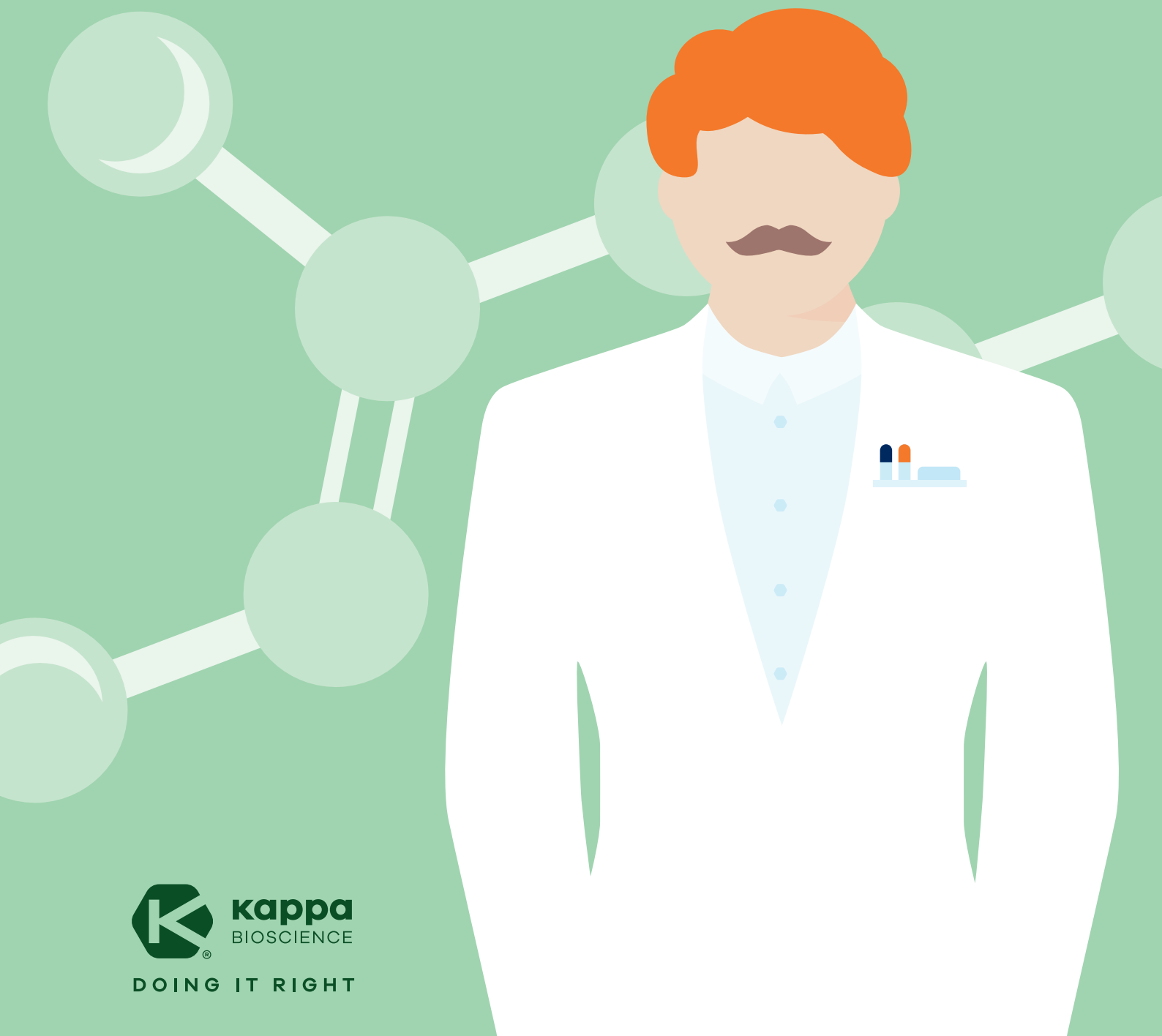


# Get to know vitamin K2

A guide to choosing  
the right vitamin K2



DOING IT RIGHT

# For quality K2, do it the Kappa way

There's a lot of information out there about vitamin K2. We know you're busy, so we've put everything you need to know into 8 key topics – our tips for finding quality vitamin K2.

It's important to keep all of these in mind when you're choosing the right product for you and your customers.

# Vitamin K2, done right

## 1. Vitamin K2 as MK-7 (and only MK-7)

Studies have shown that due to a high bioavailability and long half-life, the right vitamin K2 is one that's high in menaquinone-7 (MK-7).

