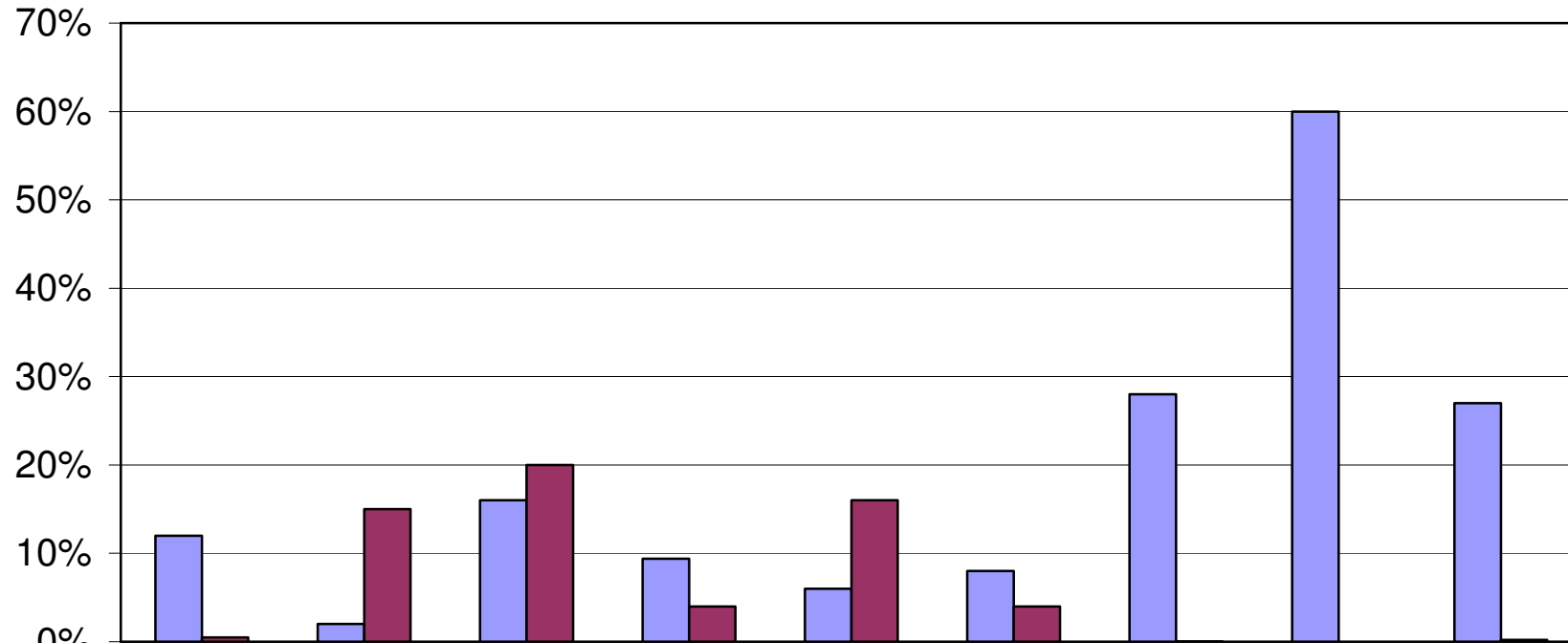
In vitro solubility showed that Magnesium oxide was only 43% soluble in simulated peak gastric acid secretion, while magnesium citrate was and 86% soluble under these conditions.

On the other hand, the various organic Magnesium shows more or less the same bioavailability with slight advantage to Magnesium Citrate.

Magnesium Content and Solubility

Organic Magnesium	Magnesium	Solubility
Magnesium Citrate	12%	0.5%
Magnesium Citrate Anh.	16%	20%
Magnesium Lactate	9.4%	4%
Magnesium Gluconate	6%	16%
Magnesium Aspartate	8%	4%
Inorganic Magnesium		
Magnesium Carbonate	25.5%	0.04%
Magnesium Oxide	60%	0.0006%
Magnesium Phosphate	27%	0.2%
A Combination Magnesium/FOS		
Gadolin Magnesium	2%	>15%

Magnesium content and Solubility Organic vs Inorganic sources



■ Mg-content	12%	2%	16%	9%	6%	8%	28%	60%	27%
■ Solubility	0.5%	15.0%	20.0%	4.0%	16.0%	4.0%	0.040%	0.0006%	0.200%

Mouth-feel & Taste of the various Magnesium sources

Organic Magnesium

Magnesium Citrate	Neutral
Magnesium Lactate	Bitter
Magnesium Gluconate	Bland
Magnesium Aspartate	Bitter

Inorganic Magnesium

Magnesium Carbonate	Sandy
Magnesium Oxide/Hydroxide	Sandy, Soapy
Magnesium Phosphate	Sandy

A Combination Magnesium/FOS

Gadolin Magnesium	Neutral
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Conclusion: Organic Magnesium sources have a better bioavailability, solubility and organoleptical characteristics.

Benefits of Gadolin Magnesium

- High bioavailability.
- Neutral flavor.
- Magnesium absorption is independent of gastric acid secretion. It does not cause stomach upset and can be taken on an empty stomach or with a meal.
- Low interference with other minerals.
- Good compatibility with other nutrients.
- A combined benefits of both natural fiber and Magnesium salt.

Gadolin Magnesium

Organic magnesium source	- Citrate
Magnesium Content	- 1.5 - 2.5 %
Dietary fiber Content	- ~ 50%
Solubility (as is)	- > 15%
Taste	- Neutral
PH (1% in water)	- 4.0 – 5.0