

TOROWHITE FOG 20

Controlled-Release Calcium Stabiliser for Hydrocolloid & Protein Systems — Summary of Advantages

FOG 20 is a **natural food-grade calcium sulfate dihydrate ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$, E516)**. Its defining property is **moderate, controlled solubility**: instead of dumping calcium ions instantly like calcium chloride, it releases Ca^{2+} gradually — giving hydrocolloid chains and protein networks time to reorganise uniformly before crosslinking locks the structure in place. The value isn't simply that it supplies calcium; it's that it supplies calcium **slowly enough to build a better structure**.

Why controlled release wins

Fast-dissolving calcium salts create steep local concentration spikes at the point of addition — the surface gels before calcium reaches the bulk, causing lumping, surface skinning, weak internal structure and uneven texture. FOG 20's gradual release avoids that failure mode entirely.

- **Homogeneous gel structure** — uniform crosslinking through the whole product, not just the surface.
- **Wider processing window** — more manufacturing flexibility and batch-to-batch consistency.
- **Enhanced water retention, reduced syneresis** — a denser, more continuous network that holds water and lipids.
- **Neutral taste** — none of the bitterness associated with calcium chloride.
- **Improved texture stability** — stronger, more heat-stable gels across the finished product.

How it compares with other calcium sources

Calcium source	Solubility	Release	Processing window	Taste
Calcium chloride	Very high	Immediate	Narrow; local over-gel	Bitter
Ca gluconate / acetate	High	Rapid	Fast set only	Neutral
FOG 20 (CaSO_4)	Moderate	Gradual / controlled	Wide; homogeneous set	Neutral
Calcium oxide	Low	Very slow	Limited reactivity	Neutral

One ingredient across many systems

The same controlled-release mechanism improves the efficiency of the structuring agents already in a formulation — so FOG 20 works across a wide range of systems rather than being tied to one:

- **Hydrocolloid gelation** — the classic internal-set agent for alginate (“egg-box” model), plus low-methoxy pectin, gellan and carrageenan systems.
- **Plant & dairy protein networks** — calcium-bridge structuring for plant-based cheese and dairy alternatives, addressing weak gelation, syneresis and poor firmness; the long-established coagulant for tofu and soy protein.
- **Meat alternatives & pet food** — plant-protein matrix stabilisation, chunk integrity and water management for juicier, firmer texture.

Where it fits — typical use levels

Application	Typical level	Function
Tofu / soy protein	0.5–1%	Controlled coagulant — smooth, even gel
Plant-based cheese & dairy alt.	~0.1–0.5%	Calcium-bridge protein structuring
Confectionery (LM pectin / gellan)	varies	Uniform gelation; fillings, jams, gummies
Bread & dough	~0.1–0.2%	Dough conditioner; improves elasticity
Pet food	~0.15%	Firming agent through thermal processing
Fortified beverages	~0.1%	Calcium fortification

A remarkably clean, proven regulatory record

Calcium sulfate has one of the longest, most consistent safety records of any additive. In 1970 the FAO/WHO expert committee (JECFA) gave it a **“no limit” acceptable daily intake** — a status granted to only a handful of substances and unchanged in 55 years since. It is **GRAS (FDA 21 CFR 184.1230), E516 in the EU, and JECFA-approved with no ADI restriction**, and sits in the thickener/stabiliser/gelling-agent class that is the single most prevalent additive family in commercial food. A natural mineral with quantum-satis freedom means you can formulate and scale without a use-level ceiling.

Bottom line: FOG 20 is controlled-release calcium technology — one natural, food-grade mineral that makes hydrocolloids and proteins work better, delivering more uniform gels, better water retention and stable texture across tofu, plant-based cheese, confectionery, bakery, meat alternatives and pet food, without the reactivity, bitterness or narrow window of soluble calcium salts.

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