## 2. All-trans makes all the difference

In nature, menaquinones are found as all-*trans* isomers. This is the bioactive form, the form that's used by our bodies.

## 3. Purity takes honesty

We don't like surprises here. We like consistency, because that's what it takes to make high quality vitamin K2 that our partners, and their customers, can count on.

## 4. Know the K2 analytics

With supplements, what you see isn't always what you get; *cis-trans* determination in finished supplements rarely happens, so low-quality products with sub-standard K2 efficacy appear on the market.

## 5. Tried, tested, trusted

The right research is key to understanding an ingredient's safety, how it works, and how it benefits people. To trust your vitamin K2 fully, it needs to be fully clinically tested.

## 6. Your vitamin K2, your way

The right vitamin K2 should offer the same quality in a world of different formulations. Meet K2VITAL® DELTA, the first vitamin K2 microencapsulated in special double-coated beadlets.

## 7. Stability you can lean on

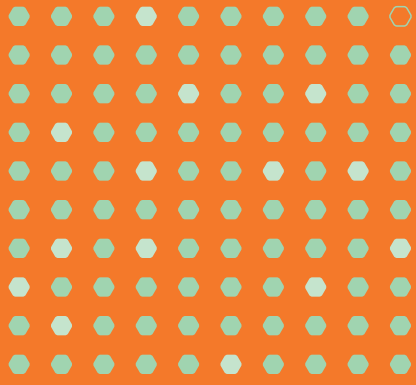
To make sure your products keep the promises they make to your customers, they need to be stable. The stability of vitamin K2 MK-7 can be impacted by four main factors.

## 8. A clear, clean label

People should be able to see quickly, and clearly, what's in their supplements. K2VITAL® is available in vegan approved, non-GMO project verified, kosher and halal certified forms. It's also free from soy, gluten, lactose, and any other allergens\*.

\* does not need allergen declarations according to EU and US regulations





>99%  
this much  
**K2**  
as **MK-7**

# Vitamin K2 as MK-7 and nothing else

Vitamin K2 is not vitamin K1. A large part of vitamin K1 is already consumed for blood clotting in the liver, leaving little for all other tissues (including functions in the cardiovascular system and bone metabolism). It explains why K1 has little or no effect on heart and bone health, and it simply does not reach these target tissues in sufficient quantities. Vitamin K2 is different, and it has dozens of subtypes called menaquinones (all named after the length of their molecular chain, now that you ask). Vitamin K2, especially MK-7, is a form of vitamin K2 with exceptionally high bioavailability and is optimally absorbed by the body. It also has a much longer half-life of about three days, so it can also be used for extrahepatic functions.

Our K2VITAL® is MK-7 in its purest form. Carefully produced in our factories in Norway using patented, cutting-edge production processes, it's identical to vitamin K2 found in nature. It's proven to activate vitamin K-dependent proteins (*Moeller et al. 2016*), so calcium is directed to where it's needed, and taken away from where it isn't, as efficiently and effectively as possible. **In short, it's vitamin K2, done right.**

**K2VITAL**<sup>®</sup>  
IS PURE,  
bioactive  
vitamin K2 MK-7



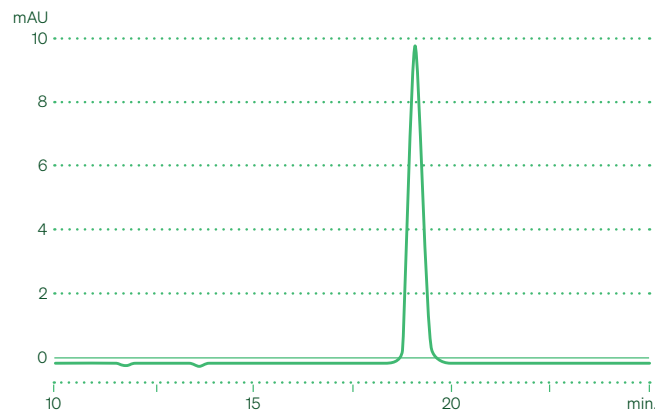
# All-*trans* makes all the difference

The efficacy of an active ingredient is affected by its chemical structure. In nature, menaquinones are found as all-*trans* isomers. This is the bio-active form, the form that's used by our bodies.

Many vitamin K2 ingredients, because of inferior production methods or stability issues, use a mix of *trans* and *cis* isomers. *Cis* forms cannot fit in their target, so they don't activate vitamin K-dependent proteins. This makes them biologically inactive, and customers don't get the full health benefit.

