LiposoMore

LiposoMore® – Advanced Liposomal Ingredients
Delivering Premium Nutrition Through Science & Innovation

A Liposomal Brand Exclusively Owned by
Joyful Nutritional Supply Co.,ltd.

COMPREHENSIVE TECHNICAL DOSSIER AND MARKETING MONOGRAPH: LIPOSOMORE™ LIPOSOMAL MAGNESIUM BISGLYCINATE

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Product Name: LiposoMore™ Liposomal Magnesium Bisglycinate

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Manufacturer: Joyful Nutritional Supply Co., Ltd.

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1. EXECUTIVE SUMMARY AND BRAND PREFACE

1.1 The LiposoMore™ Vision

In an increasingly saturated nutraceutical market, the differentiator is no longer just the ingredient itself, but the efficiency of its delivery. **LiposoMore**™ represents the flagship innovation from **Joyful Nutritional Supply Co., Ltd.**, designed to bridge the gap between nutritional potential and biological reality. While traditional magnesium supplements struggle

with bioavailability barriers—often leading to gastrointestinal distress and poor therapeutic outcomes—LiposoMore™ utilizes advanced microencapsulation technology to cloak high-quality Magnesium Bisglycinate within a phospholipid bilayer. This "Trojan Horse" mechanism ensures that the mineral payload bypasses the hostile gastric environment and is delivered directly to the cells that need it most.

This Technical Dossier serves as the definitive reference for product formulators, quality assurance officers, and brand managers. It transcends the traditional boundaries of a Technical Data Sheet (TDS) by offering a holistic view of the ingredient's physicochemical properties, scientific validation, regulatory standing, and application versatility. By choosing LiposoMore™, our partners are not merely buying a raw material; they are investing in a technology that guarantees "More Absorption, More Stability, and More Efficacy".[1]

1.2 Manufacturer Profile: Joyful Nutritional Supply Co., Ltd.

Located in the technological hub of Shenzhen, China (No. 2045 Songbai Road, Baoan District), Joyful Nutritional Supply Co., Ltd. has established itself as a premier supplier of value-added nutritional ingredients. Our facility operates at the intersection of biotechnology and food science, employing state-of-the-art spray-drying and liposomal homogenization technologies.

Our commitment to quality is evidenced by our rigorous "In-house Standards" which often exceed generic pharmacopeial requirements.[2] We recognize that trust is the currency of the supplement industry. Therefore, we maintain complete transparency regarding our sourcing, manufacturing processes, and quality control metrics. This dossier reflects that commitment, providing granular detail on every aspect of the Liposomal Magnesium Bisglycinate product, from the molecular structure of the chelate to the microbial purity of the final powder.

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2. PRODUCT IDENTIFICATION AND NOMENCLATURE

2.1 Identity Matrix

Defining the product accurately is the first step in regulatory compliance and formulation success. LiposoMore™ is a complex matrix, and its nomenclature reflects its dual nature as both a mineral chelate and a lipid-based delivery system.

Parameter	Description
Commercial Name	LiposoMore™ Liposomal Magnesium Bisglycinate

Product Brand	LiposoMore+Mg [2]
Chemical Name (Active)	Magnesium Bisglycinate; Magnesium Diglycinate; Bis(glycinato-N,O)magnesium
Chemical Formula (Active)	$C_4H_8MgN_2O_4$ [4]
Molecular Weight (Active)	172.42 g/mol [4]
CAS Number (Active)	14783-68-7 [7]
CAS Number (Lipid)	8002-43-5 (Lecithin / Phospholipids) [9]
HS Code	2922.49.90 (Amino-acids and their esters; salts thereof) [6]
Physical Form	Microencapsulated Powder
Solubility	Water Dispersible (forms a colloidal suspension)

2.2 The "Active" Definition in Liposomal Formulations

It is critical for formulators to understand the distinction between "Gross Weight" and "Elemental Yield" in liposomal ingredients.

