LITHOLIFE®

Marine Algae Calcium for Capsules, Softgels and Tablets

Ingredient identity, format selection, formulation, evidence and market positioning

A USDA Organic-certified Lithothamnion calcareum multimineral matrix for differentiated calcium supplements across solid and lipid-based dosage forms.

Technical knowledge article for the supplement industry
August 2026

Executive overview

Calcium supplements are often differentiated only by elemental dose or tablet count. Litholife creates a broader value proposition: 100% Lithothamnion calcareum providing 30–36% elemental calcium, 2–4% magnesium and naturally occurring trace constituents in a marine algae-derived matrix. The ingredient is neutral in odor and taste, available in several particle sizes, tested lot by lot and certified USDA Organic, Kosher and Vegan according to current Litholife documentation.

In different markets, this category is known by several consumer-facing names: Algae Calcium, Seaweed Calcium, Red Marine Calcium, Marine Calcium, Red Algae Calcium, Algal Calcium and Calcium from Lithothamnion. These terms communicate origin, but they are not automatically interchangeable legal ingredient names. The scientific identity, lawful common/usual name and Supplement Facts declaration must be confirmed in each jurisdiction; Litholife is the brand and should not replace the required ingredient declaration.

Format matters. Hard capsules offer flexibility and simple manufacturing but are volume-limited for a high-dose mineral. Softgels offer premium appearance and easy swallowing, yet Litholife is not oil-soluble and must be engineered as a stable suspension. Tablets can deliver more mineral per unit but require development of flow, compactability, hardness, friability, disintegration and dissolution. No particle grade should be declared universally “best” before equipment trials.

Format	Primary advantage	Primary challenge	Litholife starting point
Hard capsule	Simple, flexible, vegetarian-shell options, rapid product development.	High calcium doses may require multiple capsules; powder flow and fill variation.	325 or 400 mesh; qualify bulk/tapped density, flow and content uniformity.
Softgel / gel capsule	Premium presentation, easy swallowing, combination with oil-soluble nutrients.	Insoluble mineral suspension can settle, abrade equipment or interact with shell/fill system.	Fine 325/400 mesh development grade; validate suspension rheology and encapsulation.
Tablet	Higher payload, low unit cost at scale, scoring/coating options.	Compression behavior, large tablet size, friability and dissolution.	100 mesh granulated option for compression screening; 325/400 mesh with granulation/binders as needed.
Powder / sachet	Highest dose flexibility and easy combination with other actives.	Taste, dispersion, scoop accuracy and consumer convenience.	325–550 mesh depending on mouthfeel and flow.

U.S. COMMERCIAL QUICK REFERENCE

Dietary Supplements | Prepared for Unichem's U.S. market development team

This section consolidates the six information categories requested by Unichem. It should be read together with the full technical article, current specification, lot Certificate of Analysis and current certificates.

Unichem request	Litholife response
1. Key technical differentiators and benefits	100% Lithothamnion calcareum with 30–36% calcium and 2–4% magnesium; USDA Organic-certified ingredient; algae-derived alternative to conventional quarried minerals; neutral sensory profile; multiple grades for capsules, softgels, tablets and powders; lot-level quality controls.
2. Clinical, scientific or application data	A double-blind crossover pilot in 12 women using a different commercial Lithothamnion ingredient showed favorable acute calcium-metabolism markers versus placebo and an intermediate carbonate response. This is promising category evidence, not direct Litholife proof of clinical outcomes or superior absorption. In-vitro research confirms pH-dependent mineral release; dosage-form disintegration and dissolution remain critical.
3. Competitive positioning	Litholife contains less elemental calcium per gram than purified calcium carbonate but provides algae provenance, naturally associated magnesium, trace constituents and an organic ingredient platform. It generally offers greater calcium density than citrate, while citrate may have different solubility/tolerability characteristics. Cost-in-use and pill burden must be compared using elemental calcium, not raw-material weight.
4. U.S. regulatory status	Do not state "FDA approved." Confirm the lawful U.S. dietary ingredient status and nomenclature, cGMP supplier qualification, Supplement Facts declaration, heavy-metal specifications and intended claims. Structure/function claims require substantiation and applicable FDA notification/disclaimer; disease claims are prohibited for dietary supplements. Finished-product USDA Organic claims require separate certification approval.
5. Applications and suggested use	Dose from the actual lot CoA. At 35% calcium, 1,000 mg Litholife provides about 350 mg elemental calcium; 500 mg calcium would theoretically require about 1,429 mg Litholife before excipients. Starting grades: 325/400 mesh for hard capsules and softgel suspensions; 100 mesh for direct-compression screening; 325–550 mesh for powders. Validate flow, fill weight, suspension, compactability, disintegration, dissolution, uniformity and stability.
6. Supported marketing claims	Recommended: "algae-derived calcium," "red marine calcium from Lithothamnion," "contains naturally occurring magnesium," and "USDA Organic-certified ingredient." Substantiate superior absorption, rapid disintegration, easy swallowing, clean-label, sustainability and dosage-form performance. Avoid osteoporosis prevention/treatment, fracture healing, artery-deposition, side-effect elimination or fixed absorption-percentage claims.

