



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

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

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# LiposoMore™ Liposomal Silymarin: Comprehensive Product Dossier & Technical Data Sheet

## 1. Executive Summary

In the rapidly evolving landscape of global nutraceuticals, the demand for high-efficacy, bioavailable ingredients has catalyzed a technological shift from conventional botanical extracts to advanced delivery systems. **LiposoMore™ Liposomal Silymarin Powder**, manufactured by **Joyful Nutritional Supply Co., Ltd.**, represents a pinnacle achievement in this transition, merging the time-honored hepatoprotective properties of *Silybum marianum* with state-of-the-art liposomal encapsulation technology. This technical dossier serves as an exhaustive resource for product formulators, quality assurance professionals, and marketing teams, providing a granular analysis of the ingredient's physicochemical properties, pharmacological advantages, quality standards, and regulatory compliance status.<sup>1</sup>

The central challenge in silymarin supplementation has historically been its poor pharmacokinetic profile. Standard silymarin extracts, composed primarily of flavonolignans such as silybin, exhibit low aqueous solubility, limited intestinal absorption, and rapid first-pass metabolism, resulting in suboptimal systemic bioavailability.<sup>4</sup> LiposoMore™ technology addresses these limitations by encapsulating the active silymarin complex within a robust phospholipid bilayer. This structure not only mimics the body's cellular membranes to facilitate enhanced uptake via M-cells and lymphatic transport but also shields the delicate phytochemicals from gastric degradation.<sup>6</sup>

This dossier outlines the technical specifications of the product, characterized by a standardized Silymarin content of **29.7%–36.3%** and a unique "Orange granules and Powder" appearance that signifies its lipid-coated structure.<sup>1</sup> It details the rigorous quality control measures employed by Joyful Nutritional Supply Co., Ltd., including stringent limits on heavy

metals (Lead < 3 ppm, Arsenic < 1 ppm) and microbiological contaminants, ensuring the ingredient meets the highest standards for food supplements.<sup>1</sup> Furthermore, the report explores the stability profile of the dry powder format, which offers significant handling and shelf-life advantages over liquid liposomal formulations, maintaining stability for up to 24 months under standard storage conditions.<sup>9</sup>

By integrating detailed scientific rationale with practical formulation guidelines, this document positions LiposoMore™ Liposomal Silymarin not merely as a raw material, but as a strategic solution for brands seeking to deliver superior liver health outcomes to consumers.

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## 2. Manufacturer Profile: Joyful Nutritional Supply Co., Ltd.

### 2.1 Corporate Overview

Joyful Nutritional Supply Co., Ltd. has established itself as a premier supplier in the global nutritional ingredient sector, headquartered in Shenzhen, China. Operating from its facility in the Baoan District, the company focuses on the research, development, and manufacturing of value-added nutraceutical raw materials. The company's core mission is to bridge the gap between botanical potential and physiological reality through advanced processing technologies.<sup>1</sup>

The organization distinguishes itself through a vertical integration strategy that encompasses raw material sourcing, extraction, encapsulation, and rigorous quality testing. Unlike trading entities that merely aggregate commodities, Joyful Nutritional Supply maintains direct oversight of its manufacturing protocols, allowing for strict adherence to Good Manufacturing Practices (GMP) and the ability to customize specifications to meet specific client needs. The company's portfolio extends beyond silymarin to include a diverse range of liposomal vitamins, minerals, and specialized botanical extracts, positioning it as a comprehensive partner for functional food and dietary supplement brands.<sup>12</sup>

### 2.2 The LiposoMore™ Brand Philosophy

LiposoMore™ is the proprietary brand identity for the company's line of enhanced delivery ingredients. The nomenclature reflects a dual promise: providing "More" active ingredient to the systemic circulation through "Liposomal" technology.

- **Technological Integrity:** The LiposoMore™ seal signifies that the ingredient is a true liposome-forming powder, not merely a physical mixture of extract and lecithin. The manufacturing process involves the formation of lipid vesicles that entrap the active

payload, which are then carefully dried to preserve the vesicular structure upon rehydration.<sup>7</sup>

- **Market Positioning:** LiposoMore™ is positioned as a premium ingredient brand. It targets the upper tier of the supplement market where efficacy claims are paramount. By licensing the LiposoMore™ ingredient, finished product manufacturers can leverage the brand's association with quality and bioavailability, differentiating their products in a crowded marketplace dominated by generic extracts.<sup>15</sup>
- **Commitment to Safety:** The brand adheres to a "Safety First" principle. This is evidenced by the rigorous contaminant testing protocols (ICP-MS for heavy metals) and the selection of high-purity, non-GMO phospholipid sources, ensuring that the enhanced absorption applies only to the beneficial nutrients and not to unwanted impurities.<sup>1</sup>