- **The Chelate:** Pure Magnesium Bisglycinate is approximately 14.1% elemental magnesium by mass. The remaining ~86% consists of the two glycine molecules which provide the chelation protection.[8]
- **The Liposome:** To create the LiposoMore™ structure, the magnesium bisglycinate is coated in a phospholipid complex (derived from non-GMO sunflower). This lipid shell adds mass.
- **The Final Specification:** Consequently, the final LiposoMore™ powder has a guaranteed assay of **≥ 10.0% Elemental Magnesium**.[2] This means that 1,000 mg of LiposoMore™ powder delivers 100 mg of elemental magnesium. This 10% load is the industry "sweet spot," balancing high potency with a robust liposomal wall thickness sufficient to ensure gastric survival.

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3. TECHNICAL SPECIFICATIONS (COA ANALYSIS)

The following data is derived from the Master Specification Sheet and validated by recent Certificate of Analysis (COA) testing. These parameters act as the release criteria for every batch leaving our Shenzhen facility.

3.1 Organoleptic and Physical Properties

Test Item	Specification	Typical Result	Method / Significance
Appearance	White to slightly yellow powder	Pass (Conforms)	**Visual:** The color indicates lipid quality. A "slightly yellow" hue is natural for high-PC lecithin. Darkening would indicate oxidation. The powder form ensures stability compared to liquid liposomes.[2]
Odor	Odorless	Pass (Conforms)	**Sensory:** Magnesium salts and oxidized lipids can taste metallic or rancid. Our "odorless" profile [2] confirms the integrity of the encapsulation and the freshness of the phospholipid source.
Loss on Drying	< 7.0%	4.6%	**Gravimetric (105°C):** This is a critical stability parameter. Liposomal powders must retain a

			specific monolayer of water to maintain the structural integrity of the bilayer during the solid phase. However, excess water (>7%) invites microbial growth and hydrolysis. A result of ~4-5% [2] represents the optimal thermodynamic equilibrium for shelf stability.
Bulk Density	0.35 – 0.65 g/cm³	0.45 g/cm³	**Tapped Density:** Essential for capsule filling calculations. The flowability profile suggests suitability for Size 0 or 00 capsules (approx. 350-500mg per capsule).
Particle Size	95% pass 80 mesh	Pass	**Sieve Analysis:** Ensures uniform blending in powder formulations and rapid dispersion in liquids.

3.2 Chemical Potency and Composition

Test Item	Specification	Typical Result	Method / Significance

Assay (Magnesium)	≥ 10.0%	10.5%	**ICP-OES / Complexometric:** Confirms the elemental yield. The result of 10.5% [2] indicates a slight overage is applied during manufacturing to ensure the product meets label claims throughout its shelf life.
Identity	Positive	Pass	**FTIR:** Confirms the presence of both the magnesium bisglycinate chelate structure and the phospholipid signature.

3.3 Heavy Metal Profile (Purity)

Heavy metal contamination is a primary concern with mineral supplements, as magnesium is often mined from geological deposits that naturally co-occur with lead and arsenic. Joyful Nutritional Supply Co. employs stringent purification protocols to ensure levels are well below global regulatory limits.

Contaminant	Specification	Typical Result	Regulatory Context
Total Heavy Metals	< 10 ppm	< 10 ppm	Meets USP general limits for nutritional supplements.[2]
Lead (Pb)	< 3.0 ppm	< 3 ppm	**Critical:** Meets USP limits. For California Prop 65, formulators must calculate the total

			daily intake. At a standard 300mg Mg dose (3g powder), the lead contribution would be <9 µg, requiring careful labeling review depending on the specific Prop 65 safe harbor levels for the finished product formulation.[2]
Arsenic (As)	< 1.0 ppm	< 1.0 ppm	Significantly stricter than the general USP limit of 1.5 µg/day intake limits. Ensures safety for chronic consumption.[2]
Cadmium (Cd)	< 1.0 ppm	< 1.0 ppm	Minimizes renal toxicity risks associated with long-term mineral supplementation.[2]
Mercury (Hg)	< 0.1 ppm	< 0.1 ppm	Extremely low limit [2], essentially background noise levels, confirming the absence of marine-sourced contamination.

3.4 Microbiological Standards

Liposomal powders, being rich in lipids and amino acids (glycine), are potential substrates for bacterial growth. Our strict hygiene controls and low water activity formulation ensure microbiological safety.

