LiposoMore

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

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

Technical Data Sheet: LiposoMore® Liposomal Quercetin 50%

Corporate Profile and Brand Vision of LiposoMore®

The nutraceutical industry is currently navigating an era of unprecedented technological transition, moving beyond simple ingredient extraction toward sophisticated bioactive delivery systems. At the center of this transition is the LiposoMore® brand, the premier high-performance ingredient division of Joyful Nutritional Supply Co., Ltd..[1] Headquartered in the Baoan District of Shenzhen, China, Joyful Nutritional Supply has cultivated a global reputation for excellence in the development, manufacturing, and distribution of specialized nutritional components.[2] The company's foundational philosophy is predicated on the belief that premium nutrition is only effective if it can be successfully absorbed and utilized at the cellular level. This commitment to "Advanced Liposomal Ingredients" is the driving force behind the LiposoMore® product line, which leverages cutting-edge microencapsulation technology to solve the long-standing challenges of nutrient bioavailability.[1]

Joyful Nutritional Supply Co., Ltd. operates under a rigorous quality management framework that distinguishes it from traditional raw material suppliers. The company has successfully integrated its manufacturing and logistics systems to ensure total control over the supply chain, from raw material sourcing to the final delivery of finished powders.[2] This integrated approach is supported by a suite of international certifications that validate the company's adherence to the highest safety and quality standards. These include ISO 9001 for quality management, ISO 22000 for food safety management, and FSSC 22000, which is a comprehensive certification scheme for food safety systems.[3] Furthermore, the facility operates in compliance with Good Manufacturing Practices (GMP) and has obtained HACCP certification to ensure that every stage of the production process is monitored for potential biological, chemical, or physical hazards.[2]

The LiposoMore® brand specifically represents the pinnacle of the company's research and development efforts in liposomal technology. By focusing on "Delivering Premium Nutrition Through Science & Innovation," LiposoMore® provides B2B partners with ingredients that are

not only high in purity but are also engineered for maximum biological impact.[1] The brand's specialized focus on liposomal ingredients allows it to address the specific pharmacokinetic limitations of various vitamins, minerals, and botanicals, such as Quercetin. Through a proprietary microencapsulation process, LiposoMore® transforms poorly absorbed substances into highly bioavailable, water-dispersible powders that meet the evolving demands of the global health and wellness market.[6]

The Science and Pharmacology of Quercetin

Quercetin is a polyphenolic flavonoid that is widely distributed throughout the plant kingdom, found in high concentrations in foods such as onions, apples, berries, and tea, as well as in medicinal herbs like *Sophora japonica*.[8] Chemically, it is identified as 2-(3,4-dihydroxyphenyl)-3,5,7-trihydroxy-4H-chromen-4-one, characterized by a molecular formula of $C_{15}H_{10}O_7$ and a molecular weight of 302.24 g/mol.[10] The presence of five hydroxyl groups on the flavone backbone—specifically at the 3, 5, 7, 3', and 4' positions—provides the molecule with its significant antioxidant potential.[9] Quercetin exists in several forms, including anhydrous and various hydrate forms, with Quercetin Dihydrate ($C_{15}H_{10}O_7 \cdot 2H_2O$) being the most stable and commonly utilized form in the dietary supplement industry.[11]

The biological activity of Quercetin is multifaceted, involving the modulation of several key signaling pathways related to oxidative stress, inflammation, and immune function. As an antioxidant, Quercetin acts as a potent scavenger of free radicals, including reactive oxygen species (ROS) and reactive nitrogen species (RNS), thereby protecting cellular structures such as DNA, lipids, and proteins from oxidative damage.[6] This activity is particularly relevant in the context of chronic degenerative diseases, where oxidative stress plays a central role in pathogenesis.[9] Beyond direct scavenging, Quercetin has been shown to induce the activity of endogenous antioxidant enzymes, such as superoxide dismutase (SOD) and catalase, through the activation of the Nrf2 pathway.[12]

In addition to its antioxidant properties, Quercetin is recognized for its potent anti-inflammatory effects. It inhibits the production and release of pro-inflammatory cytokines, such as TNF-α, IL-1β, and IL-6, and modulates the activity of enzymes involved in the inflammatory response, including cyclooxygenase (COX) and lipoxygenase (LOX).[6] One of the most clinically significant aspects of Quercetin's anti-inflammatory profile is its ability to stabilize mast cells.[13] By stabilizing the membranes of these immune cells, Quercetin prevents the release of histamine and other mediators of allergic reactions, making it a valuable tool for supporting respiratory health and managing seasonal discomfort.[15] Furthermore, emerging research highlights Quercetin's role in cardiovascular health, where it supports healthy blood pressure levels, improves endothelial function, and contributes to the maintenance of healthy circulation.[6]