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## 3. Scientific Rationale: The Liposomal Advantage

### 3.1 The Bioavailability Paradox of Silymarin

Silymarin, the standardized extract of Milk Thistle seeds, is a complex mixture of flavonolignans, with **silybin** (also known as silibinin) being the most biologically active component. Despite its potent antioxidant and hepatoprotective properties demonstrated in *in vitro* studies, clinical efficacy is often hampered by its poor oral bioavailability.<sup>5</sup>

The pharmacokinetic limitations of standard silymarin are threefold:

1. **Low Aqueous Solubility:** Silymarin is highly hydrophobic. In the aqueous environment of the gastrointestinal (GI) tract, standard extracts tend to aggregate, drastically reducing the surface area available for interaction with the intestinal epithelium. This results in a low dissolution rate, which is the rate-limiting step for absorption.<sup>4</sup>
2. **Poor Membrane Permeability:** Even when dissolved, the large molecular size and structure of flavonolignans limit their passive diffusion across the lipid-rich enterocyte membranes.<sup>4</sup>
3. **Extensive First-Pass Metabolism:** The fraction of silymarin that is absorbed is transported via the portal vein directly to the liver. Here, it undergoes rapid Phase II metabolism (glucuronidation and sulfation), leading to rapid excretion in the bile and urine. This "first-pass effect" significantly reduces the half-life and systemic concentration of the active compound.<sup>5</sup>

### 3.2 Mechanism of Action: Liposomal Encapsulation

LiposoMore™ technology overcomes these barriers through the application of **Liposomal Encapsulation Technology (LET)**. Liposomes are microscopic spherical vesicles composed

of a phospholipid bilayer, typically derived from sunflower or soy lecithin, which encapsulates the active ingredient.<sup>6</sup>

### 3.2.1 Structural Mimicry

The phospholipid bilayer of a liposome is structurally identical to the cell membranes of human cells. This biomimetic nature facilitates unique interactions with the intestinal lining. When LiposoMore™ powder is ingested and rehydrated in the gut, the phospholipids organize into vesicles that shield the hydrophobic silymarin within their lipid membrane or core.<sup>18</sup>

### 3.2.2 Protection and Transport

- **Gastric Stability:** The lipid bilayer serves as a protective shield, preventing the degradation of silybin by stomach acid and digestive enzymes. This ensures that a higher percentage of the intact molecule reaches the small intestine.<sup>7</sup>
- **Absorption Pathways:** Unlike free silymarin, which relies on passive diffusion, liposomes can be absorbed via multiple enhanced pathways:
  - **M-Cell Uptake:** Specialized Microfold cells (M-cells) in the Peyer's patches of the intestine can take up intact liposomes via endocytosis, transporting them into the lymphatic system.<sup>4</sup>
  - **Chylomicron Formation:** The digestion of phospholipids stimulates the production of chylomicrons. The lipophilic silymarin complex can be incorporated into these chylomicrons, entering the lymphatic circulation. This is critical because the lymphatic system drains directly into the subclavian vein, bypassing the liver's first-pass metabolism and delivering the active ingredient directly to the systemic blood circulation.<sup>21</sup>
  - **Membrane Fusion:** Liposomes can fuse directly with the epithelial cell membranes, releasing their payload directly into the cytoplasm.<sup>7</sup>

## 3.3 Validated Efficacy

Research into phospholipid-complexed silymarin supports the superiority of this delivery method.

- **Increased Absorption:** Comparative pharmacokinetic studies have demonstrated that silymarin-phospholipid complexes can achieve **2.5 to 9.6-fold higher oral bioavailability** compared to conventional silymarin tablets.<sup>4</sup>
- **Enhanced Hepatoprotection:** In animal models of liver toxicity (induced by agents like carbon tetrachloride or acetaminophen), liposomal silymarin formulations have shown significantly greater reductions in liver enzymes (ALT, AST) and improved histological outcomes compared to equivalent doses of free silymarin.<sup>18</sup>
- **Targeted Delivery:** Phospholipids have a natural affinity for the liver (hepatotropism) as they are key components of hepatocyte membranes. This suggests that liposomes not

only improve systemic absorption but may also preferentially deliver the regenerative silymarin payload to the liver tissue itself.<sup>20</sup>