Pathogen/Indicator	Specification	Typical Result	Method
Total Plate Count	< 1,000 cfu/g	< 100 cfu/g	USP [2]
Yeasts & Molds	< 100 cfu/g	< 10 cfu/g	USP [2]
E. Coli	Negative / 10g	Negative	USP [2]
Salmonella	Negative / 25g	Negative	USP [2]
Staphylococcus Aureus	Negative / 25g	Negative	USP [2]

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4. SCIENTIFIC MONOGRAPH: THE LIPOSOMORE™ ADVANTAGE

4.1 The Magnesium Absorption Paradox

Magnesium is a cofactor for over 300 enzyme systems, yet it remains one of the most difficult minerals to absorb. Traditional forms like Magnesium Oxide have bioavailability rates as low as 4-10%.[12] This is primarily because the magnesium ion (Mg^{2+}) is highly hydrated and difficult to transport across the lipid-rich cell membranes of the intestinal wall. Furthermore, free magnesium ions in the intestine attract water (osmotic effect), leading to the well-known laxative side effects that limit the maximum tolerable dose.

4.2 Mechanism of Action: The Dual-Layer Protection

LiposoMore™ solves these challenges through a synergistic dual-layer architecture:

Layer 1: Bisglycinate Chelation (Chemical Stability) Before encapsulation, we utilize **Magnesium Bisglycinate**, a "fully reacted" chelate where the magnesium ion is bound between two glycine amino acids.

- **pH Neutrality:** Unlike Magnesium Citrate (acidic) or Oxide (alkaline), the bisglycinate chelate is pH stable.
- **Protection from Inhibitors:** The glycine ligands "claw" the magnesium, preventing it from binding with phytates (from grains) or phosphates in the stomach, which would otherwise render it insoluble.[1]
- **Glycine Synergy:** Glycine itself is a calming neurotransmitter. Upon dissociation in the

blood, it acts synergistically with magnesium to promote GABAergic activity, making this form ideal for stress relief and sleep support.[1]

Layer 2: Liposomal Encapsulation (Biological Delivery) We then wrap this stable chelate in a phospholipid bilayer (Liposome).

- **Bypassing Ion Channels:** Traditional magnesium relies on TRPM6 and TRPM7 ion channels in the gut, which are easily saturated. Liposomes, however, are absorbed via **endocytosis** and **M-cell transport** in the lymphatic system. They mimic the body's own cell membranes, effectively functioning as a "Trojan Horse" that slips through the intestinal barrier undetected.[1]
- **Protection from Gastric Acid:** The lipid shell shields the chelate from the harsh hydrochloric acid (pH 1.5) of the stomach, preventing premature dissociation.
- **Direct Cellular Fusion:** Once in circulation, liposomes can fuse directly with cell membranes, delivering the magnesium payload directly into the cytosol where it is needed for mitochondrial ATP production.[14]

4.3 Proven Benefits of LiposoMore™

Research into liposomal technologies and magnesium bisglycinate highlights several key advantages for the consumer:

1. **Superior Bioavailability:** Studies suggest liposomal entrapment can increase intracellular delivery significantly compared to non-encapsulated forms.[16]
2. **Gastrointestinal Gentle:** By shielding the magnesium ion from the gut's osmoreceptors, LiposoMore™ drastically reduces the incidence of osmotic diarrhea and cramping, even at higher therapeutic doses.[1]
3. **Systemic Stability:** The encapsulation protects the nutrient from oxidation and interactions with other food components during digestion.[11]

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5. COMPLIANCE, SAFETY, AND REGULATORY STATUS

5.1 Compliance Statements

Joyful Nutritional Supply Co., Ltd. adheres to global standards for ingredient safety and purity.

- **Non-GMO Statement:** The product is manufactured using raw materials that are not genetically modified. Specifically, the phospholipids are derived from non-GMO sunflower sources, avoiding the GMO risks associated with soy.[18]
- **Gluten-Free:** The product does not contain wheat, rye, barley, or oats, and is processed in a facility that manages allergen cross-contamination risks, making it suitable for Celiac-friendly formulations.[18]
- **BSE/TSE Free:** The product is of 100% mineral and vegetable origin. It contains no animal-derived ingredients, by-products, or processing aids. There is no risk of Bovine

Spongiform Encephalopathy (BSE) or Transmissible Spongiform Encephalopathy (TSE).[19]
- **Vegan/Vegetarian:** Suitable for strict vegan diets.
- **Melamine Free:** Rigorously tested to confirm the absence of melamine and cyanuric acid.
- **Irradiation & ETO:** The product is not treated with ionizing radiation (irradiation) or Ethylene Oxide (ETO) sterilization.[19]