Sure, vitamin K2 ingredients with at least 96% all-*trans* MK-7 are enough to meet the United States Pharmacopeia (USP) standard. But that's not enough for us. **Our K2VITAL® is 99.7% all-*trans*, all-bioactive K2 MK-7,** so your customers get the best possible benefits of this brilliant vitamin.

## Doing it right - K2VITAL® is the Reference Standard for the United States Pharmacopeia (USP)



# Purity takes honesty



We don't like surprises here. We like consistency, because that's what it takes to make high quality vitamin K2 that our partners, and their customers, can count on.

These days, a lot of K2 solutions on the market vary in quality, with misleading information that can be hard to know what goes into the final product.

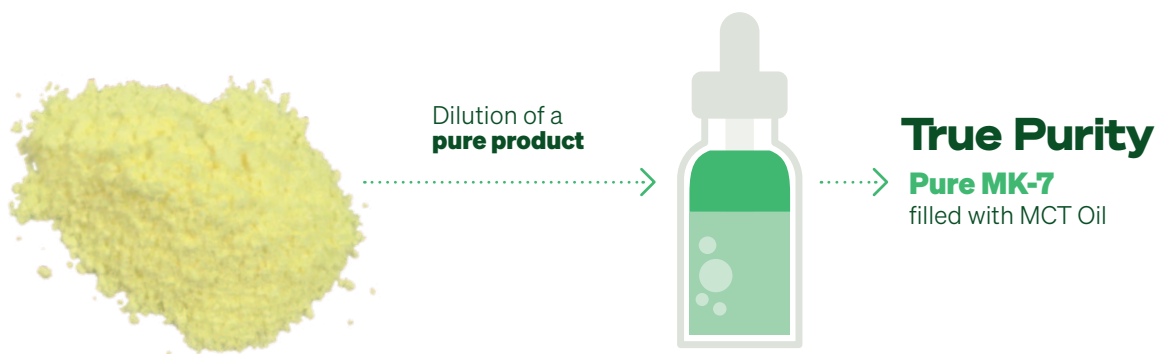
We want our solutions to set new standards of transparency in our industry, so our customers, and their customers, know every detail of what's in their product, without any doubts about quality.

Kappa's patented vitamin K2 production is designed to maximize purity. It generates nature-identical, all-bioactive MK-7 without unidentified impurities. The ideal K2 form, branded as K2VITAL®.

That means formulations with the same amount of pure, all-trans MK-7 to the last microgram, with every component characterised and documented. No unidentified substances or excipients, biomass or stabilisers.

So you know exactly what's in your product, exactly how stable it is, and exactly how long it'll last on the shelf.

Our production process yields in pristine material: MK-7 as a pure substance. Made in Oslo, Norway.



**K2VITAL®: purity at every stage, from start to finish.**

**K2VITAL<sup>®</sup>**

A vitamin  
done right.



With supplements, what you see isn't always what you get; *cis-trans* determination in finished supplements rarely happens, so low-quality products with sub-standard K2 efficacy appear on the market.

Knowing exactly what's in your vitamin K2 can be tricky. Innovations like micro-encapsulation, or new delivery formats, such as gummies or soft chews, can sometimes make getting to the truth of your product's vitamin K2 content even harder.

But we like a challenge here at Kappa. We're leaders in K2 assay methodology, using USP\* verified analytical methods designed to work with any formulation or composition, so you can see exactly what you're getting.

Our work sets the standard. Literally. K2VITAL® has become the Reference Standard for the United States Pharmacopeia, used globally as the benchmark for K2 analysis and *cis/trans* purity assessments.

\* USP: U.S. Pharmacopeia

# Know the K2 analytics



## Certificate of analysis

Method	Result
Assay vitamin K2	28 µg K2/drop
Vitamin K2 as all-trans MK-7 (Cis/trans purity)	4 µg K2/drop

## A look at the labels

We can see that this product has a label claim of 25 µg vitamin K2 per drop. The analysis shows an average of 28 µg/drop. At first glance, it seems to be above the label claim. We took a closer look at this product in our labs, testing to see how much all-*trans* content was in there. It only showed 4 mcg vitamin K2 MK-7 – the bioactive, all-*trans* form.

It is still vastly unknown that there are distinct analysis methods for determining **isomeric purity** (*cis/trans* isomers) and **MK-7 purity** (the content of MK-7).