The Bioavailability Paradox of Traditional Quercetin

Despite its significant therapeutic potential, the clinical efficacy of traditional Quercetin is severely hampered by its poor pharmacokinetic profile. This phenomenon is often referred to in pharmacological literature as the "Polyphenol Bioavailability Paradox".[14] Traditional Quercetin powder is characterized by extremely low aqueous solubility, typically measured at less than 1 $\mu g/mL$.[9] This poor solubility prevents the molecule from effectively dissolving in the aqueous environment of the gastrointestinal tract, which is a prerequisite for absorption.[9]

Furthermore, Quercetin is a highly lipophilic molecule with a high degree of hydrogen bonding, which significantly inhibits its ability to passively diffuse across the lipid-enriched epithelial lining of the small intestine.[14] Research suggests that after oral ingestion of standard Quercetin, less than 5%—and in some cases as little as 2%—of the total dose actually reaches the systemic circulation.[6] The portion that is absorbed is subject to rapid and extensive first-pass metabolism in the liver and intestines, where it is converted into glucuronide, sulfate, and methyl conjugates.[9] These metabolic processes quickly reduce the concentration of the active Quercetin aglycone in the blood, leading to a short circulatory half-life and limited tissue distribution.[9]

Consequently, to achieve therapeutic concentrations in the target tissues, consumers would need to ingest very high doses of traditional Quercetin. However, high-dose Quercetin supplementation is often associated with gastrointestinal side effects, including nausea and abdominal discomfort, creating a practical upper limit that further restricts its effectiveness.[6] This fundamental limitation has necessitated the development of advanced delivery systems, such as the liposomal microencapsulation technology employed by LiposoMore®.

LiposoMore® Advanced Liposomal Technology

The LiposoMore® delivery system is designed to fundamentally alter the absorption kinetics of Quercetin. At its core, liposomal technology involves the encapsulation of active ingredients within spherical vesicles known as liposomes.[6] These vesicles are composed of one or more phospholipid bilayers that mimic the structure of human cell membranes.[6] By "wrapping" the Quercetin molecules within these lipid shells, LiposoMore® creates a delivery vehicle that can navigate the physiological barriers of the digestive system with significantly greater efficiency than free molecules.[6]

Mechanism of Action and Cellular Uptake

The superior performance of LiposoMore® M-Q50 is derived from several distinct biological and physical mechanisms. First, the phospholipid bilayer protects the Quercetin from the acidic environment of the stomach and the action of digestive enzymes, ensuring that the active compound reaches the small intestine—the primary site of absorption—in an intact state.[6] Second, the liposomal structure facilitates multiple pathways of cellular uptake. Because

liposomes are made of the same lipids found in cellular membranes (typically phosphatidylcholine), they can fuse directly with the intestinal cell walls, releasing their contents directly into the cytoplasm.[14]

Alternatively, liposomes can be taken up through endocytosis, a process where the cell membrane engulfs the entire vesicle.[14] This allows the Quercetin to bypass the slow and inefficient process of passive diffusion that limits the absorption of standard flavonoids. Furthermore, liposomal delivery systems are often absorbed through the lymphatic system rather than the portal vein.[20] By entering the lymphatic circulation, the encapsulated Quercetin bypasses the liver during its initial transit, significantly reducing the impact of first-pass metabolism and allowing a higher concentration of the active molecule to reach the systemic bloodstream.[20]

Engineering the LiposoMore® Powder

The production of LiposoMore® M-Q50 involves a complex, multi-stage manufacturing process that ensures both high loading capacity and long-term stability. The process begins with the selection of high-purity phospholipids, often derived from non-GMO sunflower lecithin, and pharmaceutical-grade Quercetin Dihydrate.[15] Using advanced techniques such as microfluidization or ultrasonic thin-film dispersion, the lipids and Quercetin are processed to form a stable emulsion of nano-sized liposomes.[22]

The size of the liposomes is a critical quality attribute (CQA), as it directly influences the rate of cellular uptake. Research has shown that absorption significantly increases as particle size decreases, particularly when the vesicles are smaller than 200 nm.[22] The LiposoMore® process is optimized to produce a population of vesicles that balance high encapsulation efficiency (EE%) with an ideal size profile for human absorption.[22]

Once the liquid liposomal suspension is formed, it must be converted into a stable powder format for use in dietary supplements. LiposoMore® utilizes a specialized microencapsulation and drying process—typically spray-drying or freeze-drying—that incorporates protective carriers or cryoprotectants like trehalose to maintain the integrity of the lipid bilayers during dehydration.[26] The resulting LiposoMore® M-Q50 powder is a "dry liposome" system where the vesicles are embedded within a protective matrix, ready to spontaneously rehydrate into active liposomes upon contact with water or gastric fluids.[7]

Technical Specifications and Quality Standards

LiposoMore® M-Q50 is manufactured to the highest standards of the global nutraceutical industry. Every batch is subjected to comprehensive analytical testing to verify its physical, chemical, and microbiological characteristics.[1] The following specifications are derived from the official Certificate of Analysis (CoA) and represent the standardized quality profile of the product.