5.2 Regulatory Status

- **United States:** Magnesium Bisglycinate is considered a Dietary Ingredient under DSHEA. The components (Magnesium Bisglycinate and Lecithin) are Generally Recognized As Safe (GRAS) by the FDA.
- **European Union:** Magnesium Bisglycinate is listed in Annex II of Directive 2002/46/EC as a permitted source of magnesium for food supplements. Lecithins (E322) are authorized food additives.
- **China:** Complies with GB standards for nutritional fortification.

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6. APPLICATIONS AND FORMULATION GUIDELINES

6.1 Recommended Dosage

The formulation strategy must account for the 10% assay.

- **Target:** 100% of Recommended Daily Intake (approx. 400mg Mg).
- **LiposoMore™ Requirement:** 4,000 mg (4 grams) of powder.
- **Target:** Functional "Top-Up" Dose (100mg Mg).
- **LiposoMore™ Requirement:** 1,000 mg (1 gram) of powder.

Note: Due to the enhanced absorption of LiposoMore™, formulators often find that lower elemental doses (e.g., 100-200mg elemental) achieve similar physiological benefits to higher doses of poor-quality salts, allowing for smaller capsule sizes and better consumer compliance.[14]

6.2 Formulation Versatility

- **Capsules:** The powder has excellent flow properties (Bulk Density ~0.45 g/cm^3) making it ideal for two-piece hard shell capsules.
- **Sachets / Stick Packs:** The water-dispersible nature allows it to be marketed as a "mix-in" powder for beverages. The neutral/odorless profile requires minimal flavor masking compared to bitter magnesium salts.[9]
- **Functional Foods:** Can be incorporated into bars or smoothie mixes. The liposomal shell protects the magnesium from reacting with other ingredients (like oxidizing Vitamin C) in the matrix.

7. STORAGE, PACKAGING, AND STABILITY

7.1 Packaging Configuration

To ensure maximum protection against moisture and light, LiposoMore™ is packaged with industrial rigor:

- **Outer Container:** 25kg Heavy-duty Fiber Drum.[2]
- **Inner Lining:** Double-layer Food Grade Low-Density Polyethylene (LDPE) bags, heat-sealed or zip-tied to create a moisture barrier.[4]

7.2 Storage Requirements

Liposomal powders are hygroscopic and heat-sensitive. Proper storage is non-negotiable for maintaining the Certificate of Analysis validity.

- **Temperature:** Store in a cool place, ideally **below 25°C (77°F)**. Temperatures above 30°C may cause the phospholipid coating to soften, leading to powder caking or liposome fusion.[20]
- **Humidity:** Store in a dry area with Relative Humidity (RH) **< 60%**. High humidity can initiate the hydrolysis of the phospholipids.
- **Light:** Protect from direct sunlight. UV radiation can oxidize the unsaturated fatty acids in the lecithin, leading to rancidity.[21]

7.3 Shelf Life

When stored under the recommended conditions in the original unopened packaging, the product maintains its specifications for **24 months** from the date of manufacture. Re-test is recommended if the product is stored beyond this period.[2]

8. QUALITY CONTROL AND TESTING METHODOLOGY

Joyful Nutritional Supply Co., Ltd. employs a comprehensive testing regime.

- **Magnesium Content:** We utilize **Complexometric Titration** or **ICP-OES** to determine the exact elemental magnesium levels.
- **Heavy Metals:** We use **Inductively Coupled Plasma Mass Spectrometry (ICP-MS)**, the gold standard for detecting trace metals at the ppb (parts per billion) level, ensuring we meet the strict <0.1 ppm Mercury limits.[2]
- **Microbiology:** All testing follows **United States Pharmacopeia (USP)** methods (USP for enumeration, USP for pathogens) to ensure global acceptance of our data.[2]

9. DISCLAIMER AND LEGAL NOTICE

Important Notice to Formulators: The information provided in this Technical Data Sheet is based on our current knowledge and experience and is intended for B2B professionals only. While **Joyful Nutritional Supply Co., Ltd.** guarantees the quality of the product as described in the Specification and Certificate of Analysis, we assume no liability for the suitability of this product for any specific application or for the final product's compliance with local regulations.

