



**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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# **Product Master File & Technical Dossier: LiposoMore™ Liposomal Resveratrol**

## **Comprehensive Technical Data, Scientific Monograph, and Commercialization Strategy**

Document Number: PMF-LIPO-RESV-2026-REV02

Date of Issue: January 19, 2026

Version: 2.0 (Deep Research Edition)

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Confidentiality: Commercial In-Confidence

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## **1. Executive Summary**

This Product Master File (PMF) serves as the definitive technical, scientific, and commercial resource for **LiposoMore™ Liposomal Resveratrol**, a high-performance nutraceutical ingredient engineered to redefine the longevity supplement market. Developed and manufactured by **Joyful Nutritional Supply Co., Ltd.**, this product addresses the critical pharmacokinetic limitations of standard *trans*-resveratrol—namely, its poor aqueous solubility (0.03 mg/mL) and rapid Phase II metabolism—through advanced liposomal microencapsulation technology.

The dossier is structured to support the LiposoMore™ brand in global markets, providing not only the requested **English Technical Data Sheet (TDS)** but also a 15,000-word comprehensive analysis covering granular specification justifications, phospholipid chemistry, bioavailability mechanics, regulatory compliance (including Proposition 65 and Novel Food

status), and strategic market positioning.

### Key Product Highlights:

- **High Potency:** Guaranteed **60.0% - 65.0% Assay** (HPLC), significantly higher than standard liquid liposomes (often <10%) or low-load powders, enabling efficient dosing in standard capsules.<sup>1</sup>
- **Superior Bioavailability:** Utilizes a phospholipid bilayer delivery system to bypass first-pass hepatic metabolism and facilitate direct cellular uptake.<sup>3</sup>
- **Enhanced Stability:** Provided as a **white granule/powder** with a validated 24-month shelf life, solving the oxidation and hydrolysis issues inherent to liquid liposomal formulations.<sup>1</sup>
- **Clean Label & Safe:** Free from organic solvent residues, non-GMO, and rigorously tested for heavy metals (<10ppm) and microbiology, ensuring compliance with US FDA, EU EFSA, and California Prop 65 standards.<sup>1</sup>

This document integrates data from the specific Certificate of Analysis (Batch No. JN20250504018) with broader industry research to provide a holistic view of the product's value proposition.

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## 2. Technical Data Sheet (TDS)

**Note:** This section constitutes the formal "English TDS" requested for distribution to B2B partners and formulators. It is based on the specific parameters of the provided COA, generalized for standard batch release.

Document Type	Technical Data Sheet (TDS)
Product Name	Liposomal Resveratrol
Brand Name	LiposoMore™
Product Code	LIPO-RESV-60
Botanical Source	<i>Polygonum cuspidatum</i> (Japanese Knotweed)
Carrier System	Non-GMO Phospholipids (Sunflower/Soy)

	Lecithin)
<b>Country of Origin</b>	China
<b>Manufacturer</b>	Joyful Nutritional Supply Co., Ltd.

## 2.1 Product Overview

LiposoMore™ Liposomal Resveratrol is a free-flowing, white to off-white granular powder consisting of high-purity *trans*-resveratrol microencapsulated within a phospholipid matrix. This advanced delivery system renders the hydrophobic resveratrol molecule water-dispersible and protects it from gastrointestinal degradation, significantly enhancing oral bioavailability and plasma retention time compared to standard crystalline resveratrol.

## 2.2 Physical & Chemical Specifications

Test Item	Specification	Method
<b>Appearance</b>	White granules and powder	Visual
<b>Odor</b>	Odorless to characteristic	Organoleptic
<b>Taste</b>	Characteristic, bland	Organoleptic
<b>Solubility</b>	Dispersible in water (forms liposomal suspension)	Visual / Gravimetric
<b>Identification</b>	Matches Standard Retention Time	HPLC
<b>Assay (Resveratrol)</b>	60.0% – 65.0%	HPLC
<b>Loss on Drying</b>	≤ 5.0%	USP
<b>Bulk Density</b>	0.40 – 0.60 g/mL	USP
<b>Tapped Density</b>	0.60 – 0.80 g/mL	USP

<b>Particle Size</b>	≥ 95% pass 80 mesh	USP
<b>Phospholipids</b>	≥ 30.0%	HPLC / Phosphorus
<b>Residual Solvents</b>	Complies with USP / ICH Q3C	GC-HS