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

**Doing it right - together!**



# Tried, tested, trusted

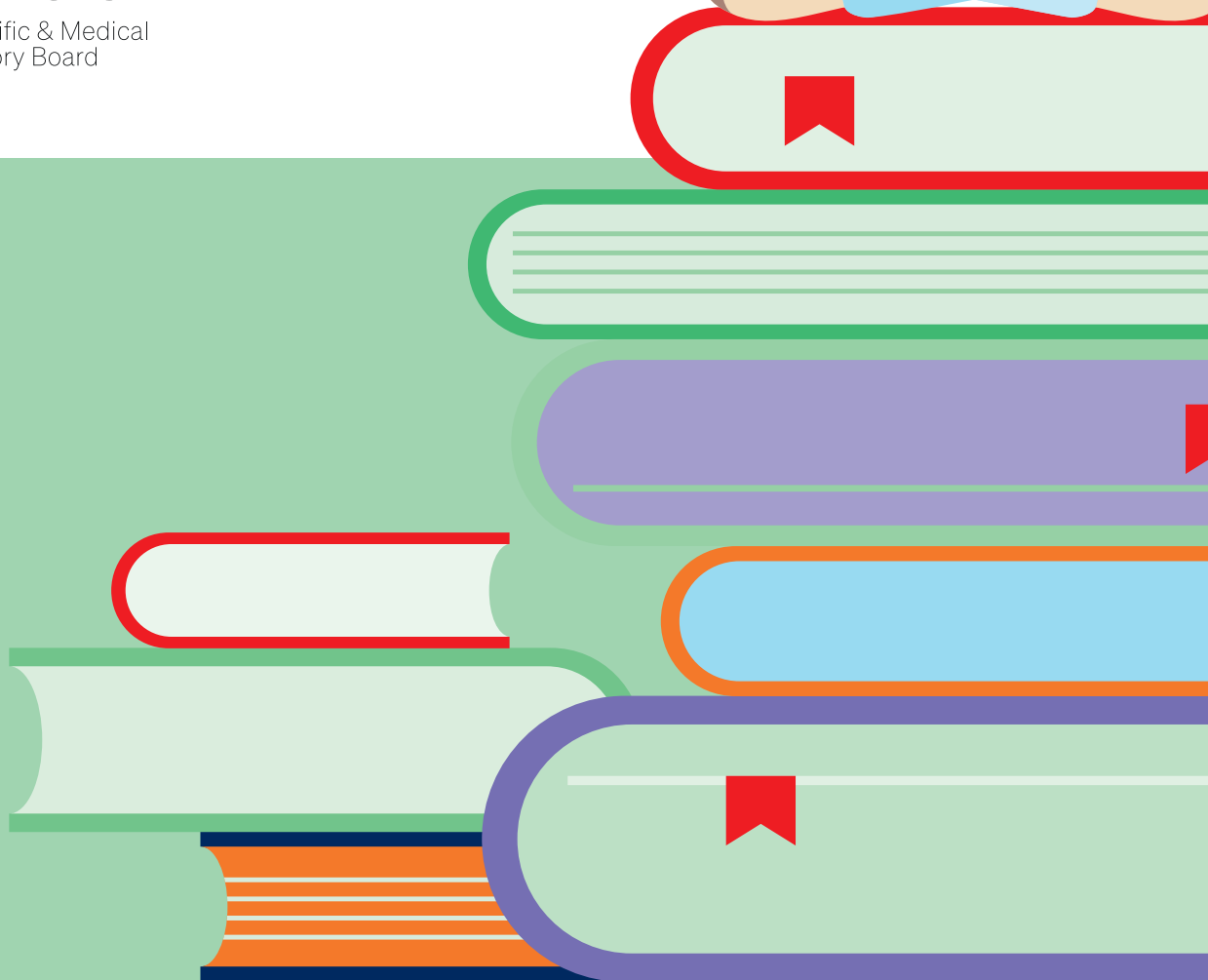
The right research is key to understanding an ingredient's safety, how it works, and how it benefits people.

To trust your vitamin K2 fully, it needs to be fully clinically tested. The pharmacokinetics, bioavailability and activity of K2VITAL® have been studied rigorously, its efficacy proven across double-blind, placebo-controlled trials. (Moeller et al. 2016)

But everything we know about vitamin K2 isn't everything there is to know about it. As proud leaders in our industry, we at Kappa have a responsibility to advance what we know about vitamin K2. So we're working closely with a global network of researchers, thought-leaders and vitamin K2 experts across many clinical trials to uncover the future of vitamin K2, and discover the benefits it can offer to everyone.