- **Regulatory Claims:** Statements regarding the benefits of liposomal encapsulation (e.g., "superior absorption") have not been evaluated by the US Food and Drug Administration (FDA) or the European Food Safety Authority (EFSA). This product is a raw material and is not intended to diagnose, treat, cure, or prevent any disease.[23]
- **Labeling:** The customer is responsible for ensuring that their finished product labeling complies with all applicable laws, including the proper listing of ingredients (e.g., "Magnesium Bisglycinate," "Sunflower Lecithin") and allergen disclosures.

CONTACT INFORMATION

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COMPREHENSIVE PRODUCT ANALYSIS: THE SCIENCE OF LIPOSOMORE™

(The following section provides an in-depth analysis of the scientific landscape surrounding LiposoMore™, intended for internal R&D and Marketing teams to support claim substantiation.)

1. Introduction: The Bioavailability Crisis in Minerals

The global dietary supplement market has long faced a "bioavailability crisis." Consumers are ingesting high doses of minerals, yet blood serum levels often fail to reflect this intake. Magnesium is the poster child for this issue. While it is the fourth most abundant mineral in the human body, involved in over 300 enzymatic reactions—from DNA synthesis to muscle contraction—deficiency remains rampant.

Traditional supplementation strategies have focused on "salts"—binding magnesium to an anion.

- **Magnesium Oxide:** The most common form. It is cheap and small, allowing for high

elemental yields. However, it is virtually insoluble in water at neutral pH. It requires high amounts of stomach acid to dissociate. Clinical studies show its fractional absorption can be as low as 4%. The unabsorbed 96% travels to the colon, where it attracts water, causing diarrhea.
- **Magnesium Citrate:** A significant improvement. It is water-soluble and has better absorption (~25-30%). However, it is also a potent osmotic laxative (used medically for colonoscopy prep), limiting its use for daily supplementation.

The Solution: The industry required a form that was (A) chemically stable, (B) soluble, and (C) biologically recognizable. This led to the development of amino acid chelates (Bisglycinate) and, subsequently, the advanced liposomal delivery systems used in LiposoMore™.

2. The Chemistry of Bisglycinate Chelation

To understand LiposoMore™, one must first understand its core: Magnesium Bisglycinate. In a bisglycinate molecule, a central magnesium ion (Mg^{2+}) is covalently bonded to two glycine molecules (NH_2CH_2COOH).

- **Neutral Valency:** Magnesium naturally has a 2+ charge, which makes it "sticky"—it wants to bind to negatively charged things like phytates (in bread/grains) or tannins (in tea). Once bound to these anti-nutrients, it becomes insoluble and cannot be absorbed. In the bisglycinate form, the glycine molecules occupy these reactive sites, effectively "neutralizing" the magnesium and allowing it to pass through the digestive tract without getting stuck to food particles.[14]
- **Dipeptide Transport:** The body has specific transporters for minerals, but they are slow and easily saturated. However, the body is *very* efficient at absorbing proteins (amino acids). Since Magnesium Bisglycinate looks like a dipeptide (protein), it can theoretically be absorbed via the **PEPT1 peptide transporter**, a high-capacity "fast lane" for absorption that doesn't compete with other minerals like calcium.[25]

3. The Physics of Liposomal Encapsulation

Joyful Nutritional Supply Co., Ltd. takes the high-quality bisglycinate chelate and subjects it to **Liposomal Encapsulation Technology (LET)**.

3.1 What is a Liposome?

A liposome is a spherical vesicle with a membrane composed of a phospholipid bilayer. This is the exact same structure as the membranes of every cell in the human body.

- **The Head:** The phosphate "head" of the phospholipid is hydrophilic (water-loving).
- **The Tail:** The fatty acid "tail" is hydrophobic (water-fearing). When mixed in an aqueous solution under specific shear conditions (using high-pressure homogenization or microfluidics), these phospholipids self-assemble into spheres. They orient their heads

outward toward the water and their tails inward, creating a protected pocket.

3.2 The LiposoMore™ Architecture

In LiposoMore™, the water-soluble Magnesium Bisglycinate is trapped inside the aqueous core of the liposome (or integrated into the matrix, depending on the specific multilamellar structure).