Physical and Chemical Attributes

Item	Specification	Result (Typical)	Test Method
Appearance	Yellow powder	Pass	USP Visual Inspection
Odor	Odorless	Pass	USP Organoleptic Test
Solubility	Dispersible in water	Pass	USP Solubility Test
Assay (Quercetin dihydrate)	> 50%	52.3%	USP HPLC
Loss on Drying	< 10%	4.8%	USP
Particle Size Distribution	> 90% pass 80 mesh	Pass	USP Sieve Analysis
Bulk Density	Report as it is	0.38 g/ml	USP

The assay value of 52.3% confirms that LiposoMore® M-Q50 provides a high concentration of active Quercetin per unit of weight, allowing for smaller capsule sizes or more potent formula blends.[1] The Loss on Drying (LOD) result of 4.8% indicates a very low moisture content, which is essential for preventing the degradation of the phospholipid matrix and inhibiting microbial growth during storage.[1] The bulk density and particle size distribution (PSD) are optimized for industrial handling, ensuring excellent flowability and consistency in high-speed encapsulation and tableting equipment.[1]

Heavy Metal Purity Profile

Heavy metal contamination is a significant concern for botanical ingredients due to the

potential for bioaccumulation in the source plants. LiposoMore® employs Inductively Coupled Plasma Mass Spectrometry (ICP-MS) to ensure that every batch meets the most stringent international safety limits.[1]

Contaminant	Specification	Result (Typical)	Method
Total Heavy Metal	< 10 ppm	< 10 ppm	USP ICP-MS
Lead (Pb)	< 2.0 ppm	< 2.0 ppm	USP ICP-MS
Arsenic (As)	< 2.0 ppm	< 2.0 ppm	USP ICP-MS
Mercury (Hg)	< 0.1 ppm	< 0.1 ppm	USP ICP-MS
Cadmium (Cd)	< 1.0 ppm	< 1.0 ppm	USP ICP-MS

These results demonstrate a high level of chemical purity, consistently falling well below the safety thresholds established by regulatory bodies like the FDA and the European Food Safety Authority (EFSA). The particularly low limit for Mercury (< 0.1 ppm) reflects the brand's commitment to consumer safety in sensitive health applications.[1]

Microbiological Purity and Safety

Microbiological control is paramount for liposomal ingredients, as the phospholipid components can potentially serve as a substrate for microbial growth if not processed and stored correctly. LiposoMore® M-Q50 is produced in a controlled cleanroom environment and undergoes rigorous pathogen testing.[1]

Microbial Test	Specification	Result (Typical)	Method

Total Plate Count	< 1000 cfu/g	< 100 cfu/g	USP
Molds & Yeasts	< 100 cfu/g	< 10 cfu/g	USP
E. Coli	Negative in 10g	Negative	USP
Salmonella	Negative in 25g	Negative	USP
Staphylococcus Aureus	Negative in 10g	Negative	USP

The extremely low microbial load (typically < 100 cfu/g for total plate count) is a testament to the hygiene standards maintained at the Joyful Nutritional Supply manufacturing facility.[1] The absence of key pathogens like *E. coli* and *Salmonella* ensures that the ingredient is safe for use in a wide variety of consumer supplement formats.

Comparative Advantages of LiposoMore® M-Q50

The adoption of LiposoMore® M-Q50 provides dietary supplement brands with a significant competitive edge. By addressing the primary limitations of traditional Quercetin, this ingredient delivers tangible benefits that resonate with educated consumers.

Superior Pharmacokinetics and Bioavailability

Clinical and preclinical research consistently demonstrates that liposomal encapsulation is the most effective method for increasing Quercetin absorption. Studies comparing liposomal Quercetin to standard preparations have shown a 7-fold to 12-fold increase in oral bioavailability.[18] This means that a 250 mg dose of LiposoMore® M-Q50 can provide the same systemic impact as a much larger dose of conventional Quercetin, without the associated gastric burden.[6]

Furthermore, the liposomal delivery system achieves a higher C_{max} (peak concentration) and a significantly larger AUC_{0-24} (total exposure over 24 hours).[18] This pharmacokinetic profile ensures that target tissues receive a sustained and therapeutic supply of Quercetin throughout

the day, maximizing its antioxidant and anti-inflammatory benefits.[6]

Enhanced Stability and Ingredient Protection

Quercetin is sensitive to oxidation and degradation when exposed to light, heat, and varying pH levels.[33] The LiposoMore® encapsulation process effectively isolates the Quercetin molecules from these environmental stressors. The lipid bilayer acts as a physical shield, ensuring that the potency of the ingredient remains stable throughout its 24-month shelf life.[6] This is a critical advantage for brands developing multi-ingredient formulas where interactions between components can often lead to degradation.

