QUEST

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Liposomal
Zinc 30mg

Increased bioavailability and absorption

Nutritional Information

One capsule provides:

		*%NRV
Liposomal Zinc Providing	375mg	
Zinc	30mg	300

*Nutrient Reference Values

Take one capsule daily with food. Swallow with water.

SUMMARY

- Advanced delivery of oral zinc.
- High bioavailability and absorption of zinc.
- Increased cellular delivery of zinc.
- Highly stable zinc and protected from degradation.
- Liposomal zinc is well tolerated.
- Supported by studies and advanced manufacturing processes

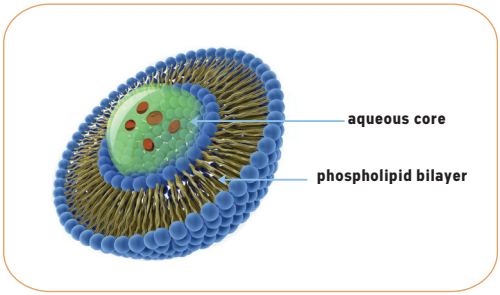
LIPOSOMES & LIPOSOMAL DELIVERY

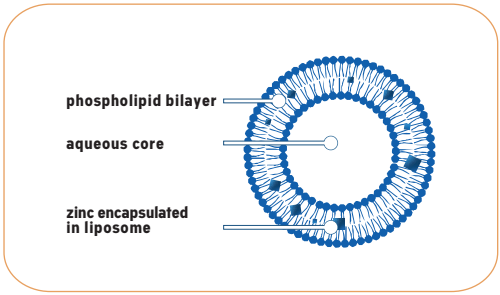
Liposomes are nanoscale phospholipid vesicles designed to enhance intestinal absorption, intracellular delivery and systemic bioavailability of encapsulated nutrients, such as zinc. Liposomes are microscopic-sized spherical envelopes or pockets containing an aqueous core. The phospholipids are arranged into a spherical cell membrane like lipid bilayer.

Liposomal technology enables the encapsulation of zinc within phospholipid vesicles, improving its stability and delivery efficiency. The liposomal zinc is created through a careful manufacturing process resulting in an innovative delivery form with significant advantages for the consumer.

Zinc is encapsulated within the aqueous core, protected by a phospholipid bilayer that enhances stability from digestive degradation.

Illustrations of liposomal Zinc structure





ADVANTAGES OF LIPOSOMAL DELIVERY OF ZINC

The functional advantages of liposomal delivery arise from the bilayer's ability to protect, transport and facilitate cellular uptake of bioactive compounds. Liposomal encapsulation provides a barrier around the active zinc, increasing resistance to digestive enzymes, acidity, intestinal flora, and oxidation.[1]

When encapsulated within a liposomal carrier, zinc benefits from improved gastrointestinal stability and more efficient cellular uptake. The phospholipid bilayer protects the zinc during digestion while facilitating transport across biological membranes, resulting in superior bioavailability compared with conventional formulations. In addition, interactions between the liposome's phospholipid bilayer membrane and the body's cell membranes offers enhanced cellular uptake through endosomal mechanisms.

As a result, the advantages of liposomal zinc include:

- High bioavailability and absorption of zinc compared with conventional oral forms of zinc.
- Protection of zinc against the acid environment of the stomach, oxidation, and degradation.
- Protection of the digestive tract from potential irritation by zinc.
- Increased intracellular delivery of zinc.
- High stability of zinc.
- Cost effective by being able to take a lower dose of zinc for the same effect.

LIPOSOMAL MANUFACTURING PROCESS

The Liposomal nutrients used by Quest are supplied by Liposovit® and manufactured using a carefully controlled manufacturing process and the liposome structures are additionally verified using cryogenic transmission and scanning electron microscopy. Particle size plays a vital role in nanoparticle adhesion to and interaction with biological cells in the body.[2,3] At Quest we use Liposomal nutrients within a particle size of 200-400 nanometres (nm), ensuring they are a highly effective delivery system. The size of the liposomes and their particle size distribution are determined using a LUMiSizer® 651 particle size analyzer.

Image of Liposovit® liposome structures using cryogenic transmission electron microscopy.

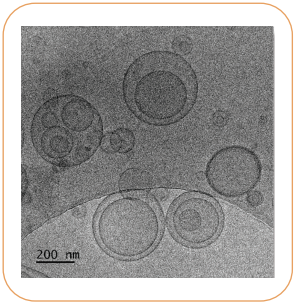


Image of Liposovit® liposome structures using x1000 magnification under scanning electron microscope.