### 2.3 Contaminant Control

<b>Parameter</b>	<b>Limit</b>	<b>Method</b>
<b>Total Heavy Metals</b>	< 10 ppm	ICP-MS
<b>Lead (Pb)</b>	< 3.0 ppm	ICP-MS
<b>Arsenic (As)</b>	< 1.0 ppm	ICP-MS
<b>Cadmium (Cd)</b>	< 1.0 ppm	ICP-MS
<b>Mercury (Hg)</b>	< 0.1 ppm	ICP-MS
<b>Emodin</b>	< 10 ppm (or Non-Detected)	HPLC
<b>PAHs (Sum of 4)</b>	< 10 ppb (Benzo(a)pyrene < 2 ppb)	GC-MS

### 2.4 Microbiological Control

<b>Parameter</b>	<b>Limit</b>	<b>Method</b>
<b>Total Plate Count</b>	< 1,000 CFU/g	USP
<b>Yeast &amp; Mold</b>	< 100 CFU/g	USP
<b>E. Coli</b>	Negative in 1g	USP

<b>Salmonella</b>	Negative in 25g	USP
<b>Staphylococcus Aureus</b>	Negative in 25g	USP

## 2.5 Storage & Stability

- **Packaging:** 1kg/Aluminum Foil Bag; 10kg or 25kg/Fiber Drum with double LDPE inner liners.
- **Storage:** Store in a tightly closed container in a cool (15°C - 25°C), dry place. Protect from light, moisture, and oxygen.
- **Shelf Life:** 24 months from the date of manufacture when stored under recommended conditions.
- **Handling:** Hygroscopic material. Reseal immediately after use.

## 2.6 Compliance Statements

- **Non-GMO:** This product is not derived from and does not contain Genetically Modified Organisms.
- **BSE/TSE Free:** The product is of plant origin and free from animal-derived materials.
- **Gluten-Free:** No gluten-containing ingredients are used in the manufacturing process.
- **Prop 65:** Complies with California Proposition 65 requirements for heavy metals (based on NSRL/MADL).
- **Irradiation:** Non-irradiated.
- **Nano-Status:** Contains liposomes (vesicles), typically in the range of 100nm - 500nm upon hydration.

**Disclaimer:** *The information contained herein is based on our current knowledge and experience. It does not relieve the processor from carrying out their own precautions and tests.*

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# 3. Scientific Monograph: The Resveratrol Bioavailability Challenge

## 3.1 The Molecule: *Trans*-Resveratrol

Resveratrol (3,5,4'-trihydroxy-*trans*-stilbene) is a polyphenolic phytoalexin belonging to the stilbene class. It is naturally produced by plants such as *Vitis vinifera* (grapevine), *Polygonum cuspidatum* (Japanese Knotweed), peanuts, and various berries in response to biotic stress

(fungal infection) or abiotic stress (UV radiation, mechanical injury).<sup>7</sup>

Structurally, resveratrol exists in two geometric isomers: *cis*- and *trans*-. The *trans*- isomer is the thermodynamically stable and biologically active form responsible for the compound's renowned health benefits. However, exposure to UV light can cause photo-isomerization to the *cis*- form, which is significantly less potent. This necessitates the robust encapsulation provided by the LiposoMore™ technology to preserve the *trans*- configuration.<sup>8</sup>

Mechanism of Action:

The therapeutic potential of resveratrol is multi-faceted, interacting with numerous molecular targets:

1. **SIRT1 Activation:** Resveratrol is the most potent natural activator of Sirtuin 1 (SIRT1), an NAD<sup>+</sup>-dependent deacetylase. SIRT1 activation mimics the metabolic effects of caloric restriction, enhancing mitochondrial biogenesis and promoting longevity pathways.<sup>9</sup>
2. **AMPK Signaling:** It stimulates AMP-activated protein kinase (AMPK), a cellular energy sensor that regulates glucose uptake and fatty acid oxidation, offering benefits for metabolic syndrome and type 2 diabetes management.<sup>9</sup>
3. **Anti-Inflammatory Activity:** Resveratrol inhibits the Nuclear Factor kappa B (NF-κB) pathway, reducing the expression of pro-inflammatory cytokines such as TNF-α, IL-1β, and IL-6. This mechanism is crucial for its neuroprotective and cardioprotective effects.<sup>8</sup>
4. **Antioxidant Defense:** Beyond direct scavenging of reactive oxygen species (ROS), resveratrol upregulates endogenous antioxidant enzymes (SOD, Catalase, Glutathione Peroxidase) via the Nrf2 pathway, providing systemic protection against oxidative stress.<sup>8</sup>

## 3.2 The Pharmacokinetic Barrier

Despite its high efficacy *in vitro*, the clinical utility of standard resveratrol powder is severely compromised by its poor pharmacokinetics, often described as the "Resveratrol Paradox."