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## 4. Technical Data Sheet (TDS)

Product Name: LiposoMore™ Liposomal Silymarin Powder

Botanical Source: Silybum marianum (L.) Gaertn. (Seed)

Grade: Food Supplements Grade

Country of Origin: China

### 4.1 General Description

Liposomal Silymarin Powder is a specialized nutritional ingredient consisting of Silymarin extract microencapsulated within a phospholipid matrix. The product appears as an **orange granule and powder**, distinct from the pale yellow of standard extracts, reflecting its unique lipid composition. It is designed to be dispersible in water, forming a liposomal suspension upon hydration.<sup>1</sup>

### 4.2 Physicochemical Specifications

Parameter	Specification	Test Method
Appearance	Orange granules and Powder	Visual
Odor	Odorless	Organoleptic
Solubility	Dispersible in water	Visual
Assay (Silymarin)	29.7% – 36.3%	HPLC
Loss on Drying	< 3.0%	Gravimetric (105°C)
Particle Size	95% pass through 80 mesh	Sieving
** Bulk Density**	0.40 – 0.60 g/ml	Tapped Density

Technical Note on Assay:

The assay specification of 29.7% – 36.3% is deliberate and optimized for liposomal stability. Unlike generic extracts which may assay at 80%, a true liposomal powder requires a significant ratio of phospholipids (approximately 60-70%) to active ingredient to ensure full encapsulation and vesicle formation. A higher concentration of silymarin would exceed the loading capacity of the liposomes, resulting in free, unencapsulated material.<sup>2</sup>

### 4.3 Heavy Metal Profile

Contaminant	Limit (Specification)	Test Method
Total Heavy Metals	< 10 ppm	ICP-MS
Lead (Pb)	< 3.0 ppm	ICP-MS
Arsenic (As)	< 1.0 ppm	ICP-MS
Cadmium (Cd)	< 1.0 ppm	ICP-MS
Mercury (Hg)	< 0.1 ppm	ICP-MS

Safety Compliance:

The product meets stringent international safety standards. The limit for Arsenic (< 1.0 ppm) and Lead (< 3.0 ppm) complies with general USP limits for botanical extracts and strict California Prop 65 guidelines for reproductive toxicity (depending on daily dose).<sup>8</sup> The ultra-low Mercury limit (< 0.1 ppm) ensures safety for long-term daily supplementation.

### 4.4 Microbiological Standards

Parameter	Limit (Specification)	Test Method
Total Plate Count	< 1000 cfu/g	USP
Yeast & Mold	< 100 cfu/g	USP

<b>E. Coli</b>	Negative / g	USP
<b>Salmonella</b>	Negative / 25g	USP
<b>Staphylococcus Aureus</b>	Negative / 25g	USP

Hygiene Assurance:

Microbiological specifications are set to ensure the product is safe for direct consumption in powdered blends or capsules. The stringent limits on pathogens (E. Coli, Salmonella, S. Aureus) reflect Good Manufacturing Practices (GMP) controls during the extraction and drying phases.<sup>1</sup>

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## 5. Regulatory & Quality Compliance

### 5.1 Certification and Statements

To facilitate global market entry and clean-label marketing claims, LiposoMore™ Liposomal Silymarin adheres to the following compliance standards:

- **Non-GMO Statement:** The silymarin extract is derived from non-genetically modified *Silybum marianum* seeds. The phospholipid carrier is sourced from Identity Preserved (IP) non-GMO sources (typically sunflower or IP soy), ensuring the final product is free from bioengineered material.<sup>16</sup>
- **Gluten-Free:** The manufacturing process utilizes no gluten-containing grains (wheat, barley, rye). The product is suitable for formulations targeting the "Gluten-Free" market segment.<sup>25</sup>
- **BSE/TSE Free:** All ingredients are of plant origin. No animal-derived substances are used in the manufacturing process, eliminating the risk of Bovine Spongiform Encephalopathy (BSE) and Transmissible Spongiform Encephalopathy (TSE).
- **Irradiation Free:** The product is sterilized using heat or filtration methods and is not subjected to ionizing radiation.<sup>26</sup>
- **Residual Solvents:** The manufacturing process is controlled to ensure compliance with USP / EP 5.4 limits for Class 1, 2, and 3 residual solvents. Ethanol and water are the primary solvents used, ensuring a safe toxicity profile.<sup>23</sup>

### 5.2 Quality Control Protocols

Joyful Nutritional Supply Co., Ltd. employs a multi-stage quality control system:

1. **Raw Material Qualification:** Identity testing (HPTLC/TLC) of *Silybum marianum* seeds to confirm botanical species and exclude adulterants.<sup>23</sup>
2. **In-Process Control:** Monitoring of lipid-to-drug ratios, homogenization pressure, and drying temperatures to ensure consistent liposome formation.
3. **Finished Product Testing:** Every batch is tested against the specifications listed in Section 4. Validation involves HPLC for potency and ICP-MS for trace metals.<sup>1</sup>

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## 6. Stability, Storage, and Packaging

### 6.1 Stability Profile

One of the distinct advantages of **LiposoMore™** powder over liquid liposomal formulations is its superior stability. Liquid liposomes are thermodynamically unstable and prone to:

- **Hydrolysis:** The breakdown of phospholipids in water, leading to "leakage" of the active ingredient.
- **Aggregation:** The fusion of small vesicles into larger, less effective particles.
- **Oxidation:** Degradation of unsaturated lipids.

By converting the liposomal suspension into a dry powder (via technologies such as spray freeze-drying), the liposomal structure is effectively locked in a stable solid matrix. Upon rehydration in the gut, the vesicles reform. The low moisture content (**Loss on Drying < 3.0%**) is a critical quality attribute that prevents lipid hydrolysis during storage.<sup>10</sup>

### 6.2 Recommended Storage Conditions

To maintain potency and prevent lipid oxidation, the following storage conditions are strictly recommended:

- **Temperature:** Store in a cool place, ideally between **15°C and 25°C (59°F - 77°F)**. While the powder is shelf-stable at room temperature, exposure to excessive heat (>30°C) can accelerate lipid degradation. Refrigeration is not required but is acceptable.<sup>9</sup>
- **Humidity:** Store in a dry environment with Relative Humidity (RH) < **60%**. The phospholipid component is hygroscopic; exposure to moisture can cause caking and degradation.
- **Light:** Protect from direct sunlight and strong artificial light. Phospholipids and silymarin are both light-sensitive.<sup>2</sup>

### 6.3 Packaging Specifications

Joyful Nutritional Supply offers packaging designed to provide a robust barrier against moisture, oxygen, and light:

- **Bulk Packaging:** 25 kg Fiber Drum containing a double-layer Low-Density Polyethylene (LDPE) liner. The inner liner ensures an airtight seal, while the outer drum provides physical protection.<sup>1</sup>
- **Sample/Small Scale:** 1 kg multi-layer Aluminum Foil Bag. This format offers the highest level of barrier protection against photo-oxidation and is ideal for trial batches or smaller production runs.<sup>29</sup>

## 6.4 Shelf Life

When stored under the recommended conditions in the original unopened packaging, the product maintains its specifications for **24 months (2 years)** from the date of manufacture.<sup>1</sup>

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# 7. Applications and Formulation Guidelines

## 7.1 Dosage Recommendations

Due to the enhanced bioavailability of LiposoMore™, the effective dose may be lower than that of standard silymarin extracts.

- **Standard Extract Equivalent:** Typical doses of standard Milk Thistle (80% Silymarin) range from 200 mg to 600 mg per day.<sup>30</sup>
- **LiposoMore™ Dosage:**
  - **General Liver Support:** 150 mg – 300 mg per day.
  - **Therapeutic Support:** 400 mg – 600 mg per day.
  - **Note:** A 300 mg dose of LiposoMore™ (at ~33.5% assay) delivers approximately **100 mg of encapsulated Silymarin**. Clinical data suggests this lower quantity of *encapsulated* active can exert biological effects comparable to much higher doses of *free* active due to superior absorption.<sup>21</sup>

## 7.2 Formulation Formats

LiposoMore™ powder is engineered for versatility in dosage forms:

1. **Capsules (Hard Shell):** The powder exhibits good flow properties (95% passing 80 mesh), making it suitable for automated capsule filling. Size 0 or 00 capsules are recommended. It can be used pure or blended with other dry powders.<sup>31</sup>
2. **Powdered Drink Mixes:** The "dispersible in water" characteristic allows for inclusion in functional beverage sachets. Upon mixing with water, it forms a cloudy, liposomal suspension. This format is increasingly popular for "pill-free" supplement consumers.<sup>1</sup>
3. **Tablets:** While possible, direct compression requires care. Excessive compression force can disrupt the liposomal structure. Use of appropriate binders and low-compression settings is advised to preserve the lipid matrix.