Versatile Application and Clean Label Profile

Unlike many traditional bioavailability enhancers that rely on synthetic surfactants or complex chemical modifications, LiposoMore® utilizes natural, food-grade phospholipids.[7] This allows brands to maintain a "Clean Label" profile while offering advanced technological benefits. Additionally, the water-dispersible nature of the LiposoMore® M-Q50 powder makes it suitable for a wide range of dosage forms beyond traditional capsules, including sachets, effervescent powders, and functional food applications.[7]

Regulatory and Compliance Declarations

LiposoMore® M-Q50 is engineered for global compliance, meeting the stringent requirements of the dietary supplement and food ingredient markets in the United States, Europe, and Asia.

Compliance Statements

To assist our partners in their regulatory filings and labeling, LiposoMore® provides the following standard compliance declarations:

- **Non-GMO Statement:** The product is manufactured without the use of genetically modified organisms. The phospholipids used in the encapsulation process are derived from non-GMO sunflower lecithin.[15]
- **Gluten-Free Statement:** LiposoMore® M-Q50 does not contain wheat, rye, barley, or other gluten-containing grains. The production process is strictly controlled to prevent cross-contamination, ensuring that any unavoidable presence of gluten is well below the 20 ppm threshold established by the FDA.[34]
- **BSE/TSE Free Statement:** The product is manufactured entirely from plant-derived materials and does not contain any substances of animal origin. It is completely free from Transmissible Spongiform Encephalopathy (TSE) and Bovine Spongiform Encephalopathy (BSE).[34]
- **Vegan and Allergen Statement:** The ingredient is 100% plant-based and suitable for vegan and vegetarian diets.[15] It is manufactured to be free from the major food allergens identified by the Food Allergen Labeling and Consumer Protection Act (FALCPA), including soy, dairy, eggs, fish, shellfish, and tree nuts.[34]

- **Solvent and Irradiation Statement:** No irradiation is used at any stage of the manufacturing process. The product is processed using food-grade methods and is free from harmful residual solvents.[34]

Storage, Packaging, and Handling Guidelines

Maintaining the integrity of the liposomal structure is critical for ensuring the bioavailability and efficacy of LiposoMore® M-Q50. Proper storage and handling are essential for preventing the physical degradation of the vesicles.

Storage Conditions

- **Humidity and Moisture:** Liposomal powders are hygroscopic and sensitive to moisture. Exposure to high humidity can lead to caking and increase the rate of lipid oxidation.[29] The product must be kept in its original, hermetically sealed container until use.[1]
- **Light Exposure:** Protect the product from direct sunlight and ultraviolet (UV) light, which can catalyze the degradation of both the Quercetin and the lipids.[26]
- **Shelf Life:** When stored under the recommended conditions in its original unopened packaging, LiposoMore® M-Q50 has a shelf life of 24 months from the date of manufacture.[1]

Packaging and Logistics

LiposoMore® M-Q50 is supplied in industrial-grade packaging designed for safe international transport and long-term storage:

- **Standard Unit:** 200kg per batch order [1]; standard unit size for distribution is typically a 25kg Fiber Drum.[46]
- **Packaging Construction:** The cylindrical body is made from high-grade kraftliner paper with steel or plastic rims and lids.[46] The drums are UN-certified for the transport of solids, ensuring they meet rigorous safety standards for drop and stack resistance.[47]
- **Protection Layer:** The product is enclosed within double-layered, food-grade polyethylene (PE) liners or moisture-barrier aluminum foil bags to provide an extra layer of protection against humidity and oxygen.[48]

Technical Summary and Strategic Application

The development of LiposoMore® M-Q50 (50% Liposomal Quercetin Dihydrate) represents a significant technological leap in flavonoid supplementation. By addressing the fundamental physiological barriers to Quercetin absorption—poor solubility, low permeability, and rapid metabolism—LiposoMore® enables the full therapeutic potential of this powerful plant compound to be realized.[6]

For product developers and brand owners, LiposoMore® M-Q50 offers a "ready-to-use" solution that combines high assay concentration with proven bioavailability enhancement. Its

robust technical profile, supported by exhaustive analytical data and global quality certifications, provides the transparency and trust required to succeed in the premium nutraceutical market.[1]

Whether used as a standalone ingredient for immune and antioxidant support or as a key component in a multi-functional wellness formula, LiposoMore® M-Q50 delivers the biological impact and consumer satisfaction that define the future of high-performance nutrition.[15] Through our commitment to advanced delivery science, LiposoMore® remains your strategic partner in delivering nutrition that truly works at the cellular level.