

K2VITAL™ DELTA

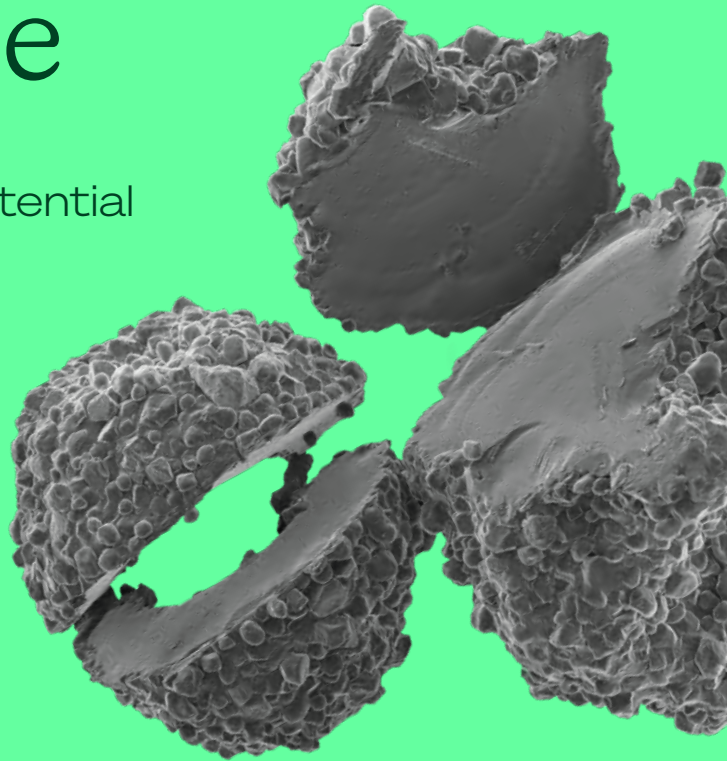
Breakthrough under the microscope

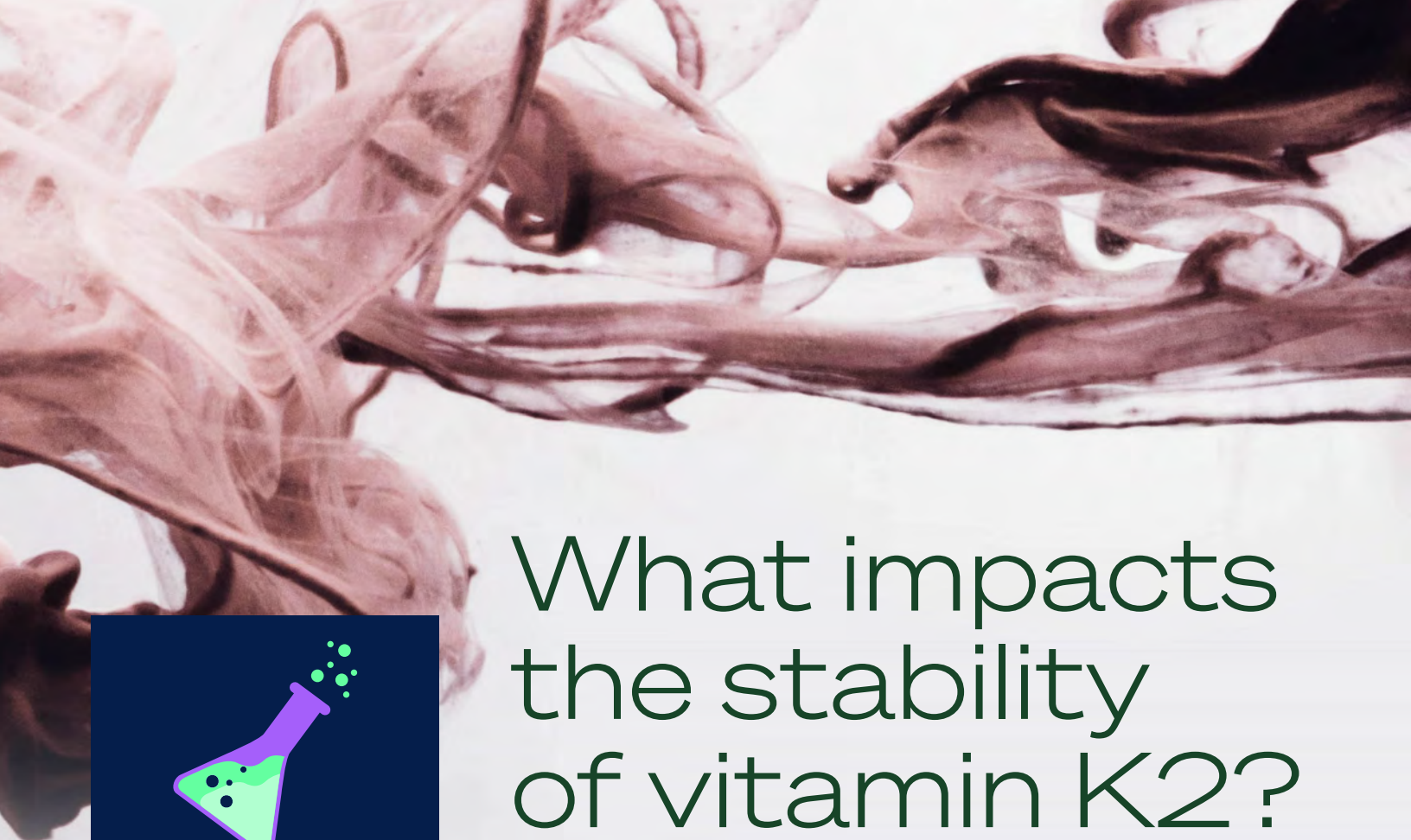
Discover the unlimited potential of K2VITAL™ DELTA