### 3.2.1 Solubility Limitations

Resveratrol is a lipophilic molecule with extremely low water solubility (~0.03 mg/mL). In the gastrointestinal (GI) tract, dissolution is the rate-limiting step for absorption. Standard crystalline resveratrol powder tends to clump and float, limiting the surface area available for interaction with intestinal epithelial cells.<sup>7</sup> This results in erratic and incomplete absorption.

### 3.2.2 Rapid Phase II Metabolism

The most significant hurdle is the "First-Pass Effect." Upon entering the enterocytes (intestinal wall cells) and subsequently the liver via the portal vein, resveratrol is aggressively metabolized by Phase II detoxification enzymes:

- **UDP-glucuronosyltransferases (UGTs):** Convert resveratrol to resveratrol-3-O-glucuronide and resveratrol-4'-O-glucuronide.

- **Sulfotransferases (SULTs):** Convert resveratrol to resveratrol-3-O-sulfate.

Studies indicate that after oral administration of standard resveratrol, circulating levels of free, bioactive resveratrol are often less than **1%** of the ingested dose. The vast majority (>99%) circulates as conjugated metabolites, which have significantly reduced biological activity and are rapidly excreted by the kidneys.<sup>8</sup>

## 3.3 The LiposoMore™ Solution: Advanced Liposomal Delivery

LiposoMore™ employs a cutting-edge liposomal encapsulation technology to overcome these pharmacokinetic barriers. Liposomes are spherical vesicles composed of one or more phospholipid bilayers enclosing an inner core.

### 3.3.1 Structural Integrity and Composition

The LiposoMore™ formulation utilizes **Phosphatidylcholine (PC)** derived from non-GMO Sunflower or Soy lecithin. Phospholipids are amphiphilic molecules with a hydrophilic (water-loving) head and two hydrophobic (fat-loving) tails.

- **Encapsulation:** In the LiposoMore™ powder (60% assay), the hydrophobic resveratrol is intercalated within the lipid bilayer or forms a solid lipid core surrounded by phospholipids. This "Pro-Liposomal" structure spontaneously hydrates upon contact with water or GI fluids to form stable liposomal vesicles.<sup>14</sup>
- **Bio-Mimicry:** The phospholipid bilayer mirrors the structure of human cell membranes. This "Trojan Horse" effect allows the liposome to protect the resveratrol from digestive enzymes and disguise it from early metabolic detection.<sup>3</sup>

### 3.3.2 Mechanisms of Enhanced Absorption

LiposoMore™ enhances bioavailability through three distinct mechanisms:

1. **Solubilization:** The phospholipid coating acts as a surfactant, vastly improving the wettability and dispersibility of resveratrol in the aqueous gut environment. The COA confirms the product is "Dispersible in water," creating a uniform suspension for absorption.<sup>16</sup>
2. **Protection:** The lipid bilayer shields the sensitive *trans*-resveratrol from UV light, pH fluctuations, and enzymatic degradation in the stomach and small intestine.<sup>3</sup>
3. **Alternative Absorption Pathways:**
  - **Direct Fusion:** Liposomes can fuse directly with the cell membranes of enterocytes, releasing their cargo intracellularly.
  - **Lymphatic Transport:** Crucially, larger liposomes and lipid complexes can be taken up by M-cells in the Peyer's patches of the intestine and incorporated into chylomicrons. These enter the **lymphatic system**, bypassing the portal vein and the

liver entirely. This allows the resveratrol to enter systemic circulation without undergoing the rapid first-pass glucuronidation that renders standard resveratrol ineffective.<sup>3</sup>

### 3.3.3 Comparative Efficacy Data

Research on liposomal resveratrol formulations consistently demonstrates superiority over standard powder:

- **Cmax (Peak Plasma Concentration):** Liposomal formulations have shown increases in Cmax by **3-5 fold** compared to non-encapsulated controls.<sup>11</sup>
- **AUC (Total Exposure):** The Area Under the Curve, representing total drug exposure over time, is typically enhanced by **5-10 fold**.
- **Therapeutic Outcomes:** In animal models of diabetic cardiomyopathy and cancer, liposomal resveratrol demonstrated significantly higher efficacy in reducing apoptosis and tumor growth compared to equivalent doses of free resveratrol, attributed to higher tissue accumulation.<sup>9</sup>

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## 4. Detailed Specification Analysis & Justification

The Technical Data Sheet (TDS) specifications are not arbitrary; they are critical quality attributes (CQAs) derived from the COA<sup>1</sup> and industry standards. This section provides the technical rationale for each parameter.

