Sustainability Report 2021/22

A circular business model

KMC

Ingredients to grow your business

“Our vision is to integrate sustainability into everything we do. We are well on our way, but we can go even further. Our report is another way to commit ourselves to achieving the goals we set – and a tool to measure our performance.”

Jesper Burgaard, CEO at KMC

Contents

Concerted efforts strengthen sustainable ambitions

Letter to our stakeholders by Jesper Burgaard

KMC's potato-based business model builds on the circular economy. This means that we use the entire potato for ever more innovative and valuable products, while at the same time reducing carbon emissions all the way – from the potato sprouting in the field to the end-product.

Continued focus on processing

Our circular mindset means that we are always thinking in terms of further refining our resources. We are inspired by the Forest Tower, where each loop takes you to new heights and offers new perspectives. Therefore, it is still natural for us to innovate our side streams, for example potato protein, which can now be used in a wide range of foods and provide structure in plant-based meat. You can read more about our work with textured potato protein on page 25.

Resistant varieties

The potato has one of the lowest climate footprints of Danish crops. It delivers many calories per hectare and has a nutritious and healthy profile. However, the vulnerable tuber also needs protecting, and in 2022 the growing season has been difficult due to mold, which can potentially destroy a field in just a few days.

This means that we must keep abreast of developments and the cultivation of new and more resistant varieties.

The special gene technology CRISPR can play a decisive role, as it has the potential to halve the consumption of plant protection products. At the same time, it can reduce the time needed to develop new and fungal-resistant varieties by several years. KMC is ready as soon as the EU gives the green light. Read more about our work with plant protection products on page 28.

Concerted sustainable efforts

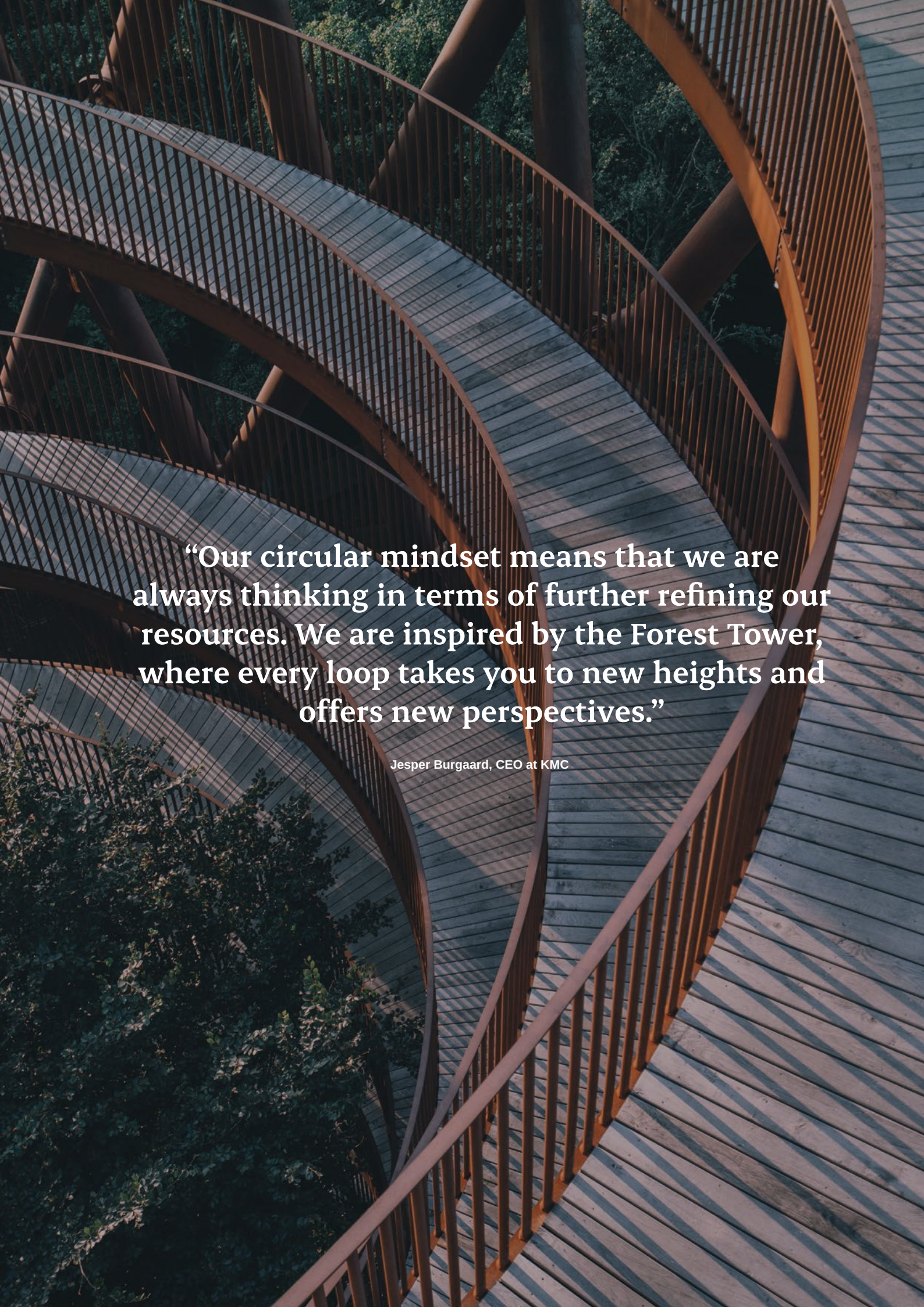
Since 1933, we have succeeded in continuously moving forward together with our customers and in strengthening our position in a constantly changing market. But we have not done it on our own. KMC's owner factories – AKD and AKK – play a crucial role in KMC's sustainable development. For AKK and AKD, sustainability is by no means a new idea. On the contrary, there is a strong correlation between the desire to produce sustainably and the factories' long-term financial interests. Learn more about what the owner factories are doing to make the most of the qualities of the potato on page 10.