The right vitamin K2 should offer the same quality in a world of different formulations. That's why we've created this guide to help you unlock the unlimited potential of K2 with K2VITAL™ DELTA, our patented solution for exceptional stability.

The big issue: stability

Not all K2 ingredients are the same. And when it comes to formulation, stability, is key to achieve bioavailability and maximum efficacy in the body. Vitamin K2 is highly sensitive by nature. If left unprotected under certain conditions or blended formulations, it quickly degrades. So, to make sure your vitamin K2 product stays intact for long enough to deliver the full health benefits to consumers, it needs to be stable – from blending to processing and throughout the entire shelf life.





What impacts the stability of vitamin K2?



Just how big of a problem is stability?

We ran analytical tests on over 267 consumer products of different formats and formulations. Shockingly, **only 16% of them contained at least 90% of the vitamin K2 amount claimed on the label**, and many contained no vitamin K2 at all.⁽⁵⁾

Oxygen and light

Multiple double bonds in the alkyl-chain make vitamin K2 highly sensitive to ultraviolet light and oxygen as these bonds may undergo racemization and oxidation, leading to degradation and inactive vitamin K2 analogues.⁽¹⁾

pH

Vitamin K2 is highly susceptible to degradation in high-alkaline environments or in combination with alkaline compounds, such as calcium carbonate.^(2,3)

Ingredient interactions

In combination with krill oil or certain minerals, such as calcium and magnesium, unprotected vitamin K2 will break down.⁽⁴⁾ This poses a challenge for manufacturers looking to develop multivitamins and blended supplements, like vitamin K2 and calcium, an important combination required to support cardiovascular and bone health.

(1) Shining a Light on Vitamin K | Natural Products INSIDER

(2) Orlando P, Silvestri S, Marcheggiani F, Cirilli I, Tiano L. Menaquinone 7 Stability of Formulations and Its Relationship with Purity Profile. *Molecules*. 26;24(5):829 (2019).

(3) <https://www.nutritionaloutlook.com/view/new-stability-data-unique-encapsulated-vitamin-k2>

(4) Vitamin K2 MK-7: A stability challenge, a market study (nutraingredients.com)

(5) Kappa Bioscience unpublished study

Our cutting-edge ingredient – K2VITAL™ DELTA – is the first vitamin K2 to be microencapsulated in special double-coated beads for superior stability in most environments. This means manufacturers can develop blended supplements and explore new formulations that meet their label claim. And guess what? It's the only patented preparation to preserve vitamin K2 in combination with calcium, magnesium and other dietary minerals.

All vitamin K2-plus-minerals combination products should contain K2VITAL™ DELTA for two important reasons. Firstly, for its superior stability, and secondly, it's the only patented microencapsulated K2 solution on the market. So, you can develop new K2 formulations containing minerals, without any worries about product performance and you can add our 'patented' seal to your final product.