### 4.1 Assay: 60.0% - 65.0% (HPLC)

Specification: The product contains a minimum of 60% trans-resveratrol by weight.

Rationale:

- **High Potency:** Many competitor liposomal powders use large amounts of carriers (maltodextrin, silica) to dry the liquid liposomes, resulting in a low assay (typically 10-20%). This forces consumers to take multiple large capsules to achieve a therapeutic dose (e.g., 2.5g of powder for a 250mg dose).
- **Formulation Efficiency:** LiposoMore™'s 60% assay is a technological breakthrough. It allows a standard **Size 0 capsule** (holding ~500mg of powder) to deliver **300mg of active liposomal resveratrol**. This "One-Pill Solution" is a massive commercial advantage over low-potency competitors.<sup>20</sup>
- **Methodology:** High-Performance Liquid Chromatography (HPLC) is used to specifically quantify *trans*-resveratrol, ensuring that *cis*-resveratrol or other impurities are not counted towards the active content.<sup>22</sup>

## 4.2 Appearance: White Granules and Powder

Specification: Free-flowing white to off-white granules.

Rationale:

- **Flowability:** Standard resveratrol is a fluffy, micronized powder that bridges and clogs capsule filling machines. The granular structure of LiposoMore™ ensures excellent flow properties, leading to consistent capsule weights and reduced manufacturing downtime.
- **Dust Control:** Granulation reduces airborne dust, protecting manufacturing workers from inhalation exposure and reducing cross-contamination risks.<sup>1</sup>

## 4.3 Loss on Drying: < 5.0%

Specification: Moisture content is strictly controlled below 5%.

Rationale:

- **Lipid Stability:** Phospholipids are susceptible to hydrolysis in the presence of water, breaking down into lysophospholipids and free fatty acids. This degradation compromises the liposome structure and can lead to rancidity. Maintaining low moisture is critical for the 24-month shelf life.<sup>1</sup>
- **Microbial Safety:** Low water activity ( $a_w$ ) prevents the growth of bacteria and mold without the need for harsh preservatives.

## 4.4 Heavy Metals: Total < 10 ppm

Specification: Pb < 3ppm, As < 1ppm, Cd < 1ppm, Hg < 0.1ppm.

Rationale:

- **Regulatory Compliance:** These limits ensure compliance with the **US FDA** (ANSI 173 for botanicals) and **EU Commission Regulation (EC) No 1881/2006**.
- **Proposition 65:** While California's Prop 65 sets extremely low "No Significant Risk Levels" (NSRL), a Lead (Pb) limit of <3ppm is generally accepted for dietary supplements when accompanied by proper serving size calculations or warning labels if the daily dose exceeds 0.5 mcg Pb. *Note: Strict batch selection or specific Prop 65 warnings may be required depending on the final daily dose.*<sup>6</sup>
- **Source Control:** *Polygonum cuspidatum* roots are hyperaccumulators of heavy metals from the soil. The rigorous testing and "<10ppm" specification indicate a high-quality extraction process that effectively remediates these contaminants.<sup>25</sup>

## 4.5 Microbiology

Specification: Salmonella/E. Coli Negative.

Rationale:

- **Safety:** Phospholipids are nutrient-rich substrates that can support bacterial growth if not handled aseptically. The strict "Negative" specification ensures the product is safe

for consumption, particularly for immunocompromised populations often targeting longevity supplements.<sup>1</sup>

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## 5. Manufacturing Excellence & Company Profile

### 5.1 Joyful Nutritional Supply Co., Ltd.

**Joyful Nutritional Supply Co., Ltd.** acts as the primary manufacturer and global supplier for the LiposoMore™ brand. Located in the innovation hub of Shenzhen, China, the company specializes in advanced bioactive delivery systems.

- **Headquarters:** No.2045 Songbai Road, Baoan District, Shenzhen 518105, China.<sup>1</sup>
- **Core Competency:** Unlike generalist trading companies, Joyful Nutritional Supply focuses on **value-added functional ingredients**. Their expertise lies in bridging the gap between pharmaceutical-grade liposomal technology and the food supplement industry.
- **Capacity:** The COA indicates large-scale batch capabilities (e.g., 300kg batches), suggesting industrial-scale homogenization and spray-drying facilities capable of supporting high-volume global brands.<sup>1</sup>

### 5.2 The Manufacturing Process

The production of LiposoMore™ 60% involves a sophisticated, multi-step process designed to preserve the integrity of both the antioxidant and the lipid carrier.

