

Orosoluble Powder

Application Guide



Inside you can find:

- Key customer trends in magnesium supplementation
- Common challenges faced in on-trend supplement manufacturing
- How MAGSHAPE™ microcapsules can help create a differentiated, consumer-centric product

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MAGSHAPE™
Magnesium microcapsules

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Magnesium in nutraceuticals

MAGSHAPE™
Magnesium microcapsules

Over 300 enzymatic reactions in the human body require magnesium, yet according to the American Osteopathic Association up to 50% of North Americans are deficient in the mineral. Essential for hormone balance, muscle recovery and neurotransmitter function, magnesium enables a healthier, more active lifestyle.

In the last five years, increasing awareness of magnesium's wide-ranging benefits has triggered a sharp growth in the magnesium supplement market as consumers look for easy, convenient ways to increase magnesium intake.

To stand out in this rapidly growing, marketplace while aligning with consumer demands, formulators must pair science-backed, bioavailable ingredients with a sensory appealing delivery platform. This involves embracing non-pill formats and overcoming the associated formulation challenges to create in-demand products.

Lubrizol's microencapsulated magnesium product, **MAGSHAPE™** microcapsules, is informed by our insights-driven approach, which pairs in-depth market knowledge with technical expertise. This ensures that the ingredient helps formulators overcome common challenges to create in-demand magnesium supplements.

Magnesium facilitates:



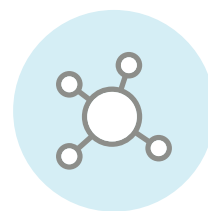
Better
sleep



Better muscle
recovery



Stress
reduction

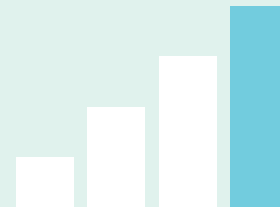


Improved
hormone balance



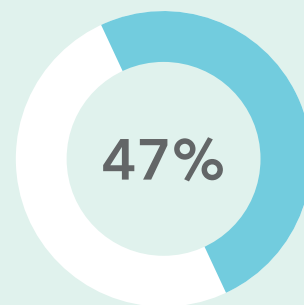
Relaxation
support

Magnesium: A mineral on the rise



\$19.8 billion

The expected value of the magnesium
market in 2028



The proportion of global supplements
that contained magnesium in 2023

Magnesium sources in the market

There are a wide range of magnesium sources available for use in supplements, each with its own set of challenges. For example, as shown in the table, magnesium citrate is well absorbed. However, low levels of elemental magnesium necessitates the use of a large quantity of this salt, which can cause negative organoleptic properties and an unpleasant final consumer product. Another challenging characteristic of some magnesium sources is undesirable taste.

On the other hand, magnesium sources such as magnesium oxide are convenient because they are highly concentrated, but there is the potential for gastrointestinal problems and poor bioavailability.

| Magnesium source | Taste | Magnesium Concentration | Quantity required* | Flow |
|----------------------------------|------------------|--------------------------------|---------------------------|------------------|
| Magnesium citrate | Sour | 11.2 % | 2.2 g | Average |
| Magnesium chloride | Bitter | 12.0 % | 2.1 g | Average |
| Magnesium bisglycinate/glycinate | Bitter | 10.0 % | 1.8 g | Average |
| MAGSHAPE™ microcapsules | Tasteless | 33.0 % | 0.8 g | Very good |
| Magnesium oxide | Tasteless | 60.3 % | 0.4 g | Poor |
| Magnesium carbonate | Tasteless | 24 % | 0.9 g | Poor |

* Quantity required for 250 mg elemental Mg

In addition, a number of magnesium sources have flowability issues due to their rheological properties, such as tendency to clump, hygroscopicity, and fine particle size. Addressing these issues can be challenging.

MAGSHAPE™ microcapsules are a highly concentrated source of magnesium that is micronized and microencapsulated.

This ingredient has excellent flow properties compared to magnesium oxide and other magnesium salts. It also performs better in terms of taste, magnesium concentration, and flowability, making it an ideal magnesium candidate for incorporation into a wide range of products.

Non-pill formats and formulation challenges

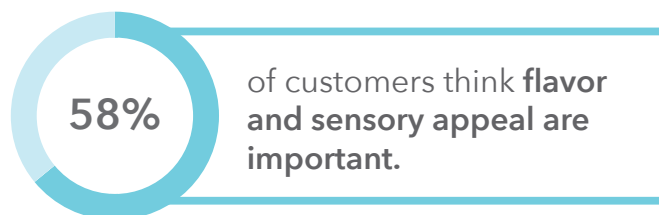
MAGSHAPE™
Magnesium microcapsules

The recommended dietary allowance for magnesium varies between authorities.

- The Institute of Medicine Standing Committee (USA) recommends **400 mg** in males and **310 mg** in females.
- EFSA's Panel (EU) establishes a Dietary Reference Value of **375 mg** a day.

Consumers are increasingly seeking out non-pill formats for their dosage of magnesium, including capsules, soft gels and orosoluble powders. Lubrizol's research has found that factors such as taste, texture and amount of product to consume are crucial for consumer product acceptance.