STUDIES OF LIPOSOMAL DELIVERY OF ZINC

A number of studies have evaluated liposomal delivery systems as a means to influence the absorption profile and systemic exposure of minerals, including zinc.

In a randomized crossover human study assessing liposomal mineral delivery, it was found that liposomal encapsulation altered the post-ingestion appearance of minerals in circulation compared with non-liposomal forms. The authors concluded that liposomal delivery represents a promising strategy for improving mineral absorption efficiency.[4]

Similarly, pharmacokinetic analyses of liposomal versus conventional multivitamin/mineral supplementation demonstrated differences in nutrient appearance curves following liposomal administration. It was observed that liposomal encapsulation modified systemic exposure profiles for several micronutrients, supporting the concept that phospholipid vesicles can influence oral nutrient delivery.[5]

Formulation research provides additional mechanistic support finding that liposomal zinc preparations demonstrated improved physicochemical stability, protection under simulated gastrointestinal conditions, and enhanced cellular uptake in vitro compared with non-encapsulate-d zinc.[6]

Taken together, the available evidence indicates that liposomal encapsulation can modify zinc pharmacokinetics and improve stability and cellular interaction.

BENEFITS OF ZINC SUPPLEMENTATION

Zinc is an essential trace mineral involved in more than 300 enzymatic reactions throughout the human body. It is required for normal immune function, protein synthesis, wound healing, DNA synthesis, cell division, and gene expression. Zinc contributes to normal testosterone levels in blood, and to normal fertility and reproduction. As zinc is not significantly stored in the body, adequate daily intake through diet or supplementation is essential for maintaining optimal zinc status.

Immune Function.
Zinc is critical for the normal development, maturation and function of immune cells, including neutrophils, natural killer (NK) cells, and T and B lymphocytes. Zinc deficiency results in impaired cell-mediated immunity, reduced antibody production, and increased susceptibility to bacterial, viral and fungal infections. Zinc is required for the production and maturation of T-lymphocytes in the thymus, and exerts direct antiviral properties against a number of pathogens including respiratory viruses.[7] Studies have demonstrated that adequate zinc status is associated with reduced duration and severity of common respiratory infections and contributes to maintaining overall immune defence.[8]

Antioxidant Protection

Zinc contributes to the protection of cells from oxidative stress through several key mechanisms. It is a structural component of copper-zinc superoxide dismutase (Cu/Zn-SOD), one of the body's primary enzymatic antioxidants responsible for neutralising superoxide free radicals. Zinc also stabilises cell membrane integrity by protecting sulphydryl groups from oxidation, and inhibits the pro-oxidant activity of transition metals such as iron and copper. Adequate zinc status is therefore essential for preventing oxidative damage to DNA, proteins, and lipids throughout the body.[9]

Skin, Hair and Nails

Zinc plays a central role in the maintenance of healthy skin, hair and nails. It is required for normal keratinisation and regulation of sebaceous gland activity, and acts as a cofactor in collagen and elastin synthesis. Zinc deficiency is associated with impaired wound healing, acne vulgaris, alopecia and brittle nails. Clinical studies have demonstrated the efficacy of zinc supplementation in the management of acne and in supporting wound healing, particularly in individuals with suboptimal zinc levels.[10]

Fertility and Reproduction

Zinc is essential for both male and female reproductive health. In males, zinc is required for testosterone biosynthesis, spermatogenesis, and normal sperm motility and morphology. In females, zinc is involved in follicular development, ovulation, and the maintenance of normal pregnancy. Zinc deficiency has been associated with impaired fertility, reduced libido, and hormonal imbalances in both sexes. Adequate zinc intake during pregnancy is also critical for normal foetal growth and development.[11]

Growth and Development

Zinc is required for normal growth and physical development, particularly in children, adolescents and during pregnancy. It plays a direct role in cell proliferation, differentiation and gene expression through its function as a structural component of numerous transcription factors and growth-related proteins. Zinc deficiency in children can result in growth retardation, delayed sexual maturation and impaired cognitive development.

HEALTH NEEDS

IMMUNITY

SKIN, HAIR & NAILS

PREGNANCY & FERTILITY

DETOX & CELL PROTECTION

SPECIALIST HEALTH

SCIENTIFIC REFERENCES

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