Even though our circular business principles have been part and parcel of everything we do for almost 90 years, we continue to strengthen our green ambitions. In this connection, we have appointed Heidi Bretthauer as KMC's first Quality and Sustainability Director, who will be tasked with setting a sustainable course and, together with the rest of KMC, documenting the impact of our initiatives. We are finding that when both we and our customers can see business opportunities in sustainability, it becomes a lever for growth.

Our vision is for sustainability to become integrated into everything we do. We are well on our way, but we can go even further. Therefore, our CSR report also represents a commitment to the goals we have set – and to publishing the progress we have made.

Enjoy the read!

Jesper Burgaard
CEO



“Our circular mindset means that we are always thinking in terms of further refining our resources. We are inspired by the Forest Tower, where every loop takes you to new heights and offers new perspectives.”

Jesper Burgaard, CEO at KMC

For almost 90 years, the potato has paved the way for innovative ingredients – and will continue to do so in the future

KMC is a cooperative owned by Danish starch-potato farmers. Since 1933, we have developed and produced potato-based ingredients, which are used in food ingredients.

1933

Potato starch for the Danish population

In 1933, the Danish state decides that Denmark should produce its own potato starch to meet the country's needs. This leads to the formation of KMC (Kartoffelmelcentralen), which is tasked with selling the combined production from seven Danish potato farms that had been granted a license from the Danish state.

Employees
5

World War II 1940-50

During the war, food shortages increase. This impacts the conditions for Danish potato starch production, and KMC successfully starts producing and selling pearl sago, which – in this case – is made from potato starch.

Supply gaps closed 1950-60

After World War II, potato starch is occasionally imported from abroad to close the gaps in supply chains. In 1952, the situation ends, and Danish potato starch production is sufficient to start exporting.

Sales to Danish industry 1960-70

In 1960, Denmark joins the European Free Trade Association (EFTA), which enables the unrestricted trade of industrial goods between member states.

Denmark joins the EEC 1970-80

Following Danish membership of the European Economic Community (EEC) in 1973, the starch industry flourishes, and KMC increases production many times over through its sales of potato starch. Suddenly, being a potato farmer is a lucrative business.

1930 1940 1950 1960 1970

1980-90

Exports picks up

Exports pick up when KMC establishes its own development department in 1988. The aim is to improve existing products and develop new ones. The first export markets are the UK, Germany, and the Nordic countries, and KMC subsequently starts growing its exports to Japan and Taiwan in 1983.

1988

Exports see explosive growth 2010-20

After 16 years, the EU's quotas on potato starch end in 2010, and exports skyrocket. From originally only selling potato starch, KMC now producesand exports more than 60 different potato-based ingredients to more than 80 countries.

Employees
239

New innovation center coming soon 2022

The head office in Brande is set to be doubled in size, and a new pilot hall makes it possible to boost volumes and run larger batches for customers wanting to explore the scaling potential of KMC's various applications.