KAPPA BIOSCIENCE  
**smab**  
Scientific & Medical  
Advisory Board





# Your vitamin K2, your way



## **K2VITAL® MCC**

For dry powder formulations



## **K2VITAL® MCT**

For oil-based liquid or semi-solid formulations



## **K2VITAL® DELTA**

For dry powder, oil-based liquid, semi-solid formulations, and where water dispersibility is needed

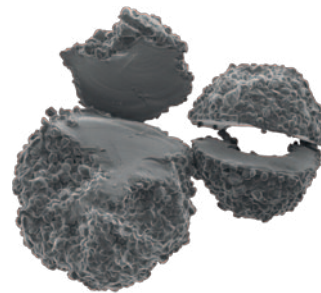


## **K2VITAL® ALPHA**

Crystalline, pure K2 MK-7 for customized applications

The right vitamin K2 should offer the same quality in a world of different formulations. We use pure vitamin K2 MK-7 to make our K2VITAL®. In its raw form, it's a crystalline powder, but because humans need it at much lower dosages, it gets diluted. At Kappa, we can dilute to fit any formulation, from tablets to soft gels, powders to liquids, gummies to oral sprays, or various food applications.

Vitamin K2 is sensitive by nature. It degrades in the presence of minerals. So we made K2VITAL® DELTA, the first vitamin K2 microencapsulated in special double-coated beadlets, for complete stability in any environment (Kappa Bioscience Analytical Database). In fact, K2VITAL® DELTA is the only double-coated microencapsulation formulation supported by 3 years of stability data. This means your products will meet the label claim for active vitamin K2 MK-7 throughout their entire expiration period. Now, you can get on with life, without worrying about shelf-life.

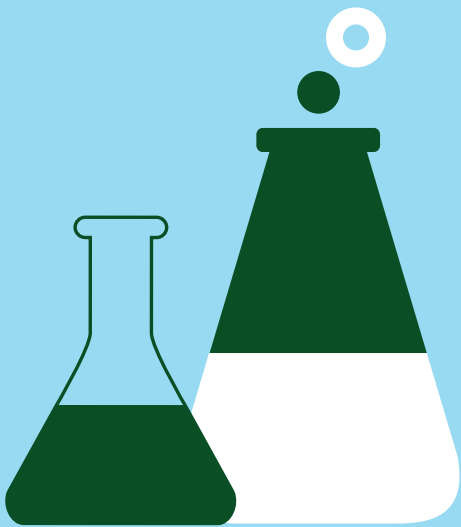


**K2VITAL® DELTA under the microscope:** the double-coated beadlet is fully shielded from the air and protects the MK-7 molecule in any hazardous environments.

## **This is all in K2VITAL®**

Patented technology, highest purity, a lot of experience.  
And above all, great attention to detail.

We've run more than 400 product tests in more than 267 ingredient formulations. The results? **Only 16% of them contained at least 90% of the K2 amount claimed on the label.** Many of them contained no K2 at all. We're proud to say that **100% of our K2VITAL® DELTA K2 products met their label claim.**



“K2 is unstable in alkaline environments as you find them in calcium or magnesium combinations, which is still relatively unknown in the market. Even if you use a ‘good’ K2 source but not a microencapsulated one, you will not reach the label claim after a couple of weeks.”

*Inger Reidun Aukrust, PhD, VP of R&D*

## Stability you can lean on

To make sure your products keep the promises they make to your customers, they need to be stable. The stability of vitamin K2 MK-7 can be impacted by four main factors: temperature, light, pH value and ingredient interactions.

At Kappa, we believe that the right vitamin K2 should stand the test of time. Every one of our K2VITAL® products is extensively tested according to ICH guidelines – the gold standard.

K2VITAL® is proven to have a shelf life of typically 36 months from when it rolls off our production lines (in its original packaging and under the recommended storage conditions).

If you're curious to see if your vitamin K2 product is stable, send it to us. We'll test it against the label claim, in complete confidence.