Claim-use discipline

Claims should match the evidence level of the exact ingredient and finished product. Category-level Lithothamnion research supports technical plausibility but is not automatically Litholife-specific clinical proof. Disease-treatment claims are outside the recommended territory.

Documents to accompany customer discussions

Current technical specification for the proposed grade

Representative and shipment-specific Certificate of Analysis

Current USDA Organic, Kosher, Vegan, Halal and GMP documentation, as applicable

Safety, allergen, non-GMO, contaminant and microbiological documentation

Full segment technical article and cited scientific references

1. Ingredient identity and market names

Lithothamnion calcareum is a calcified coralline red alga. Calcium and magnesium carbonates become incorporated into its structure as it grows, creating a naturally assembled mineral matrix. Litholife specifications describe approximately 85% calcium carbonate, 11.5% magnesium carbonate and 3.5% other constituents, with working guarantees of 30–36% calcium and 2–4% magnesium.

Name used in commerce	What it communicates	Recommended discipline
Algae Calcium / Algal Calcium	Broad algae origin; concise and internationally understandable.	Pair with species identity and calcium assay in technical documents.
Red Marine Calcium	Red coralline algae and marine provenance; strong premium language.	Use as marketing descriptor, not automatically as the legal ingredient name.
Marine Calcium	Marine sourcing, but can also describe shell, coral or fish-bone sources.	Qualify as “from Lithothamnion calcareum” to avoid ambiguity.
Seaweed Calcium	Consumer-friendly term common in some markets.	“Seaweed” is broad; include scientific identity.
Red Algae Calcium	Accurately links the ingredient to red algae.	Avoid implying the final powder remains red; calcified material is beige.
Calcium from Lithothamnion	Most precise origin-focused descriptor.	Confirm spelling, taxonomy and local labeling acceptance.
Litholife®	Supplier brand and quality platform.	Brand may appear in marketing but not instead of mandatory ingredient nomenclature.

2. Nutritional and commercial differentiation

Differentiator	Litholife value	Evidence boundary
Multimineral matrix	Concentrated calcium with naturally associated magnesium and trace constituents.	Only assayed/guaranteed nutrients should support quantitative claims.
Algae-derived origin	Differentiates from conventional quarried single-mineral calcium sources.	“Algae-derived” is more precise than calling the calcified material a living plant.
USDA Organic	Third-party-certified ingredient platform for organic-positioned supplements.	Finished supplement eligibility and seal use require independent certification review.
Neutral sensory profile	Supports capsules and coated tablets with limited taste contribution.	Finished-product sensory and swallowability testing remain necessary.
Certifications	USDA Organic, Kosher and Vegan documented; GMP and Halal described in corporate materials.	Verify current scope, validity and logo authorization before use.
Quality controls	Defined composition, contaminant and microbiological specifications, 48-month shelf life.	Buyer and market requirements may demand additional tests/methods.

3. Evidence on calcium utilization

A double-blind crossover pilot trial in 12 premenopausal women compared a single dose of a different commercial Lithothamnion-derived calcium ingredient with conventional calcium carbonate and placebo. The algae-derived product produced greater urinary calcium clearance versus placebo and a more prolonged suppression of parathyroid hormone after a meal; calcium carbonate showed an intermediate response. The authors concluded that the Lithothamnion ingredient may exert greater influence on these calcium-metabolism markers.