2000-10

Focus on food ingredients

Innovation reaches new heights in the 2000s, and KMC devotes all efforts to creating ingredients for the food industry. Production is expanded, and at the new head office in Brande in central Jutland an innovation center is established where newly hired specialists and application technicians experiment with, develop, and refine recipes. Potato-based cheese becomes KMC's first focus application.

2000

Employees
14

KMC pursues new avenues 1990-2000

Due to surplus production and decreasing prices for potato starch, in 1994 the EU imposes quotas on production in Denmark. KMC revises its strategy and establishes its first subsidiary in the UK as well as production in China and Vietnam. Throughout the 1990s, KMC focuses on ingredients for the food industry, which proves to be a door-opener to the land of opportunity.

1980 1990 2000 2010 2020

How we use the potato

Even though KMC will soon be celebrating its 90th anniversary, our philosophy remains the same: For us, simple common sense is the starting point for greener food production for the benefit of all. Therefore, we are constantly looking for and exploring new ways of utilizing the potato – for anything from juice and starch to protein and fiber – in new and increasingly valuable ways.

18-20%

Potato starch

Potato starch was the first product in our portfolio, and it is still our most important product. Potato starch is used by the food industry in products such as pasta, snacks, sauces, and alternative dairy products.
We use processed potato starch to replace or reduce animal ingredients such as casein in cheese, gelatin in wine gums, and eggs in mayonnaise.

1-2%

Potato fibers

Potato fibers are used in food production, as they bind water efficiently and have good digestive properties.

1-2%

Potato protein

Potato protein has a very special composition of amino acids that are extremely beneficial for both humans and animals. The protein is often used in animal feed, but the nutritional benefits have made potato protein very attractive in the food industry. Here, it is used, among other things, to help people with small appetites, vegetarians, vegans, and people who exercise a lot to get enough protein, while it is also being tested at the moment in plant-based meat alternatives.

73-78%

Potato juice

Potato juice – or protamylasse in concentrated form – is a nutrient-rich potato fruit juice with diverse uses. It can, for example, be used for biogas production, and be recycled as a fertilizer for farmland. In the future, we expect to see even more applications for protamylasse.

Common sustainable front

Since 1933, we have continuously managed to move together with our customers and strengthened our position in a constantly changing market. But we haven't done it on our own. KMC's potato starch factories, **AKD** and **AKK**, play an indispensable role in KMC's sustainable development.

Over the years, the two potato starch factories AKK and AKD have worked to extract all the valuable ingredients of the humble potato. It is an important part of our work to extract as much as we can from potatoes with the lowest possible resource consumption and the smallest possible carbon footprint.

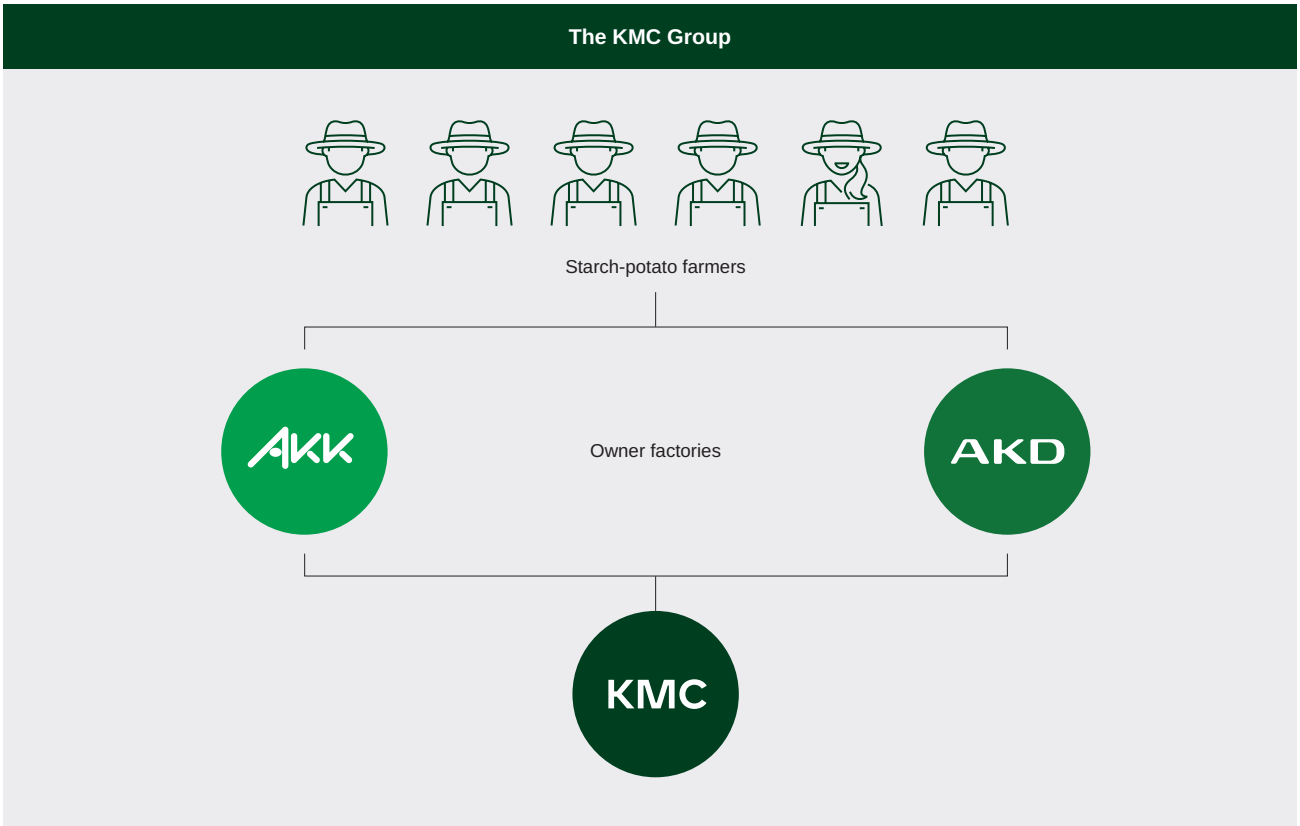
When the factories were established almost 100 years ago, the goal was to produce a single product: potato starch. A potato contains about 20% starch, so once the starch had been extracted, you were left with 80% of a raw material that could not be used. The remaining 80% was therefore primarily considered a waste product that needed to be disposed of as easily and cheaply as possible.