# A clean, clear label



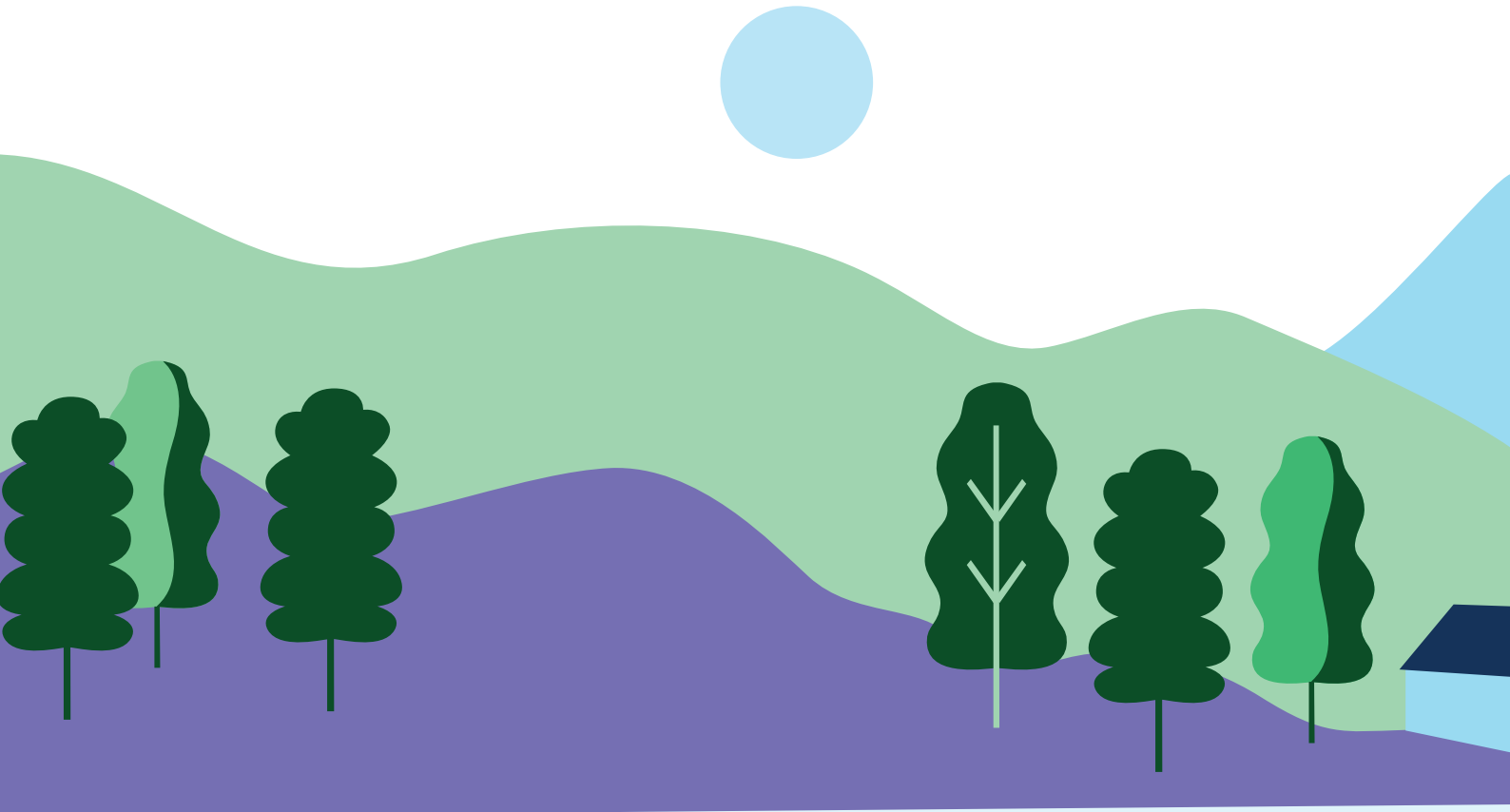
Now more than ever, consumers are worried about what goes into the products they use, and the information that's written on them. People should be able to see quickly, and clearly, what's in their supplements.

That's why we believe in clear, clean labels – working with transparency initiatives to make sure product information is honest, open, and easy to understand.

We also believe in helping everyone get the best possible benefits of vitamin K2, without barriers like gluten, allergens, lactose and other unnecessary things like GMO, sugars, stabilisers and preservatives getting in the way.

Our K2VITAL® is available in vegan approved, non-GMO project verified, kosher and halal certified forms. It's also free from soy, gluten, lactose, and any other allergens\* – so your product can have a label that's as clear and clean as it gets.

*\* does not need allergen declarations according to EU and US regulations*



“Ethics outweigh profit when it comes to health, well-being, and safety, and this is not negotiable.”

**Henriette Bastiansen,  
Executive Vice President Quality & Regulatory**



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



**kappa**  
BIOSCIENCE

DOING IT RIGHT

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