This highlights the importance of choosing the right source of magnesium that facilitates the creation of a sufficient, appealing consumer product. To maximize consumer convenience, the goal should be to make it possible to fulfill the Recommended Dietary Intake (RDI) for magnesium in a single shot.



Orosoluble powders are a rapidly growing format in magnesium supplements. The powders can deliver a single dose of up to 300 mg elemental magnesium in a single sachet to consumers. This convenience is driving increased attention and popularity.

However, the unique format can cause its own manufacturing difficulties. Factors such as balancing particle size, solubility, taste, and flowability need to be managed.

Low bioavailability salts can cause:



Large, difficult-to-swallow doses



An unpleasant, off-taste



Poor texture and aroma

MAGSHAPE™ Microcapsules

MAGSHAPE™
Magnesium microcapsules

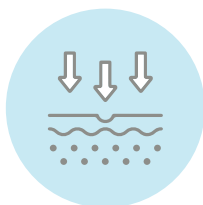
Lubrizol Nutraceuticals' **MAGSHAPE™** microcapsules deliver a reliable and effective source of magnesium in a concentrated powder that can differentiate your product.

MAGSHAPE™ can be incorporated into a wide range of delivery formats without adversely affecting taste or texture. In contrast to conventional magnesium salts, **MAGSHAPE™** has been carefully designed to align with modern consumer demands and enables formulators to create great-tasting, easy-to-consume products.

MAGSHAPE™ enables:



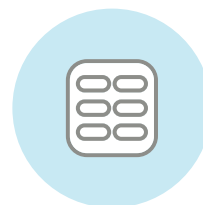
Enhanced
taste and
texture



Superior
flowability



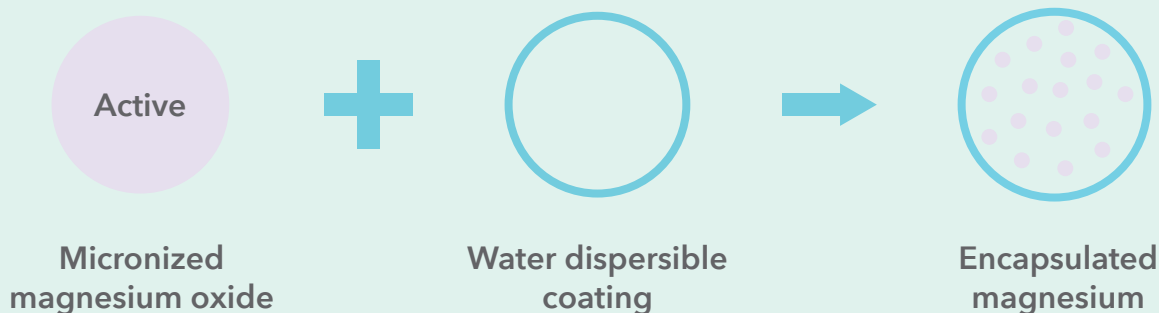
Higher
concentration and
smaller servings



Increased
tableability

Unleash your ideal magnesium product

Lubrizol Nutraceuticals' **MAGSHAPE™** microcapsules deliver a reliable and effective source of magnesium in a concentrated powder that can differentiate your product.



MAGSHAPE™ magnesium particles are micronized and microencapsulated, helping to immobilize, and disperse the magnesium. This promotes stability, protects it from interactions with other ingredients, and enhances bioavailability.

Case Study:

Creating orosoluble powders with MAGSHAPE™

MAGSHAPE™
Magnesium microcapsules

Easily transportable due to their low weight and small size, orosoluble powder sticks offer a convenient and on-the-go way for consumers to achieve their daily dose of magnesium.

In order to create a palatable, consumer-centric orosoluble powder stick, formulators must strike a careful balance between a wide range of factors.

| Quality | Reason |
|---------------|---|
| Orosolubility | To avoid a dough-like texture |
| Particle size | To avoid a gritty texture |
| Taste | To prevent the need for expensive taste-masking ingredients |
| Acidity | To stimulate saliva production |
| Flowability | To ensure uniformity and palatability |

MAGSHAPE™ microcapsules enable a product that targets these qualities and results in an orosoluble powder that reduces these side effects.

| Ingredient | % total |
|--------------|---------|
| MAGSHAPE™ | 50.50 |
| Mannitol | 46.30 |
| Peach flavor | 2.00 |
| Citric Acid | 1.00 |
| Sucralose | 0.20 |



MAGSHAPE™ consumer acceptance tests

MAGSHAPE™
Magnesium microcapsules

To verify its sensory parameters, an orosoluble powder using **MAGSHAPE™** was compared to an array of conventional magnesium salts at the same concentration. In the experiment, participants were presented with each of the powders, rated their preference for the products' sensory attributes, and justified their reasoning.

The attributes surveyed were **taste, aftertaste, smell, color, texture, and general appearance**. The test found that **MAGSHAPE™** provided the highest overall acceptance across the sensory attributes tested.