This is promising category-level evidence, not direct proof for Litholife, chronic use, clinical outcomes or every dosage form. It measured acute metabolism markers rather than fracture prevention or long-term bone density. Product form, meal timing, dose, vitamin D status, disintegration and dissolution can affect exposure. A universal percentage such as “87% bioavailability” should not be used without a validated, product-specific study.

Research reviews on marine-derived calcium support its potential as a supplement source, while in-vitro work confirms that release of calcium and magnesium from Lithothamnion is strongly pH-dependent. Consequently, formulation must ensure dosage-form rupture, disintegration and access to gastric fluid; high tablet hardness or a poorly designed hydrophobic suspension can undermine otherwise attractive ingredient properties.

4. Hard capsules

4.1 Strengths and dose-volume reality

Hard capsules enable rapid line extensions, low-temperature processing, vegetarian shell options and flexible combinations with vitamins D3/K2, collagen or other ingredients. Their limitation is volume. At a representative 35% calcium assay, 1,000 mg Litholife supplies about 350 mg elemental calcium. A label target of 500 mg calcium would theoretically require about 1,429 mg Litholife before excipients, often necessitating multiple large capsules. Capsule count must therefore be treated as a core commercial decision, not a late packaging detail.

4.2 Development controls

- Measure bulk and tapped density, angle of repose, flow through the selected dosator/tamping system and weight variation.
- Use a geometric dilution or validated blending sequence for low-dose co-ingredients such as vitamin D3 or K2.
- Evaluate glidants/lubricants, segregation and electrostatic behavior without compromising dissolution.
- Confirm capsule-shell compatibility, moisture transfer, disintegration, microbial quality and stability.
- Calculate elemental calcium from the lot CoA and verify finished-capsule content analytically.

5. Softgels and liquid-filled gel capsules

Litholife is insoluble in oils, so a “liquid calcium” softgel is normally a solid mineral suspension in an oil-based or other nonaqueous vehicle—not a true solution. This distinction matters. Settling can produce dose nonuniformity between the beginning and end of a batch, while excessive viscosity can impair pumping and ribbon encapsulation.

5.1 Formulation priorities

- Select a fine, tightly controlled particle-size distribution to limit grit, sedimentation and nozzle wear.
- Design vehicle density and rheology with suitable suspending agents; validate redispersibility after hold time.
- Maintain controlled agitation from compounding through encapsulation and establish maximum hold time.

- Test fill homogeneity at beginning/middle/end, leak rate, seam integrity, shell moisture, drying and accelerated/real-time stability.
- Assess interactions with gelatin or alternative shells, plasticizers, colorants and mineral surfaces.
- When combining with D3/K2 or oils, demonstrate uniform distribution of both dissolved and suspended actives.

Softgel feasibility is equipment- and contract-manufacturer-specific. Litholife 325/400 mesh grades are logical starting candidates, but the optimal grade must be established by the encapsulator. “Softgel improves absorption” should not be claimed merely from dosage form; a suspended mineral still depends on release, dispersion and gastrointestinal conditions.

6. Tablets

Tablets are usually the most efficient format for high mineral payload, but calcium-rich formulas can produce large units and create compression challenges. Published formulation work with calcium carbonate shows that successful tablets may require direct-compression granules or binders and disintegrants; rapidly disintegrating calcium carbonate tablets have been developed with complete elemental-calcium release in simulated gastric fluid within 20 minutes. These findings demonstrate the importance of dosage-form engineering, not equivalence between every raw material.

6.1 Litholife tablet development

- Screen the 100-mesh granulated grade for direct compression and compare with 325/400-mesh material using wet or dry granulation.
- Build compaction profiles across press forces; monitor ejection force, sticking, capping and lamination.
- Optimize binder, filler, disintegrant, lubricant and glidant levels; excess lubricant can delay wetting/dissolution.
- Balance tablet hardness with friability, disintegration and mineral release; verify after stability, not only at manufacture.
- Consider coating for swallowability, appearance, moisture protection and premium branding.
- Validate elemental calcium uniformity, magnesium contribution, dissolution method, heavy metals and microbiology.

