

White paper

All you need to know about plant-based cheese solutions

Seizing industry opportunities in ever-changing market conditions



KMC

Ingredients to grow your business



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Introduction

There is a revolution happening in the cheese market. And it has absolutely nothing to do with dairy

Plant-based cheese has steadily found its way to the dining table, and both dairy companies and food manufacturers are busy supplying us with non-dairy versions of everything from parmesan to pizza cheese that makes an effort to stand toe-to-toe with the “real thing”.

In other words: The plant-based cheese revolution is happening as we speak. But one thing is for sure: It requires deep know-how and creative product formulations to succeed in the plant-based cheese industry.

In this white paper, we delve into the main trends that will be essential to winning market share in the expanding plant-based market. Moreover, we share our best advice on what it takes to produce plant-based cheese and what it requires in terms of equipment, resources and ambitions, enabling you to run a successful business in ever-changing market conditions.

Enjoy the read!



Ole Primholdt Christensen
Business Development Director, KMC





These 5 cutting-edge trends will shape the plant-based food industry in the years to come

In the future, five trends will be essential to winning market share in an expanding plant-based market.

The plant-based food industry is leaping forwards and gaining strength at a rapid pace. According to the Good Food Institute, plant-based food sales in the U.S. [grew 43 percent](#) in the last two years alone. Bloomberg Intelligence has projected that the plant-based food industry, worth \$29.4 billion in 2020, [will expand by 451% by 2030](#), and Credit Suisse [foresees 100-fold growth within the next 30 years](#).

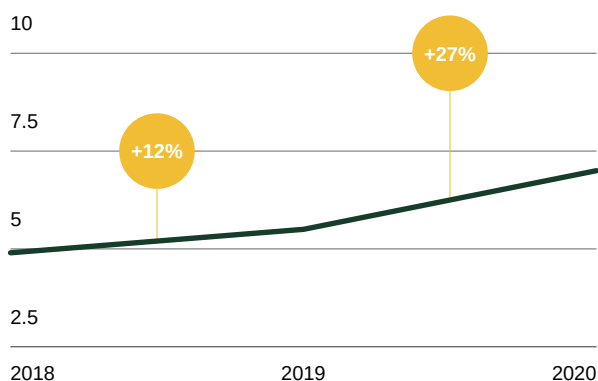
There is little doubt that the industry is poised for explosive growth. Complex ingredient technology and creative product formulations are paving the way for the development of a wide range of products appealing to consumers. And the growing interest in all plant-based foods presents plenty of opportunity for companies to get a foothold in the expanding plant-based market.

Yet there are certain focus areas that are more decisive than others, according to Claus Felby, an internationally acknowledged professor in bioenergy and sustainability at Copenhagen University and Senior Vice President of Biotech at the Novo Nordisk Foundation.

– As a society, we desperately need to develop more sustainable plant-based food resources that resemble traditional products in texture, taste and nutrition.

Total U.S plant-based food market

(stated in billions USD)



But in order to do so, we need to understand the composition matrix of plant-based products properly – just as we do with animal products. There is an obvious hole in the market here. And the way to wedge yourself in there is to conduct quality fundamental research, he says.

It's all at our fingertips

During the past five years, the Novo Nordisk Foundation has donated around 3 billion DKK to research and development projects that improve the sustainability of society, including research into plant-based food products.

In fact, a broad coalition of foundations, companies and organizations recently started dedicating large shares of their assets to research in the plant-based food industry. Plant-based products are no longer perceived as a niche category among consumers and companies.

– The special thing about this area is that we know it is possible to make plant-based products that are just as good as animal products. We don't need to invent something groundbreaking to reach this goal. It is right at our fingertips, we just need to accelerate the development, says Claus Felby.

Room for growth

The growing number of consumers eating plant-based products backs up Claus Felby's claim. In fact, the number of vegan cheeses launched in western Europe has doubled over the past five years, and even traditional dairy companies are showing sincere interest in developing their own ranges of plant-based products to compete with the category's pioneers.

Yet there is still plenty of room for growth. Globally, vegan and plant-based cheeses represent only 3% and 1% of market share, respectively. North America has the highest share of cheese with a Vegan or a Plant-Based claim, at 7% and 6% respectively, according to Innova Market Insights.

It is nonetheless evident that strong product development and marketing will be critical in this category, as many consumers can be put off by differences in taste, texture and nutrition. So where should R&D departments be especially vigilant in the years to come?

In the following, Claus Felby describes the 5 main trends that will shape plant-based food during the coming years.