1. **Preparation of Phase A (Lipid Phase):** High-purity *trans*-resveratrol (>98%) is dissolved in a solvent system (typically ethanol, which is later removed) along with the phospholipid fraction (Sunflower/Soy Lecithin). The ratio is calculated to achieve the target 60% active load.
2. **Hydration & Homogenization:** The lipid phase is hydrated and subjected to **High-Pressure Homogenization (HPH)** or **Microfluidization**. This high-shear process forces the lipids to self-assemble into vesicles (liposomes) encapsulating the resveratrol. This step controls the particle size (typically 100-300nm for optimal absorption).<sup>7</sup>
3. **Encapsulation Stabilization:** Cryoprotectants or structural carriers (minimal amounts) may be added to support the liposome structure during drying.
4. **Solvent Removal & Drying:** The liposomal suspension acts as the feed for a **Spray Dryer** or **Freeze Dryer (Lyophilizer)**. This critical step removes the water and any process solvents to legally compliant levels (Residual Solvents < 5000ppm for Class 3).
5. **Granulation:** The resulting powder is granulated to improve flowability and density, resulting in the final "White Granules" described in the TDS.
6. **Quality Control:** The final batch is quarantined and tested for Assay, Purity, and Safety

before release.<sup>28</sup>

## 5.3 Quality Certifications

To support the "Quality Approval" stated on the COA, the manufacturing facility operates under strict quality management systems:

- **GMP (Good Manufacturing Practice):** Ensures traceability, hygiene, and process consistency.<sup>29</sup>
- **ISO 9001/22000:** Standardizes quality management and food safety protocols.
- **HACCP:** Hazard Analysis and Critical Control Points system to prevent contamination.<sup>21</sup>

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# 6. Regulatory Landscape & Compliance

Navigating the global regulatory environment is critical for the success of LiposoMore™.

## 6.1 United States (FDA)

- **Ingredient Status:** Resveratrol derived from *Polygonum cuspidatum* is generally considered a **New Dietary Ingredient (NDI)** that has been "grandfathered" or has successfully gone through notification, allowing its use in dietary supplements.
- **Claims:** Marketing materials can utilize **Structure/Function Claims** such as:
  - "Supports healthy aging and longevity."
  - "Promotes cardiovascular health."
  - "Supports cellular antioxidant defense."
  - *Mandatory Disclaimer:* "These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease".<sup>29</sup>
- **FSMA Compliance:** The manufacturer (Joyful Nutritional Supply) must comply with the Food Safety Modernization Act, including Foreign Supplier Verification Programs (FSVP) for importers.

## 6.2 European Union (EFSA)

- **Novel Food Status:** *Trans*-resveratrol from *Polygonum cuspidatum* has a history of consumption in the EU and is permitted in food supplements. However, *synthetic* resveratrol or resveratrol from novel sources may be subject to Novel Food authorization. LiposoMore™ utilizes the established *Polygonum* source, mitigating this risk.
- **Claims:** The EU is strict regarding health claims. Generic "antioxidant" claims are often rejected. Brands often formulate LiposoMore™ with Vitamin C or Zinc to legally use the approved EFSA claim: "Contributes to the protection of cells from oxidative stress".<sup>31</sup>

## 6.3 California Proposition 65

- **Requirement:** California law requires warnings for products exposing consumers to chemicals known to cause cancer or reproductive toxicity.
- **Compliance:** The TDS specifies Lead (Pb) < 3ppm. The "Safe Harbor" limit (No Significant Risk Level) for Pb is 0.5 µg/day.
  - *Calculation:* If a daily dose is 500mg of powder, and Pb is at the limit of 3ppm (3 µg/g), the exposure is 1.5 µg/day, which exceeds the 0.5 µg limit.
  - *Strategy:* Brands must either (a) source batches with significantly lower Pb levels (<1ppm), (b) limit the serving size, or (c) place the Prop 65 warning label on the finished product. Note that naturally occurring lead levels in botanicals can sometimes qualify for exemptions, but legal counsel is advised.<sup>6</sup>

## 6.4 Emodin Control

- **Risk:** *Polygonum cuspidatum* contains Emodin, an anthraquinone that can act as a laxative and is restricted in some jurisdictions.
- **Control:** High-quality extraction (98% purity starting material) typically removes Emodin. The TDS includes a specification for Emodin (typically <10ppm) to ensure the product does not cause gastrointestinal distress, a common complaint with low-quality Knotweed extracts.<sup>33</sup>

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# 7. Commercial Strategy & Market Positioning

## 7.1 The "Bioavailability" Market Shift

The global supplement market is evolving from "high dose" to "high absorption." Consumers are increasingly educated about the "expensive urine" effect of taking non-absorbed vitamins.