Today, there is virtually no waste from the 1,400,000 tons of potatoes we process every year. Every ounce of the raw material is transformed into good and marketable products, and this development is a success story for both the climate, the environment, and the company's finances.

Full utilization of the potato's qualities

The 20% of potato starch is still our primary product. It is used either directly or in processed form for food production all over the world. Potato starch is a pure plant-based ingredient that has countless uses. Often, plant-based potato starch is used to replace animal products such as milk and eggs, and is making a significant contribution to the transition to a more plant-based diet.

In addition to potato starch, we have also identified several other applications over the years.



↑ Photo from AKD in Toftlund, Denmark

Approx. 75% of the potato is fruit juice, comparable to the juice in an orange. Potato fruit juice is rich in nutrients, and at our factories we concentrate the juice into a product called protamylasse. Protamylasse has two applications: for biogas production, and also as a very popular agricultural fertilizer which is sold back to potato growers. Thus, the circular and sustainable use of the concentrated fruit juice provides nutrients from this year's harvest for next year's crops.

Whether the protamylasse is used as a fertilizer on the fields or for biogas production, there are clear energy benefits. Biogas is a clean and fossil-free energy source, and when recycled as agricultural fertilizer, protamylasse replaces conventional energy-intensive artificial fertilizer with a sustainable alternative.

During the concentration of the fruit juice into protamylasse, another product is created. We call this condensate, and it is basically the water from the fruit juice. The condensate is used for field irrigation, and in this way another part of the potato is also returned to its original cycle.

Cell walls are pure Kinder Egg

The cell walls of potatoes, which are like orange pulp, are also fully utilized.

We call the product potato pulp, and it is used in the following three ways:

1. First, we can further refine the pulp by isolating the dietary fiber into a product that can contribute important dietary fibers and a better structure to foods.

2. Next, potato pulp is a popular animal feed for cattle, for example, where it stimulates both milk yields and fat content.

3. Finally, potato pulp is also an efficient raw material in biogas production. If all the potato pulp from AKK and AKD was used to produce biogas, volumes would exceed the amount of gas consumed by the factories themselves.

The value of a long, sustainable tradition

For AKK and AKD, the increased focus on sustainability is by no means a new idea entailing only inconvenience and increased costs. We are very fortunate in that there is a strong correlation between the desire to produce sustainably and the factories' long-term financial interests.

We have a long tradition of working passionately to lower our energy and water consumption and to recycle as much of the energy and water as possible. Within the past 10 years, investments in modern production technology and ongoing optimizations have, for example, reduced our CO_2e emissions by up to 70% per produced unit. But we are not stopping there. The potato has probably not revealed all its secrets to us yet, and therefore we believe that the little tubers hold even greater potential, and that we will be able to conjure up even more exciting products from it in new and sustainable ways.