7. Particle-size selection

Grade	Best initial screening use	Key qualification
100 mesh	Direct-compression or granulation-oriented tablets.	Flow, compactability, ejection, friability, disintegration and dissolution.
325 mesh	Hard capsules, softgels, coated tablets and general blends.	Density, flow, suspension behavior and mouthfeel if chewable.
400 mesh	Hard capsules, softgel suspensions and fine tablet blends.	Content uniformity, sedimentation and equipment wear.
550 mesh	Very fine powders or specialized blends; not automatically ideal for all encapsulators.	Dusting, cohesion, poor flow and surface-area effects.
1,250 mesh	Special development where extremely fine particles are required.	Agglomeration, handling, suspension rheology and analytical PSD control.

8. Combinations and product concepts

Concept	Rationale	Development caution
Calcium + vitamin D3	D3 is central to calcium homeostasis and offers familiar consumer positioning.	Low-dose D3 requires validated premixing and stability/light controls.
Calcium + vitamin K2	Premium bone-health platform often paired with D3.	Claims and permitted forms/doses vary by jurisdiction; ensure homogeneity.
Calcium + magnesium	Litholife already contributes Mg, reducing the “calcium alone” narrative.	Do not assume it reaches target Mg dose; calculate from the CoA.
Calcium + collagen	Supports a broader structural-nutrition concept.	High collagen and mineral payload can make tablets/capsules impractically large.
Women’s healthy aging	Strong market fit for calcium-focused products.	Avoid osteoporosis prevention/treatment claims unless lawfully authorized.
Vegan mineral system	Algae origin and Vegan certification support coherent positioning.	Gelatin softgels are not vegan; use an appropriate alternative shell.

9. Regulatory and communication discipline

In the United States, a dietary supplement label must use lawful ingredient nomenclature and declare calcium in Supplement Facts according to applicable rules. Consumer-facing descriptors may explain source but should not obscure identity. “Red Marine Calcium” or “Marine Calcium” can be ambiguous because marine calcium may also come from shells, coral or fish bone; “calcium from Lithothamnion calcareum” or “algae-derived calcium” is more precise.

Recommended territory	Use with substantiation	Avoid without authorization/direct evidence
“Algae-derived calcium,” “Red Marine Calcium from Lithothamnion,” “contains naturally occurring magnesium,” “USDA Organic-certified ingredient.”	Superior absorption, easy swallowing, rapid disintegration, clean label, sustainable sourcing and format-specific performance.	Prevents/treats osteoporosis, heals fractures, eliminates side effects, deposits no calcium in arteries, or guarantees a fixed absorption percentage.

10. Recommended positioning

Litholife is a USDA Organic-certified, red marine algae-derived multimineral calcium ingredient for capsules, softgels and tablets. Known in international markets as Algae Calcium, Red Marine Calcium, Marine Calcium, Seaweed Calcium and Calcium from Lithothamnion, it supplies concentrated calcium with naturally occurring magnesium, flexible particle-size options and robust lot-level quality controls.

References and source notes

1. Litholife Seaweed Minerals Ltda. ET01, 325 mesh specification, rev. April 24, 2025.

2. Litholife Seaweed Minerals Ltda. ET03, 550 mesh specification, rev. January 26, 2026.

3. Litholife Seaweed Minerals Ltda. Commercial Presentation 2026.

4. Zenk JL, Frestedt JL, Kuskowski MA. Effect of Calcium Derived from Lithothamnion sp. on Markers of Calcium Metabolism. J Med Food. 2018;21(2).

5. Xu Y et al. Research progress on applications of calcium derived from marine organisms. Sci Rep. 2020;10:18425.

6. Zhu Y-S et al. Solubilisation of calcium and magnesium from Lithothamnion calcareum. Int J Food Sci Technol. 2014.

7. Naharros-Molinero A et al. Shell Formulation in Soft Gelatin Capsules: Design and Characterization. 2023.

8. Fausett H et al. Evaluation of quick disintegrating calcium carbonate tablets. AAPS PharmSciTech. 2000;1(3).

9. FDA. Dietary Supplement Labeling Guide and applicable 21 CFR labeling provisions, current edition.

10. USDA Agricultural Marketing Service. National Organic Program regulations, current edition.

Scientific and regulatory limitation

This article is a technical knowledge resource, not legal advice, medical advice or a finished-formula recommendation. Evidence from other Lithothamnion ingredients cannot be treated as direct proof for Litholife. Naming, permitted forms, daily values, claims, organic status and labeling must be confirmed for each market. Formulation and claims require finished-product evidence.