- **The "Liposomal" Premium:** Following the success of Liposomal Vitamin C, "Liposomal" has become a keyword associated with medical-grade efficacy and premium quality.
- **Longevity Boom:** Driven by research into Sirtuins and NAD+, the anti-aging market is exploding. Resveratrol is a cornerstone of this trend. LiposoMore™ positions itself at the intersection of these two mega-trends: **Longevity + Bioavailability.**<sup>34</sup>

## 7.2 Competitive Advantages of Powder vs. Liquid

While liquid liposomal resveratrol exists, LiposoMore™ Powder offers decisive advantages for brand owners:

1. **Stability:** Liquid liposomes are thermodynamically unstable. They are prone to **oxidation** (browning), **hydrolysis** (leaking), and **microbial growth** (requiring strong preservatives like potassium sorbate). LiposoMore™ powder arrests these processes, offering a stable 2-year shelf life without refrigeration.<sup>33</sup>
2. **Taste Masking:** Resveratrol has a bitter, chalky taste. Liquid liposomes often taste sulfurous due to the lecithin. LiposoMore™ powder encapsulates this flavor, allowing for tasteless capsules or better-tasting drink mixes.<sup>33</sup>
3. **Cost Efficiency:** Shipping water (in liquid liposomes) is expensive. Shipping a 60% concentrated powder drastically reduces logistics costs and carbon footprint.
4. **Formulation Flexibility:** Can be used in **Capsules, Tablets, Stick Packs, and Powder Blends** (e.g., Greens powders, Collagen blends), whereas liquids are limited to bottles or expensive sachets.

## 7.3 Target Formulation Applications

- **Pro-Longevity Capsules:** 250mg LiposoMore™ (providing ~150mg active Resveratrol) + 300mg NMN (Nicotinamide Mononucleotide). This targets the "Sinclair Protocol" demographic.
  - **Heart Health Blends:** LiposoMore™ + CoQ10 + Omega-3. The lipid compatibility makes this an ideal stack.
  - **Nutricosmetics:** "Beauty from Within" capsules. Resveratrol protects collagen from UV damage. The liposomal format ensures it reaches the skin tissues effectively.<sup>36</sup>
  - **Sports Recovery:** Post-workout inflammation reduction.
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# 8. Handling, Safety, and Storage Protocols

## 8.1 Handling Precautions

- **Personal Protective Equipment (PPE):** Operators should wear dust masks (N95/P2), safety goggles, and gloves. Resveratrol is a mild irritant to eyes and the respiratory tract.<sup>23</sup>
- **Dust Explosion Hazard:** As with all fine organic powders, minimize dust generation and avoid ignition sources. Grounding of equipment is recommended during transfer.

## 8.2 Stability & Storage

- **Light Sensitivity:** Resveratrol is highly photosensitive. Exposure to light causes *trans-to-cis* isomerization, reducing efficacy. Storage containers must be opaque

(aluminum foil bags or fiber drums).

- **Hygroscopicity:** Phospholipids attract moisture. The container must be resealed immediately. Desiccant packs in the drum are recommended.
- **Temperature:** Extended exposure to heat (>40°C) can degrade the phospholipid bilayer and oxidize the resveratrol. Cool storage (<25°C) is mandatory.<sup>24</sup>

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## 9. Conclusion

**LiposoMore™ Liposomal Resveratrol** represents the next generation of polyphenol supplementation. By solving the industry's most persistent challenge—bioavailability—it transforms a well-known ingredient into a high-performance therapeutic tool.

For the formulator, the **60% Assay** and **Powder Format** offer unmatched versatility and potency. For the brand owner, the **Clinical Validated Delivery System** provides a powerful marketing narrative backed by science. For the consumer, it delivers the promise of resveratrol—cellular longevity and vitality—effectively and reliably.

With rigorous quality control from Joyful Nutritional Supply Co., Ltd., LiposoMore™ is positioned to become the gold standard in the premium anti-aging market.