The potato is one of the world's most versatile, climate-friendly, and sustainable crops. At AKK and AKD, we are continuing our efforts to make starch potatoes and our products even more sustainable, and thus contribute further to KMC's circular business model.

Did you know that…

Potatoes contain about 2% protein, and even though this does not sound like much, it actually amounts quite a lot when processing 1,400,000 tons of potatoes every year. The protein offers a range of nutritional benefits for both animals and humans. Read more about potato protein and our work with the product at page 25.

“KMC has always taken a circular approach and, together with its owner factories, wants to strengthen its green ambitions. With my new title as Quality and Sustainability Director, I am therefore looking forward to ensuring even greater coherence in the KMC group and promoting the sustainable course we have set together. There is no doubt that sustainability is the way forward – for our planet, but also for the company’s growth and the way in which we shape the future. Customers see the KMC group as a united company, and therefore it is important that we work together. We want to focus even more on this in the future. I am very much looking forward to the green journey.”

Heidi Bretthauer,
Quality and Sustainability Director at KMC

Photo from AKK in Viborg, Denmark.

Facts about the owner factories

KMC's owner factories – **AKK** and **AKD** – are committed to extracting all the value the humble potato can offer.

Facts about AKK and AKD:

136
Employees

1,040
Cooperative owners

Annual production (tonnes):

335,000
Potato starch

15,500
Potato protein

204,000
Potato pulp

110.000
Protamylasse

Did you know that...

The production of potato starch takes place from August to January. We call this period the potato campaign.

The largest silos at AKK and AKD are 53 meters high and each holds 65,000 tonnes of potato starch.

Approx. 65% of all the potatoes grown in Denmark are used to produce potato starch.

Extract from Management Report

Continued focus on food contributes to this year's growth

At KMC, sustainability means "producing a product that contributes to solving the global challenges of hunger, climate change, and biodiversity, and that production is based on the least possible input and thus minimum strain on the earth's resources". The potato is grown in the same fields as 100 years ago, and due to the potato's long growing season and low climate footprint, it is one of the Danish crops with the lowest CO_2 emissions.

Changing requirements for plant-based foods

In recent years, the consumption of plant-based foods has increased significantly, developing into a megatrend in the West. It is a trend based on new types of meals and principles centered around climate responsibility.

This fits in well with KMC's product portfolio, which is always being developed and optimized to match the changing needs, wishes, and expectations of our customers and the market. KMC's focus on high-value ingredient solutions has once again resulted in the setting of new records and thus contributed significantly to the results for the year.

Better resource utilization

At KMC, we want to protect the environment and the climate by continuously reducing our emissions and constantly making better use of the company's resources. The principle behind KMC's business model means that, based on a circular mindset, we utilize the entire potato as a raw material to produce an increasing number of valuable products, while at the same time reducing the amount of waste and our climate footprint.

> **In the 2021/22 financial year, KMC replaced 32,450 tons of animal ingredients worldwide.**

The starch produced is inherently plant-based and widely used in the food industry. The starch can help replace or reduce animal ingredients in our customers' products. It can, for example, be used as a complete or partial replacement for gelatin in confectionery, for casein in cheese, or for eggs in mayonnaise and dressings. In the 2021/22 financial year, KMC replaced 32,450 tons of animal ingredients worldwide with plant-based ones from KMC. This represents a 23% increase compared to the previous year.

In the quest to make better use of our resources, our goal is to reduce our energy consumption per ton of processed starch by 10% by 2024/25 compared to the 2017/18 baseline.

In 2021/22, we built up and ran in a completely new product mix at the factory, which meant that total energy consumption per ton of processed starch increased 4.8% relative to 2017/18. The increase covers a 9.4% decrease in electricity consumption and a 7.2% increase in natural gas consumption. Our natural gas consumption has been particularly impacted by the changed product mix.

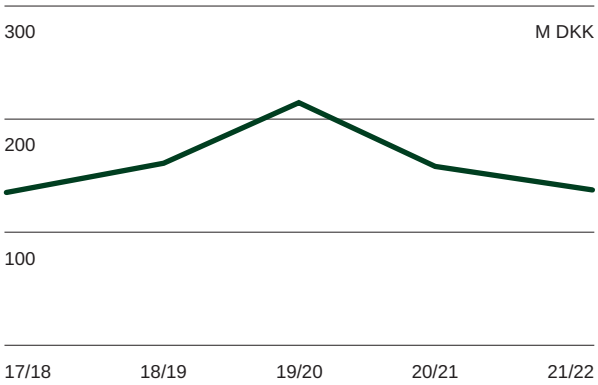
Outlook

The COVID-19 pandemic is on the wane, but local knock-on effects are still expected in our markets. The relationship between the retail and foodservice sectors has normalized as countries around the world have got a grip on the pandemic.

