VitaChelate – Chelated Forms of Minerals

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VitaChelate

Introducing VitaChelates, our next-generation of bioavailable minerals!

Many of the best multivitamin and mineral supplements use high-quality chelated minerals because as a way to ensure better stability and bioavailability. They offer formulators unrivalled advantages for human health, animal nutrition, and agricultural efficiency, and have many well-documented advantages over non-chelated minerals.

What Are Chelated Minerals?

Chelated minerals are minerals that have been chemically combined with an organic molecule – usually amino acids. Thanks to this unique chemical bond, their biochemistry is optimised contributing to superior bioavailability and absorption properties.

Because our bodies absorbs amino acids quite effectively, the combination of a mineral bonded to an amino acid makes the mineral easier to absorb by the body, giving chelated minerals higher bioavailability than non-chelated minerals.

The advantages of chelated minerals over non-chelated minerals are well-documented; chelated minerals can mitigate side effects

The advantages of chelated minerals over non-chelated minerals are well-documented. Chelated minerals can mitigate side effects from mineral intake, reducing the likelihood of gastrointestinal discomforts and other issues associated with mineral intake.

Their distinctive structure also allows for targeted delivery to specific tissues or organs by attaching them to carrier molecules, which can optimise their health and therapeutic effects.

Where Are Chelated Minerals Used?

The versatility of chelated minerals have proved key in its use in a range of applications, particularly in nutritional supplements, pharmaceuticals, and fortified food and beverage products.

They form the backbone of multivitamin-mineral supplements, targeted mineral complexes, and specialised formulations that target certain health concerns or nutritional deficiencies.

Chelated minerals are also of great value in pharmaceutical applications and in foods and supplements for specific medical uses – including mineral supplements, medications, and therapeutic formulations that tackle mineral deficiencies, metabolic disorders, among other health disorders.

Furthermore, the food and beverage sector use chelated minerals to fortify products and increase their nutritional value. These minerals are incorporated into foods like bread and cereal as well as functional beverages to boost mineral absorption and bioavailability.

However, the efficacy of chelated minerals hinge on product quality and integrity, emphasising the importance of selecting reputable providers who adhere to strict standards for purity, potency, and safety.

Chelated Chemistry: The Difference is Clear

Chelated minerals are mineral molecules chemically bonded to organic compounds through a process known as chelation. This process involves the formation of a ring-like structure around the metal ion, which enhances its stability and solubility.

Common chelating agents include amino acids, peptides, organic acids, and other biomolecules containing functional groups capable of coordinating with metal ions.

Amino acids like glycine, histidine, and cysteine are frequently used as chelating agents due to their capacity to form stable complexes with a broad spectrum of mineral ions.

The rich body of scientific evidence consistently supports the superior bioavailability, absorption, tissue uptake, and clinical efficacy of chelated minerals in comparison to traditional mineral salts.

One study (1) reported that chelated minerals exhibit better tissue uptake and retention compared to inorganic mineral salts. The study replaced inorganic trace minerals with an advanced chelate technology-based supplement on growth performance, mineral digestibility, tibia bone quality, and antioxidant status on broiler chickens.

These results indicated that chelated trace mineral supplementation to 25% and 50% of the commercially recommended levels could support growth performance, bone mineralisation, and antioxidant status.

However, totally replacing inorganic trace minerals by equivalent levels of chelated trace mineral could also improve performance index and glutathione peroxidase activity of broiler chickens.

Clinical studies have also demonstrated the effectiveness of chelated minerals in addressing nutritional deficiencies via food fortification.

A 2022 review (2) paper considers iron deficiency, fortification and the use of chelates in food fortification, as well as different types of mineral-chelate complexes.

Here three innovative methods: encapsulation, nanoparticulation, and chelation were explored, which aim to overcome problems associated with conventional fortification, especially those affecting organoleptic properties and bioavailability.

The review concluded that chelation protected minerals from inhibitors increasing bioavailability by 2–3 times and that the process overcame encapsulation's instability and unproven safety of nanoparticles. In comparing the three methods, the optimum appeared to be mineral chelates.

The Principles of Chelation

Chelated mineral biochemistry involves creating a series of complexes between mineral ions and organic molecules that improves their absorption, transport, and use within biological systems.

The chelation process begins when a mineral ion binds to multiple sites on an organic molecule or ligand, to create a coordinated complex.

The binding sites on the ligand usually consist of electron-donating groups, like nitrogen, oxygen, or sulphur atoms, which react with the positively charged mineral ion.

This chemical reaction results in the creation of a ring-like formation known as a chelate. This form ensures stability to the mineral complex, whilst safeguarding the mineral ion from chemical reactions or interactions that may hamper its absorption or utilisation.

Once created, chelated minerals can travel through biological membranes, using a number of transport mechanisms or passive diffusion. The organic ligand can aid the passage of the mineral complex through cell membranes, improving its absorption in the

blood.

Once absorbed chelated minerals can then be transported in the bloodstream, bound to carrier proteins or incorporated into enzymes, proteins, or structural components of tissues and organs.

The mineral ions released from chelates can themselves become part of important enzymatic reactions, signalling pathways, and other biological practices.