About Claus Felby

Claus Felby is Senior Vice President, Biotech at the Novo Nordisk Foundation. He is also an internationally acknowledged professor specializing in biomass and bioenergy at Copenhagen University. He has worked with bioenergy and sustainability for more than 20 years, both academically and within industry. Throughout his career, Claus Felby has achieved impressive results, publishing 113 scientific articles and obtaining 24 patents or patent applications.



Trend 1: Focus on nutrition

While many companies have come a long way towards creating the right texture and taste in plant-based products, the next deciding factor for the popularity of plant-based products will be the attention to nutrition, according to Claus Felby.

– The biggest hurdle here is dairy products. A majority of humans are extremely efficient at benefitting from dairy products, we are mammals, and many of the minerals and vitamins we get from these products are not yet present in plant-based food. There is a clear gap here that we need to close. And we should not cut corners and be taken by surprise by trans fatty acids and the like. Before we can shift our diet to plant-based, researchers need to cover these nutritional aspects and make sure it is healthy for humans in the long run. We need to try and make these products better for the human body than what is currently available.



Trend 2: Share knowledge across sectors

Knowledge sharing across public and private sectors is extremely important in order to accelerate developments towards plant-based food, concludes Claus Felby.

– The universities are doing well, but they need input from private companies and vice versa. It is important to keep an open mind in the development process, acknowledge that these things are hard to get right, and realize that we need to collaborate across sectors in order to succeed. The money is clearly there for the right teams, and crazy but revolutionary ideas are just around the corner. But in order to get there, we need to expand our innovative capacity by working together. Because we need to figure this out quickly.



Trend 3: Use genetic resources

Until now, the plant-based industry has harvested the low hanging fruits of plant-based food. But according to Claus Felby, companies need to raise their ambitions in order to find better solutions.

– The next step in this development is to focus on the unused genetic resources that are out there. Our gene banks contain thousands of unknown plant gene material in their vaults, just waiting for researchers to figure out their benefits. Yet we only grow around 100 types of crops in our agricultural landscape today. We simply have no idea what the other types of crops can do for plant-based products. It's crazy that we don't benefit more from the genetic resources that we have.



Trend 4: Reconnect with the old ways of creating taste and texture

Amidst the thirst for innovation, Claus Felby also believes that traditional ways of bringing taste and texture to plant-based food remain relevant in the modern era.

– We need to reconnect with what we did before and what we have done for thousands of years. Fermenting and conserving food in different ways is an obvious way to create appealing taste and texture in plant-based products. The science is there, we just need lift it from the toolbox, he says.



Trend 5: Reach the traditional consumer segment

According to Claus Felby, only a minority of the population is willing to change their eating habits and pay more for plant-based products than they do for traditional ones. [This study](#) suggests that 49 % of the population has a pattern of “attachment” to meat consumption and [this study](#) shows that price is a deciding factor for nearly half the population. Breaking through the price barrier is thus an important element in gaining market share.

– If you as a company are not able to create products at an attractive cost, you will not get access to a majority of the market. The next step in the development is to penetrate this consumer segment and not only cater to the people who can afford fancy, expensive, new food. The majority will not change their eating habits unless it is cheaper and akin to their staple foods, says Claus Felby.

Get started now

At KMC, we help innovative food manufacturers make their products greener. If you are ready to embark on a plant-based journey and reserve your share of the inevitable growth that will occur in the plant-based sector, please reach out to our experts at KMC.

Get in touch

Sliceable, hard, melty, spreadable: A guide to plant-based cheese

Finding the right recipe for plant-based cheese requires advanced understanding and know-how. Here, we give a brief introduction to 4 different types of plant-based cheeses.



About Line Bach Christensen

Line is a Senior Application Specialist with a specialty in plant-based cheeses. She has a PhD in Food Science from the University of Copenhagen in Denmark. Line has been working at KMC since 2016.

Plant-based cheese has steadily found its way to the mainstream supermarket shelves, and both dairy companies and food manufacturers are busy supplying us with the best plant-based alternatives to traditional cheeses made from cows' milk.

But what characterizes the development of the various plant-based cheeses? And what do different types of cheese require in terms of production setup, resources, and ambitions?

We have asked our very own Senior Application Specialist at KMC, Line Bach Christensen, to give you a brief introduction to 4 typical cheeses made with potato starch.

Pizza cheese

Shredded cheese makes a perfect topping for foods such as pizza and lasagna. Usually, pizza cheese is associated with a stretchy mozzarella, and in the plant-based version, it's essential to find the right texture and meltability in order to make the perfect pizza cheese.