Costs are expected to remain high, driven by continued high energy and freight prices and by generally high levels of inflation. We expect a market situation in which we must continue to work hard to maintain the current level. Financially speaking, KMC expects a level of turnover which, due to increased volume and cost, will increase by 25-40 percent.

Highlights of the financial year

Net income



138

Net income after tax in 2021/22 totals DKK 138 million, which is 13% lower than last year's net income of DKK 158 million. The decline was expected, and primarily due to sharply increasing commodity, logistics, and energy costs. In addition, the results for the year have been affected by the shutdown of trade with Russia. In view of these difficult conditions, we are satisfied with the development.

Number of employees

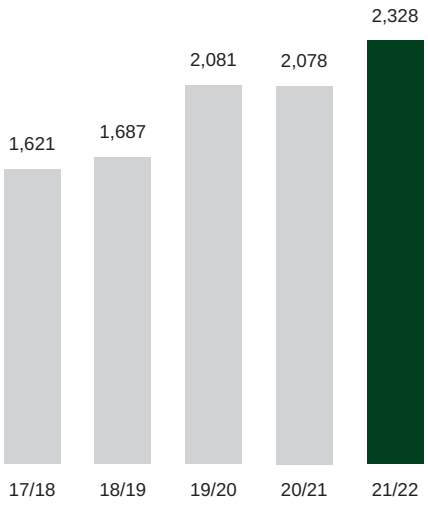
239

Since 2020/21, the average number of full-time employees at KMC has increased from 236 to 239 employees.

"Looking ahead to 2025, we are focused on fostering greater diversity within KMC, where people of all genders, ages and backgrounds contribute to the development of KMC. Among other things, within the past year we have upgraded the management with two women. We believe that diversity improves both company performance and employee well-being."

Gitte Blæsild, Head of HR at KMC

Net sales



2,328

Net sales for the year totaled DKK 2,328 million, up 12% on 2020/21.

Our five CSR goals

With the UN Sustainable Development Goals (SDGs) as a framework, we are working to achieve these five goals. We follow up on the progress annually.

Goal 1: Replace animal ingredients with plant-based ingredients

Long-term goal:
We will replace 57,000 tonnes of animal proteins with plant-based alternatives in selected food systems in 2026/27.

Goal status:
In 2021/22, we have replaced a total of 32,450 tonnes of animal protein in 60 different countries.

Goal 2: Increase the use of Danish-produced feed protein over imported alternatives

Long-term goal:
We will implement minimum 10,000 tonnes of potato protein in Danish feed in 2024/25.

Goal status:
In 2021/22, we have implemented 6,400 tonnes of potato protein in Danish animal feed.

Goal 3: Less use of plant protection products

Short-term goal:
We want to minimise the use of plant protection products as much as possible by advising the growers. Depending on the weather, the goal is 10-30% each year.

Goal status:
In 2021/22, we recommended reducing the use of plant protection products by 14.1%.

Long-term goal:
We will increase the development of new varieties with improved resistance to primarily leaf spot and mould. The goal is minimum 10,000 new hybrids a year by 2024/25.

Goal status:
In 2021/22, we created 14,900 new hybrids with focus on higher disease resistance.

Goal 4: Well-being, safety and diversity

Long-term goal:
In 2024/25, we have the following goal:

- 16% women on KMC's Board of Directors
- 25% women on KMC's International Management Committee
- 40/60% gender distribution (f/m)
- Max. 15% staff turnover
- Max. 2% rate of sickness absence.

Goal status:
In 2021/22, the status was:

- 0% women on KMC's Board of Directors
- 19% women on KMC's International Management Committee
- 41/59% gender distribution (f/m)
- 12,3% staff turnover
- 1,44% rate of sickness absence.