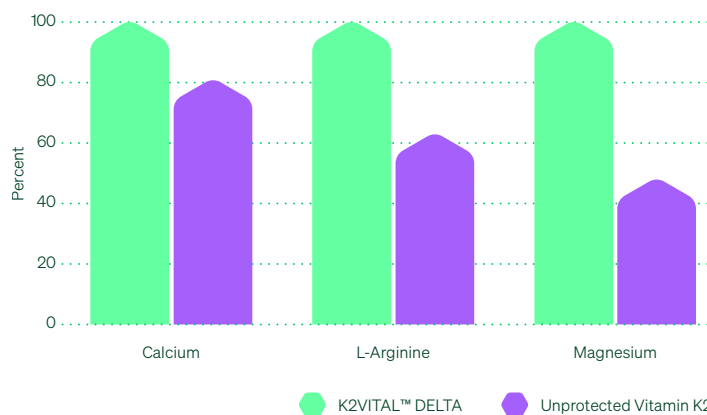


K2VITAL™ DELTA: Taking vitamin K2 to new heights

100% of all K2VITAL™ DELTA products met or were close to label claim.

Results that speak for themselves

K2VITAL™ DELTA superior stability
3 months recovery DELTA vs Unprotected Vitamin K2



Our market study found that K2VITAL™ DELTA has superior stability in combination with calcium, L-arginine and magnesium, compared to unprotected vitamin K2. Results demonstrated that after three months, only 8% of unprotected vitamin K2-plus-minerals products met or were close to label claim. In comparison, 100% of all K2VITAL™ DELTA products met or were close to label claim.



Your vitamin K2, your way

K2VITAL™ DELTA:
the same quality
in a world of
different
formulations



Sachets



Tablets and capsules



Gummies



Water-based liquids

If you're looking for a versatile solution that offers bioavailability and stability in a plethora of different formats, then K2VITAL™ DELTA is the answer. Suitable for dry powder and water-based liquid formulations, including sachets, tablets and gummies. In more recent years, a number of new studies have confirmed excellent stability of K2VITAL™ DELTA in final product applications, such as UHT, dairy and plant-based drinks, gummies, cereal bars and fortified dairy powders.

Not only is K2VITAL™ DELTA the most versatile vitamin K2 ingredient on the market, but it is also the strongest. Its double layer of encapsulating beads shields the MK-7 molecule from the air and hazardous environments. This means formulating with K2VITAL™ DELTA is a breeze, thanks to its superior handling properties and extra tolerance in manufacturing. It also has excellent flowability and outstanding organoleptic properties – with a neutral taste and smell.

It's easy as A, B ... K



1. K2VITAL™ DELTA flows freely and does not lump.

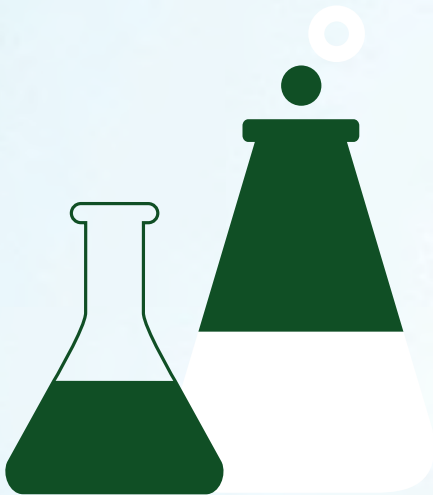


2. Mild swirling for complete dispersion.



3. K2VITAL™ DELTA remains in physically stable dispersion.

K2VITAL™ DELTA is dispersible in cold water and maintains its homogeneity in liquid formulations over time, which means you can create water-dispersible vitamin K2 products with ease. Including mineral-containing food applications such as dairy and plant-based drinks, powder drinks and more.



We believe that the right vitamin K2 should stand the test of time. So that you can get on with life, without worrying about shelf-life. That's why K2VITAL™ DELTA is extensively tested according to ICH guidelines – the gold standard. K2VITAL™ DELTA is proven to have a shelf life of 36 months from when it rolls off our production lines (in its original packaging and under the recommended storage conditions).