According to Line Bach Christensen, developing the perfect recipe for pizza cheese requires ongoing testing and patience:

- When formulating a new recipe for pizza cheese, the process can take anywhere from months to years. Sometimes, a customer returns to us after years of testing, because the cheese is either too hard, too melty, or so soft that it cannot be grated, she says and adds:
- It all depends on factors such as climate, production equipment, storage conditions, the other ingredients in the cheese, and how the various parameters affect the cheese over time. All of these things are important to take into consideration.

Spreadable cheese

Plant-based spreadable cheeses can be firm, fluffy, and creamy, or smooth and melty. Either way, this cheese is ideal for spreading on bread or using in baked goods. Furthermore, it is a very versatile cheese that is easy to add to your production.

Line Christensen highlights the importance of putting oneself in the consumer's place when formulating the cheese recipe:

- When developing the cheese recipes, we often think a couple of steps ahead with regards to consumer behavior. We ask ourselves: In what way will the consumer most likely use and process the cheese? Cold on bread, or should it be able to withstand being melted, whipped and frozen? Most often, the consumer will expect the cheese to behave the same way as the dairy-based version, Line Christensen explains and continues:
- That is why we need to take all of these scenarios into consideration, if we want the result to come as close to the dairy-based "twin" as possible.

Block cheese

Block cheese is one of the most challenging types of cheese to produce in a plant-based version. Not only does it need to have the right flexibility and suppleness; it also has to emulate the same creamy mouthfeel of a dairy-based block cheese. The expectations for a block cheese to match the dairy-based version are sky-high, and there are plenty of factors that affect the outcome:

- Depending on whether you use pea or soy protein, they interact differently with potato starch which will inevitably affect the end-result. The same goes for your processing equipment.



Did you know:

- Plant-based cheese products based on potato starch are neutral in both taste and color, allowing you to add flavors and colors to match the desired product without needing to first mask other flavors.
- Plant-based hard cheese made with CheeseMaker starch can be produced in less than 48 hours – a significantly shorter maturation time compared to a dairy-based Parmesan-type.

If you use a high-speed cooker instead of a twin screw-cooker that mixes the ingredients more gently, the result will reflect this, Line explains and emphasizes:

– With that being said, at KMC, we have specialized in block cheese alternatives and have built a profound understanding of the various ingredients used. So, no matter your resources, ingredients and production setup, we always take the various considerations into account.

Hard cheese

Hard cheese is flaky and has a brittle structure – exactly like parmesan and pecorino. Moreover, hard cheeses must be grated in all sorts of different ways and need to have a relatively dry mouthfeel.

Line Christensen highlights one of the main advantages when making plant-based hard cheese compared to the dairy-based version:

– For a parmigiano reggiano, the minimum maturation time is 12 months. This is both labor-intensive and expensive, whereas a plant-based hard cheese only takes 48 hours from production to consumption. This will lead to significant cost savings and bring down your time to market.

The CheeseMaker alternative

Based on potato starch, which is non-GMO and non-allergenic, Cheese Maker can be used to make all the plant-based cheese alternatives you desire – grated, shredded, sliced, or spreadable cheeses that are easy for modern and health-oriented consumers to use.

[Learn more](#)

From idea to implementation in 4 steps

The process of producing plant-based cheese can take many different forms. Here, we provide an overview of the steps that we at KMC go through with a typical customer – all the way from idea to implementation.



About Kasper Steffens

As Commercial Manager at KMC, Kasper oversees the Scandinavian and the South East European market. He has an education in Supply Chain Management and has been working at KMC since 2017.

Idea

Let's say you're a dairy company wanting to enter the plant-based market. You know that more and more customers are requesting vegan alternatives to your dairy-based cheeses, so now is a great time to get started and reap valuable price-competitive benefits in the growing market for plant-based foods.

1



Needs assessment

The collaboration begins with a meeting where we figure out what kind of cheese you want to start producing. We'll make a number of recommendations based on the local conditions in your part of the world and help address issues like resources, equipment, regulations, functionality and ingredient choices. All of which need to be considered before we move forward with the process.



2

Recipe development

After the needs assessment, we'll develop a recipe based on the ingredients and equipment you want to use. You'll be invited to visit the Food Innovation Centre located at our headquarters in Brande, Denmark, where together we'll produce a number of small-portion trial batches from the recipe, adapting and adjusting along the way. Maybe the cheese needs a different melting profile. Maybe it should be harder or softer. Or maybe it needs to be able to withstand storage in varying temperature conditions. We'll take all of this into account when developing the recipe.





4



Launch and ongoing evaluation

After the testing period, the product is ready for launch. Here, we use customer feedback as an active part in the ongoing development of the cheese. Maybe after a while we'll find out that the cheese is not melting as expected. Maybe the consumer wants a different functionality. Or maybe we'll need to adjust the amount of starch.