## 7.3 Synergistic Combinations

Formulators can create premium blends by combining LiposoMore™ with other synergistic ingredients:

- **Detox Complex:** Combine with **Liposomal Glutathione** or **N-Acetyl Cysteine (NAC)**. Silymarin helps preserve hepatic glutathione levels, making this a powerful dual-action formula.<sup>32</sup>
- **Metabolic Health:** Combine with **Berberine** or **Curcumin**. The lipid matrix of the liposomal silymarin may facilitate the absorption of these other lipophilic compounds.<sup>33</sup>

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## 8. Marketing Claims and Consumer Education

For brand owners, the "LiposoMore™" ingredient offers a compelling narrative that resonates with the modern, science-savvy consumer.

### 8.1 Key Selling Points

- **"Powered by LiposoMore™ Technology":** Leveraging the branded ingredient name implies quality and innovation.
- **"Supercharged Absorption":** Highlight the mechanism of bypassing digestion and direct cell delivery. "Absorb More, Waste Less."
- **"Stomach Friendly":** The lipid encapsulation creates a gentle delivery system, reducing the potential for gastric upset often associated with concentrated herbal extracts.<sup>6</sup>
- **"Targeted Liver Support":** Explain the hepatotropic nature of phospholipids—delivering the silymarin exactly where it is needed.<sup>20</sup>

### 8.2 Differentiating from Competitors

While standard Milk Thistle supplements compete solely on price and milligrams, products containing LiposoMore™ compete on *value* and *efficacy*. By educating consumers on the "Bioavailability Paradox"—that it's not what you eat, but what you *absorb*—brands can justify a premium price point and build loyalty through superior results.<sup>34</sup>

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## 9. Conclusion

**LiposoMore™ Liposomal Silymarin Powder** represents a significant advancement in botanical nutrition. By harnessing the power of phospholipid encapsulation, Joyful Nutritional Supply Co., Ltd. has transformed a traditionally difficult-to-absorb herbal extract into a high-performance functional ingredient.

The specifications detailed in this dossier confirm a product of exceptional quality:

- **Standardized Potency:** Consistent 33.5% Silymarin content.
- **Validated Safety:** Extremely low heavy metal and microbial profiles.
- **Superior Stability:** A robust dry powder format with a 2-year shelf life.

For supplement manufacturers, LiposoMore™ offers a turnkey solution to the demand for more effective liver health products. It provides the scientific validation, regulatory compliance, and formulation flexibility required to succeed in today's competitive global market.

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**Disclaimer:** *The information contained in this technical dossier is accurate to the best of our knowledge at the time of publication. It is intended for business-to-business (B2B) educational purposes for professionals in the dietary supplement industry. It does not constitute medical advice. Finished product manufacturers are responsible for ensuring that their product claims, labeling, and formulations comply with all local, regional, and national laws and regulations.*

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## Appendix: Product Specification Sheet (Quick Reference)

Product Name	Liposomal Silymarin Powder
Brand	LiposoMore™
Botanical Source	<i>Silybum marianum</i> (Seed)
Carrier	Phospholipids (Non-GMO)

Shelf Life	24 Months
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### Physical & Chemical Analysis

Test Item	Specification	Method
Appearance	Orange granules and Powder	Visual
Odor	Characteristic / Odorless	Organoleptic
Assay (Silymarin)	29.7% – 36.3%	HPLC
Loss on Drying	≤ 3.0%	USP
Bulk Density	0.40 – 0.60 g/ml	USP
Particle Size	≥ 95% pass 80 mesh	USP

### Contaminants

Test Item	Specification	Method
Total Heavy Metals	≤ 10 ppm	ICP-MS
Lead (Pb)	≤ 3.0 ppm	ICP-MS
Arsenic (As)	≤ 1.0 ppm	ICP-MS

<b>Cadmium (Cd)</b>	≤ 1.0 ppm	ICP-MS
<b>Mercury (Hg)</b>	≤ 0.1 ppm	ICP-MS
<b>Residual Solvents</b>	Complies	USP
<b>Pesticides</b>	Complies	USP

### Microbiology

<b>Test Item</b>	<b>Specification</b>	<b>Method</b>
<b>Total Plate Count</b>	≤ 1000 cfu/g	USP
<b>Yeast &amp; Mold</b>	≤ 100 cfu/g	USP
<b>E. Coli</b>	Negative	USP
<b>Salmonella</b>	Negative	USP
<b>Staphylococcus Aureus</b>	Negative	USP

### Storage & Packaging

- **Standard Pack:** 25 kg Fiber Drum with double PE liner.
- **Storage:** Store in a cool, dry place, protected from light and moisture.