Quercetin - Actionable insights for R&D and B2B teams

Quick reference: form selection, formulation priorities, tests, and procurement checklist

What to expect

- Multifunctional co-active: antioxidant, anti inflammatory, and UV filter stabilizer.
- Primary limitations: low water solubility, modest passive skin permeation, yellow color, and preservative interactions.
- Best suited as a supporting active in day-care, sunscreen stabilizers, soothing serums, and antioxidant boosters.

Primary formulation priorities

- Choose ingredient form to match claim ambition: phytosome or lipid carrier for soothing and redness reduction; encapsulates for color control; powder for oil-phase antioxidant boost.
- Address color and sensory early: plan microencapsulation or tinted formats if needed.
- Validate preservative efficacy and include microbial challenge testing for polyphenol-rich systems.

Essential tests - run early

- Accelerated stability on raw material and finished formula including photostability under simulated sunlight.
- Preservative efficacy test (challenge test) with finished formula.
- Instrumental endpoints: corneometry (hydration), TEWL, erythema scoring (colorimetry) for clinical work.
- Photostability of UV filters with and without quercetin for sunscreen claims.

Supplier and procurement checklist

Item	Required evidence
Quercetin form	Powder / extract / phytosome / encapsulated
Assay	HPLC percent quercetin and impurity profile
COA	Batch level COA for each lot
Stability	Accelerated + photostability data
Contaminants	Heavy metals, residual solvents, microbial limits
Format availability	Sample dispersions, phytosome, encapsulation options
Recommended use range	Supplier suggested finished formulation ranges

Decision matrix - quick guide

Claim focus	Recommended form	Typical starting level	Priority tests
Soothing / redness	Phytosome / lipid carrier	0.5 - 2% (phytosome)	Erythema, TEWL, irritancy
Photostability / sunscreen	Powder or dispersion; encapsulated option	0.1 - 0.5% (stabilizer)	In vitro photostability, SPF impact
Antioxidant booster	Powder or extract; phytosome for better uptake	0.1 - 1% (depends on form)	Oxidative stress markers, stability

Quick go/no-go criteria for pilots

- Go: supplier provides batch COAs, photostability data, and a phytosome or encapsulated sample with recommended use levels.
- No-go: only a raw powder COA with no photostability or stability data for intended package and exposure.
- Go with caveats: extract shows high quercetin content but strong color that fails sensory acceptance tests.

Recommended next steps

- Request 1-2 sample formats (phytosome + powder) and run accelerated stability and preservative challenge in your matrix.
- Run a short, instrumented pilot: corneometry, TEWL, and colorimetry under use conditions.
- If pursuing claims, design a randomized, vehicle controlled study targeting erythema and TEWL with 30 to 60 participants.

Selected references

- Maramaldi G et al. Soothing and anti itch effect of quercetin phytosome. Clinical Cosmetic Investig Dermatol. 2016.
- Scalia S, Mezzena M. Photostabilization effect of quercetin on BMDBM and OMC. Photochem Photobiol. 2010.
- Wadhwa K et al. Quercetin nanoformulations review. 2022.