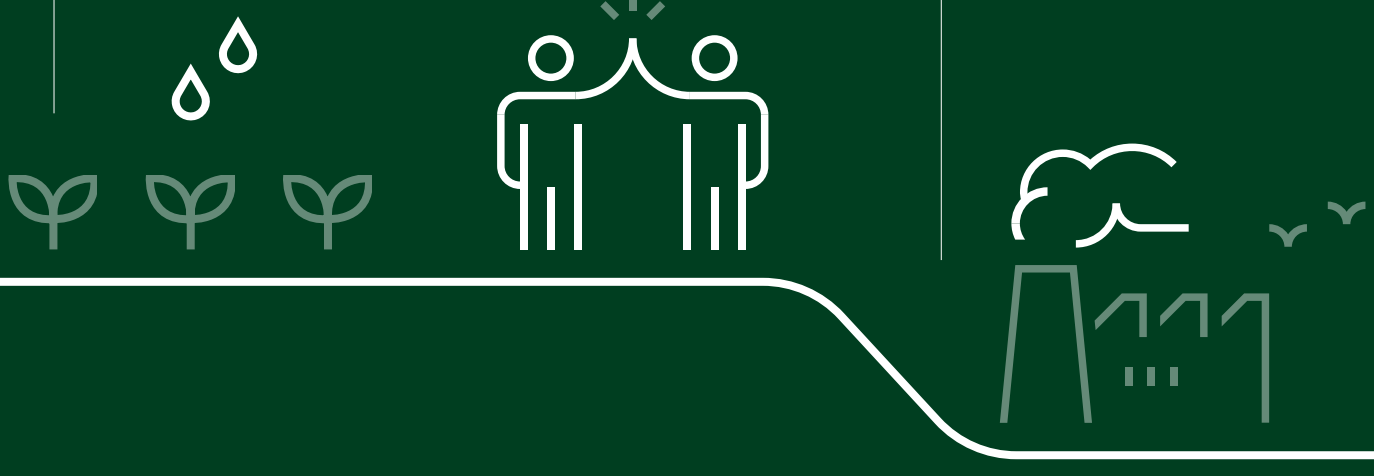
Goal 5: Reduce resource consumption and increase wastewater treatment

Long-term goal 1:
The goal is to reduce energy consumption per tonne of processed starch by 10% in 2024/25 relative to the reference year 2017/18.

Goal status:
In 2021/22, we have reduced energy consumption per tonne of processed starch by 4.8% relative to 2017/18.

Long-term goal 2:
The goal is to treat 100% of the wastewater at our own facility to a degree of purity that allows the wastewater to be discharged directly to the recipient in 2024/25.

Goal status:
In 2021/22, we treated 87% of the wastewater at our own facility to a degree of purity that allows the wastewater to be discharged directly to the recipient.



Eating plant-based foods takes getting used to

With Lise Walbom, CEO at Food Nation

KMC Goal 1: Replace animal ingredients with plant-based ingredients

SDG Goal 12: Responsible consumption and production

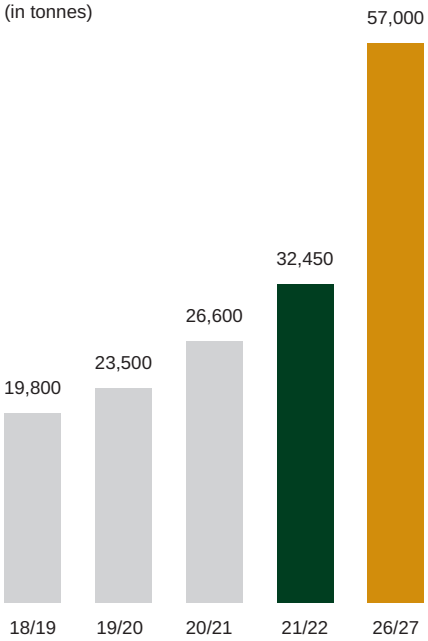
The consumption of plant-based foods is growing. However, factors such as culture, habits, and prosperity determine how quickly consumption increases, and for what reasons.

Although the consumption of plant-based foods is generally growing, the speed of this development and the actual intake depend on where in the world you live. In the West, more plant-based raw materials and meat substitutes are appearing on the supermarket shelves, and are proving increasingly popular with consumers. However, according to Lise Walbom, CEO at Food Nation, consumption is still low and only increasing slowly:

“The West is currently in a transition period, and consumers are slowly getting used to increasing their intake of plant-based foods.

Potato-based ingredients replacing animal ingredients

(in tonnes)



This is only to be expected, as the majority of their food habits and traditions have so far been – and still are – tied to meat and animal foods,” she says, adding:

“However, we are seeing a growing level of interest in meat substitutes in countries such as Germany and Spain in particular, where the expectations and requirements regarding plant-based meat alternatives are generally higher than in other parts of the world.”