The Benefits of Chelated Minerals

Essentially, the enhanced bioavailability of chelated minerals means the body receives a greater quantity of essential nutrients, contributing to superior health outcomes, whether mental or physical, as well as better overall well-being.

Investigations looking into the bioavailability of chelated minerals consistently demonstrate their superiority over traditional mineral salts.

These investigations employ various methodologies, including stable isotope tracers and pharmacokinetic studies, to assess absorption, tissue uptake, and clinical efficacy.

This body of research once again emphasises the significance of chelated minerals in boosting nutrient delivery and optimising health outcomes.

One study (3) concluded that magnesium chelate supplementation in hypertensive women was associated with better BP control, improved endothelial function and amelioration of subclinical atherosclerosis.

The research team attributed the findings to chelated magnesium as "[being] more likely to survive the passage from the stomach to the small intestines intact. Therefore, the chelated magnesium bioavailability seems to be higher than other preparations."

As the study illustrates, the enhanced bioavailability of chelated magnesium forms exhibit superior therapeutic effects in addressing various health conditions.

Chelated forms of this micronutrient include magnesium orotate, magnesium malate, magnesium aspartate, magnesium taurate, magnesium L-Threonate, and magnesium glycinate.

These forms have been touted as a solution to the escalating global issue of micronutrient deficiency, of which magnesium is one of the most common.

According to the World Health Organization (WHO), magnesium deficiency is a major global health problem, particularly in regions where dietary intakes are inadequate.

Recent research suggests most aren't consuming the recommended amount of magnesium to support the body's needs (4). It's also estimated that in developed countries, between 10-30% of the population has a slight magnesium deficiency (5).

The importance of magnesium in maintaining health and well-being, is well-documented, particularly its role in energy metabolism, muscle function, nerve transmission, and bone health.

The use of chelated magnesium in supplements can play a major role in addressing magnesium deficiency. For example, the bioavailable superiority of magnesium glycinate means it can offer benefits like relaxation, immune boost, and anti-inflammatory effects.

The chelated mineral is especially useful for those with stress, depression, or insomnia, and remains a preferred choice for those sensitive to other magnesium forms.

Magnesium L-Threonate is another form noted for its highly absorbable nature. Research has pointed to its role in boosting brain magnesium levels, offering potential cognitive benefits in addressing depression, Alzheimer's, and age-associated memory issues (6).

The Business Case for Chelation

The use of chelated minerals offers product developers a competitive advantage when formulating a product that meets the needs and demands of the health-conscious consumer.

As well as an enhanced bioavailability, chelated minerals offer greater flexibility during formulation, where it can be incorporated into a range of delivery formats, such as liquids, powders, functional foods, capsules and tablets.

This flexibility allows product developers to be innovative in their formulations catering to exacting consumer preferences, dietary requirements, and lifestyle choices.

The flexibility in formulation is in no small part to chelated minerals' scientific robustness, in which extensive research and clinical validation have demonstrated their efficacy and safety. Manufacturers can bolster the credibility of their products by selecting chelated minerals from reputable suppliers known for their rigorous scientific research to quality assurance, thereby earning confidence from consumers and healthcare professionals alike.

Finally, chelated minerals also offer differentiation, which in today's globalised marketplace, is a proven key to success.

Creating a product with chelated minerals as a key ingredient can also set it apart from competitors, giving a superior nutrient delivery method that meets increasing consumer demand for scientifically proven ingredients.

By building on these advantages, companies can use them to further distinguish their brand, build audience loyalty, and foster

growth within an ever competitive industry environment.

VitalChelates: The Right Chemistry

Vita Actives' science-backed approach ensures that each ingredient is optimised for quality, effectiveness and integration.

As one of Europe's largest inventories, we offer a network of over 500 global partners and 20+ proprietary ingredient brands like Advifolate, BioK2, CurQreal, and Zymate.

VitalChelate is our flagship range and answers the growing demand for high-quality, highly absorbable mineral supplements.

The range of chelated minerals include magnesium L-threonate, zinc bisglycinate, and dicalcium malate buffered powders that offer targeted solutions for heart health, cognitive function, stress relief, and sleep improvement.

This range is not just a product line; it's a testament to our commitment to enhancing health and well-being through advanced mineral supplementation.

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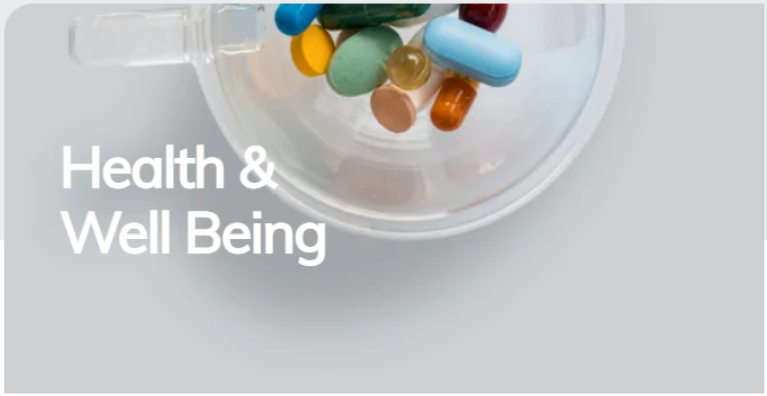



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