Tried, tested and trusted

10 years ago, K2VITAL™ DELTA was created. Now, 400 tests later, K2VITAL™ DELTA is still the go-to format when companies need to make stable, effective products combining vitamin K2 and minerals.

Improving industry standards

Our team has worked diligently, investing in research, working with 3rd party laboratories and collaborating with brand partners to test products and identify quality and purity misrepresentation within the industry. As a next phase, Kappa Bioscience will launch a campaign to increase awareness about vitamin K2 quality and enhanced transparency in the dietary supplement market.

Get on with life, without worrying about shelf-life

K2VITAL™ DELTA is analyzed following a specific USP method for microencapsulated K2. For formulation or analytical support, please reach out to Kappa Solutions AS – our team of devoted researchers with versatile vitamin K2 expertise. Our ISO certified laboratory supports other researcher teams with method transfer and interlaboratory comparisons to increase awareness about K2 analytics.

If you have any doubts about your product, we offer label claim testing at the Kappa labs to help you get to the truth.



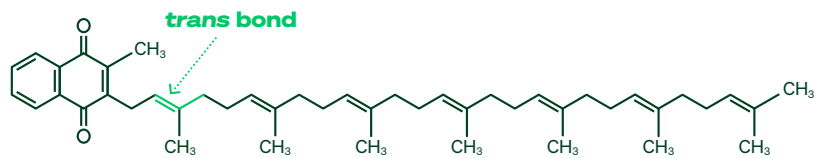


An ingredient you can rely on

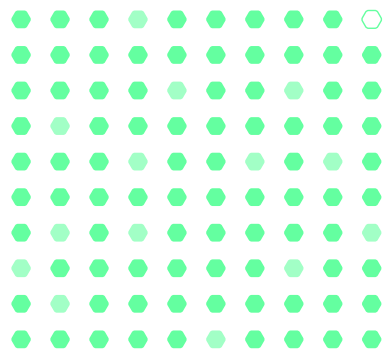
To develop superior vitamin K2 supplements, we know that only the very best ingredients will do. That's why we use an *all-trans* MK-7 vitamin K2. But why does this matter?

Our K2VITAL™ is all MK-7 for optimal bioavailability. Vitamin K2 has dozens of subtypes called menaquinones - all named after the length of their molecular chain, and MK-7 is the only subtype with superior bioavailability.⁽⁵⁾ This means the vitamin is easily absorbed by the body.

What's more, K2VITAL™ is an *all-trans* structure, where the molecule's seven double chemical bonds are set in a linear configuration, resulting in a highly bioactive form of the vitamin. So, our K2VITAL™ has more time in the body to facilitate its essential functions and deliver important health benefits with enhanced efficacy.




All-trans-isomer



>99%
this much
K2
as MK-7

The Kappa Bioscience method for the organic synthesis of K2VITAL™ DELTA results in a molecule that is identical to the MK-7 found in nature.

(5) Schurgers LJ, Teunissen KJ, Hamulyák K, Knapen MH, Vik H, Vermeer C. Vitamin K-containing dietary supplements: comparison of synthetic vitamin K1 and natto-derived menaquinone-7. *Blood*. 15;109(8):3279-83 (2007).

A person is shown from the chest up, underwater in a swimming pool. They are giving a thumbs-up gesture with their right hand. They are wearing a white t-shirt and a bright orange wristband. The water is clear blue, and there are many bubbles around the person's head. A blue and white lane line is visible in the bottom right corner of the image.

Say goodbye to lumps, sedimentation and formulation road bumps

Discover the DELTA difference:

- The world's only patented K2 preparation for mineral formulations
- Microencapsulated for optimal protection and stability
- Consistent bioavailability backed by solid clinical data

For more information or to request a sample of K2VITAL™ DELTA, visit our website: [K2VITAL DELTA our patented solution](#)

K2VITAL™ DELTA

Curious about combining vitamin K2 with minerals and more?

If you have any thoughts, questions, or you'd like to talk about any of the information in this document, we're here to help you out.



Kappa Bioscience AS – a Balchem company
Silurveien 2, Building B · 0380 Oslo, Norway

Kappa Bioscience Europe GmbH
Friesenweg 22 · 22763 Hamburg, Germany
Office +49 40 6094087-0
info@kappabio.com · www.kappabio.com · www.k2vital.com

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