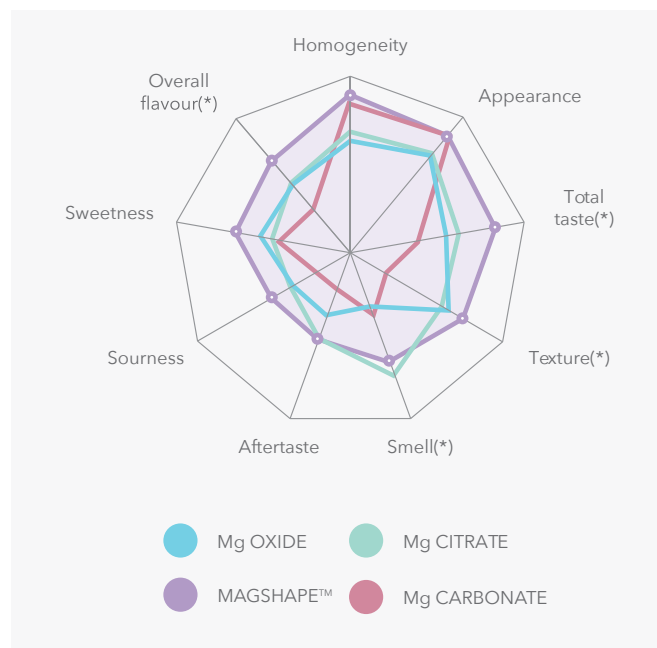


Figure 1: A summary of the consumer acceptance test results, divided by attribute.

Consumers were also asked whether the product consumed would be adequate to be taken once a day, for which **MAGSHAPE™** also scored the highest.

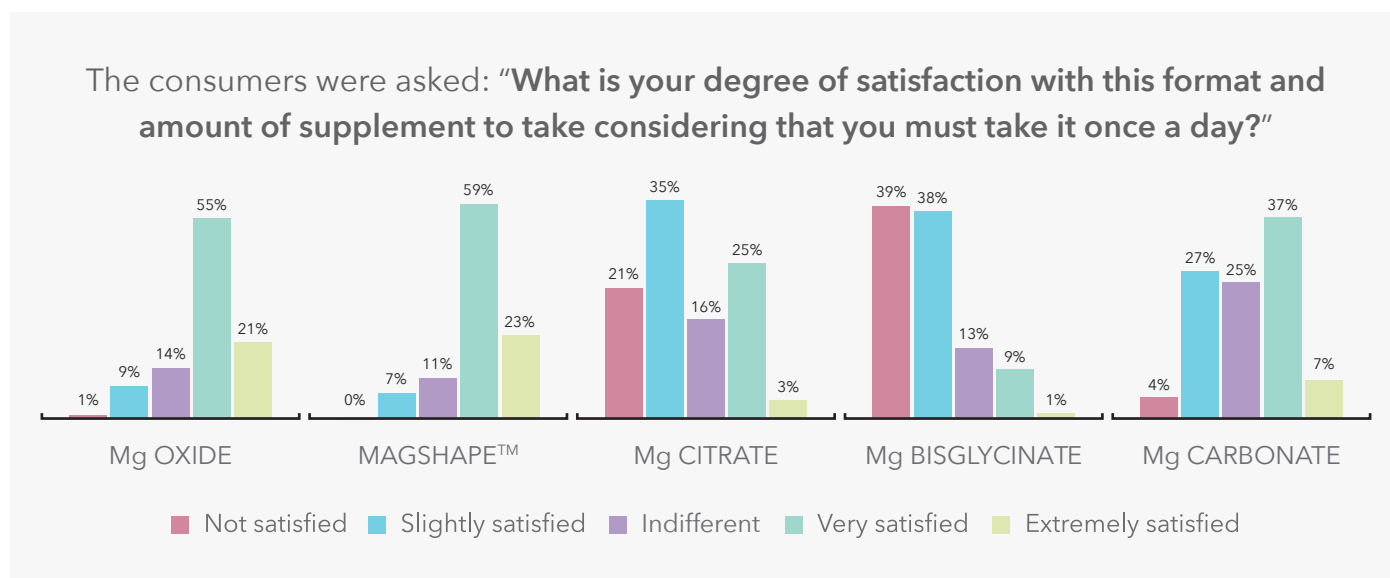


Figure 2: Comparison of relative consumer satisfaction in the magnesium powders tested.

These consumer tests demonstrate **MAGSHAPE™** is highly suitable for non-pill delivery formats, as well as offering appealing sensory benefits that it can bring to formulations.

Unleash your perfect magnesium product

MAGSHAPE™
Magnesium microcapsules

Guided by our state-of-the-art research, Lubrizol is ready to facilitate your consumer-centric product and help you stand out in the marketplace.

MAGSHAPE™ microcapsules enable the creation of great-tasting, sensory-appealing magnesium products that align with consumer demand.

As the nutraceutical supplement market continues to move towards non-pill formats, **MAGSHAPE™** provides a reliable, concentrated, and versatile source of magnesium suitable across a range of delivery formats, **these include:**



Tablets



Soft gels



Capsules



Orosoluble
powders



Get in touch

To learn more about how our nutraceuticals portfolio can enable great-tasting, on-trend products that enhance consumer experience, contact us at:

nutraceuticals@lubrizol.com

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