3

Testing period

Once the recipe has been developed, it's ready to be scaled for production using your own production setup. Typically, the cheese will then undergo a testing period, where it will be subjected to a series of taste tests, shelf-life tests, and tests of how the cheese develops over time and under various storage and handling conditions. KMC is an active part of this process and is happy to help test different conditions.



Implementation

Producing plant-based cheese is an ongoing work in progress, and together with you, KMC plays an active role in the process. All the way from idea to implementation. And we do not leave until it works.



Easing the decision-making process:

Key considerations to keep in mind before kickstarting plant-based cheese manufacturing

Consumer demand for plant-based cheese is skyrocketing. But how do you seize the opportunity in the best possible way? Here are 5 key considerations to make before beginning plant-based cheese production.

About Jeppe Witte Nielsen

Jeppe is a Senior Technical Sales Manager at KMC, responsible for UK, Spain, Israel, Egypt, and Denmark. He has a background as a Dairy Technician and has a bachelor's degree in International Sales. Jeppe has been working at KMC since 2014.

Maybe you are a dairy company looking to extend your product range with a plant-based cheese. Or perhaps you are a small startup wanting to enter the plant-based market with a vegan cheese. The good news is that the plant-based food industry is full of potential, and there are no signs that it is going to slow down anytime soon – rather quite the opposite.

But how do you as a food manufacturer seize the abundance of opportunities? And what considerations are important to make before starting production?

According to Senior Technical Sales Manager at KMC Jeppe Witte Nielsen, the considerations can be divided into five main categories:

If the sky is your starting point..

...it might be a good idea to reconsider your ambitions. Although getting started in plant-based cheese production is relatively easy – and certainly simpler than dairy-based cheese production – it is important to carefully consider your expectations of the final result. You cannot expect to get a cheese that looks and tastes like a twin replica of a cheese from dairy milk – at least not if you're hoping to bring a cheese to market in the foreseeable future. So: What are your ambitions? What is your timeframe? And what compromises should you be prepared to make?

Using the right crops for the job

The potato is a great crop since the starch forms a clear, solid gel that does not affect taste or color. It can easily be combined with the cheese's other plant-based ingredients, such as pea or soy protein. However, it is important to consider how the combination of ingredients affects the end result, since ingredients change according to what they are combined with and how they are processed. Therefore: What ingredients should your cheese consist of? Are the ingredients easy to source in the part of the world you are operating? And how does the combination of ingredients affect the end result?

Keeping a close eye on the competition

The market for plant-based cheese is growing rapidly, so as a food manufacturer, there is plenty of room to roam. That said, it is still a good idea to keep an eye on the competition to find the niche in the market with the best conditions for increasing your market share and running a profitable business at the same time.

Sitting down at the consumer's table

Although the global market for plant-based cheese is growing, there are major differences in what different markets have achieved and what individual consumers value. In some countries, where plant-based diets are a commonplace reality, it is about securing a product that satisfies and feeds the family.



Did you know:

At KMC, our specialized technical sales managers are responsible for each market and have in-depth knowledge of local conditions. This means that they can advise you based on the unique market conditions in the part of the world where your products will be produced and sold. We always start where you are. With your setup. For your needs.

Looking to other countries, where consumers are typically further up Maslow's hierarchy of needs, there is more focus on sustainability and health when choosing plant-based cheese. So, think about what customer needs your cheese should meet.

Choosing the right partner

Although plant-based cheese production has relatively few entry barriers, combining all the relevant considerations into a single recipe that produces the perfect cheese is a large undertaking. That is why it is a good idea to choose a partner with a sharp eye for detail who can help you connect all the dots along the way from idea to implementation.

What's next?

We hope that this white paper has provided you with valuable insights into plant-based cheese manufacturing: How it happens. What it requires. And why the growing interest in plant-based foods makes now the perfect time to get a head start.

One thing is for sure: The right tools and know-how will help you well on your way. And choosing the right partner to help you is a wise move towards running a successful plant-based cheese business.

Want to get in touch?

To learn more about KMC's plant-based cheese solutions, please reach out to:

Ole Primholdt Christensen
Business Development Director
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Get in touch



In KMC, we believe the future is **plant-based and climate-friendly**.
Our contribution lies in helping innovative food manufactures make their
products greener. And by becoming increasingly sustainable ourselves.

KMC is your preferred partner because we use our **extensive know-how**
to provide solutions that develop your business and optimize every single
production – **from ingredient to implementation**.

Because our **Danish roots** guarantee high quality and food safety.
And because our team of experts stays on until your solution works.

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