- **Gastric Survival:** The stomach is a chemical incinerator. Acid (HCl) and enzymes (pepsin) tear apart standard nutrients. The phospholipid bilayer of the liposome is chemically robust against this acid attack. It acts as a shield, carrying the magnesium payload intact through the stomach and into the small intestine.[1]
- **Zeta Potential and Stability:** Our manufacturing process carefully controls the "Zeta Potential"—the electrical charge on the surface of the liposome. A high repulsive charge prevents the liposomes from clumping together (aggregation), ensuring that they remain as discrete, nano-sized particles ready for absorption.

3.3 The Mechanism of Absorption: "The Trojan Horse"

This is the key differentiator.

1. **M-Cell Uptake:** In the Peyer's patches of the small intestine, specialized cells called Microfold cells (M-cells) constantly sample the gut contents for particles. They readily take up liposomes, treating them as potential nutrients or immune targets.
2. **Chylomicron Pathway:** Phospholipids are fats. The body digests them differently than minerals. They are processed into micelles and absorbed into the lymphatic system (via chylomicrons), eventually dumping into the bloodstream via the thoracic duct. This route bypasses the liver's "first-pass metabolism," which often degrades nutrients before they can reach peripheral tissues.
3. **Fusion:** Once in the blood, the liposome encounters a human cell. Because both the liposome and the cell membrane are made of the same material (phospholipids), they can fuse. The liposome merges with the cell wall, flipping its magnesium payload directly into the interior of the cell. This is **intracellular delivery**, the holy grail of supplementation.[1]

4. Manufacturing Excellence: From Liquid to Powder

One of the greatest challenges in liposomal science is stability. Liquid liposomes are fragile. They can leak, grow bacteria, or oxidize. Joyful Nutritional Supply Co. employs advanced **drying technologies** (likely Spray Freeze Drying or Low-Temperature Spray Drying) to solve this.

- **The Process:** The liquid liposomal suspension is mixed with a carrier (like maltodextrin or cyclodextrin) which acts as a "glassy matrix."
- **Water Removal:** The water is removed under controlled conditions. This "freezes" the liposomal structure in place.

- **Reconstitution:** When the consumer swallows the LiposoMore™ powder (or when it hits water in the gut), the carrier dissolves, and the liposomes re-hydrate and re-assemble instantly.
- **The Result:** A powder that has the bioavailability of a liquid liposome but the stability (24 months) and convenience of a solid mineral salt.[26]

5. Comparative Market Analysis

Feature	Magnesium Oxide	Magnesium Bisglycinate (Standard)	LiposoMore™ (Liposomal Bisglycinate)
Mg Content	High (~60%)	Moderate (~14%)	Moderate (~10%)
Bioavailability	Very Low (~4%)	High	**Superior (Targeted Delivery)**
GI Side Effects	High (Diarrhea)	Low	**Very Low / Negligible**
Absorption Path	Ion Channels (Saturable)	Peptide Transporters	**Endocytosis / Lipid Pathways**
Stability	High	High	**High (Protected)**
Cost	Low	Moderate	**Premium**

Strategic Positioning: LiposoMore™ is not a commodity ingredient. It is a premium problem-solver. It is designed for:

1. **Premium Sleep Formulas:** Where the consumer demands fast-acting relaxation without digestive upset.
2. **Sports Nutrition:** For athletes who cannot risk diarrhea before a race but need rapid electrolyte replenishment.
3. **Clinical Nutrition:** For elderly patients with compromised digestion (low stomach acid) who cannot absorb standard minerals effectively.

6. Conclusion

The **LiposoMore™ Liposomal Magnesium Bisglycinate** represents the zenith of mineral delivery technology. By combining the chemical stability of glycine chelation with the biological

efficiency of phospholipid encapsulation, Joyful Nutritional Supply Co., Ltd. has created an ingredient that offers unparalleled bioavailability and tolerability. The rigorous specifications outlined in this TDS—from the 10% assay to the stringent heavy metal limits—guarantee a product that is safe, effective, and ready for the global market.

Authorized By: *Technical Director* Joyful Nutritional Supply Co., Ltd. Shenzhen, China

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Disclaimer: The information contained herein is for business-to-business (B2B) educational purposes and does not constitute medical advice. Finished product claims must be substantiated by the brand owner in accordance with local regulations.