Force of habit

Although eating more plant-based foods is generally a growing trend, we can conclude that culture, habits, and prosperity have a decisive influence on how motivated we are and the extent to which these foods are consumed:

“In a country like Denmark, approx. 95 kg of meat is consumed on average per person per year, while in India the figure is only 5 kg. In India, the food tradition is predominantly vegetarian, and meat is often considered an optional extra, while the socioeconomic conditions in India are also significantly different,” explains Lise Walbom, and goes on:

“In addition, we see an affluent middle class in both Asia and the Middle East, where meat production is actually growing due to increased economic prosperity.”

A lot is demanded of new, plant-based foods

According to Lise Walbom, if we start with those parts of the world where people need to become accustomed to eating plant-based ingredients and new foods, it is a question of changing consumers’ perceptions of the way in which they compose their meals:

32,450

KMC replaced 32,450 tonnes of animal ingredients in 21/22.
An increase of almost 22 percent compared to the previous year.

"We need to break with the idea that meat has to play the leading part on our plates, and instead see it as more of a luxury addition," she says.

We must come round to the idea of eating less but better meat:

"If consumers increasingly reduce their total meat intake and instead go for less but better and higher-quality meat, which has perhaps even been produced sustainably, an ever-increasing share of meals will be supplemented with or replaced by plant-based ingredients," says Lise Walbom.

The Food Nation CEO explains that in such cases we will also see consumers in future demanding more of the many plant-based meat substitutes already available in supermarkets:

"For people for whom meat still plays a central role in their meals, meat substitutes offer an attractive alternative to pure plant crops. However, consumers demand a lot in terms of the quality, taste, texture, and appearance of plant-based meat substitutes if they are to become an attractive and well-known alternative to chicken, pork, etc." says Lise Walbom. She adds:

"It would be fantastic if we, as consumers, could just accept that a vegetarian steak need not taste the same as animal meat, but just taste the way a plant-based steak happens to taste. But we're not there yet. If we want to push consumers in a more plant-based direction, they need to be nudged and inspired with recognizable and non-exotic alternatives."

Sustainable food systems gaining ground

If we zoom out and consider plant-based diets as part of a larger, sustainable movement, we can see that sustainability is increasingly being associated with healthy living, and that producers with sustainable food systems will contribute to a clear improvement in global health.

This appears from Food Nation's latest Insight Report from October 2022, which explores how four countries perceive the relationship between sustainability and health.

It can be seen, among other things, that 86% of respondents from the four selected markets – Vietnam, South Korea, Japan and the UK – believe that consumers will demand more healthy foods in the future, while 80% point out that food systems focused on food safety throughout the value chain are important for consumers' overall health:

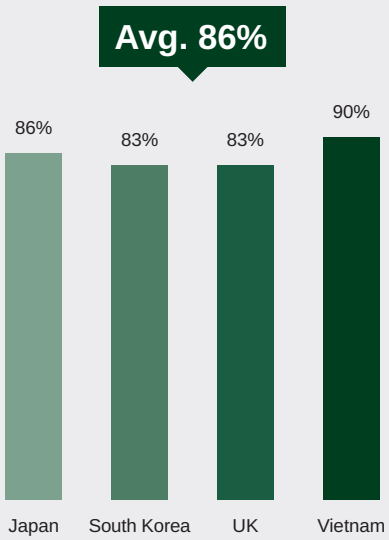
"It is no longer enough that both animal and plant-based foods simply taste good. Consumers will increasingly be concerned that the food they consume is produced under sustainable conditions," says Lise Walbom in conclusion.

For food manufacturers, there are many perspectives to be considered if consumers are to be pushed in a more plant-based direction. Here, increased requirements relating to taste and health play a crucial role for greener food consumption.

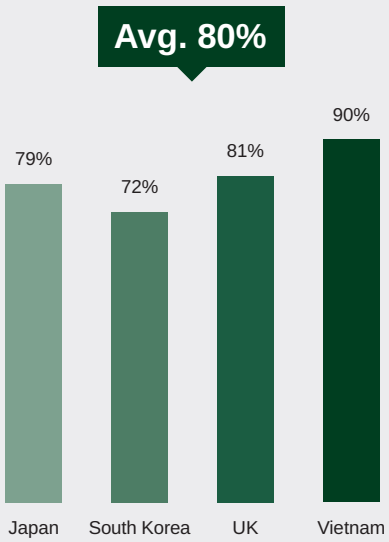
International decision-makers' perception of health

The proportion of decision-makers who agree or strongly agree with the following statements:

Statement: My company's customers are demanding more healthy food products and solutions.

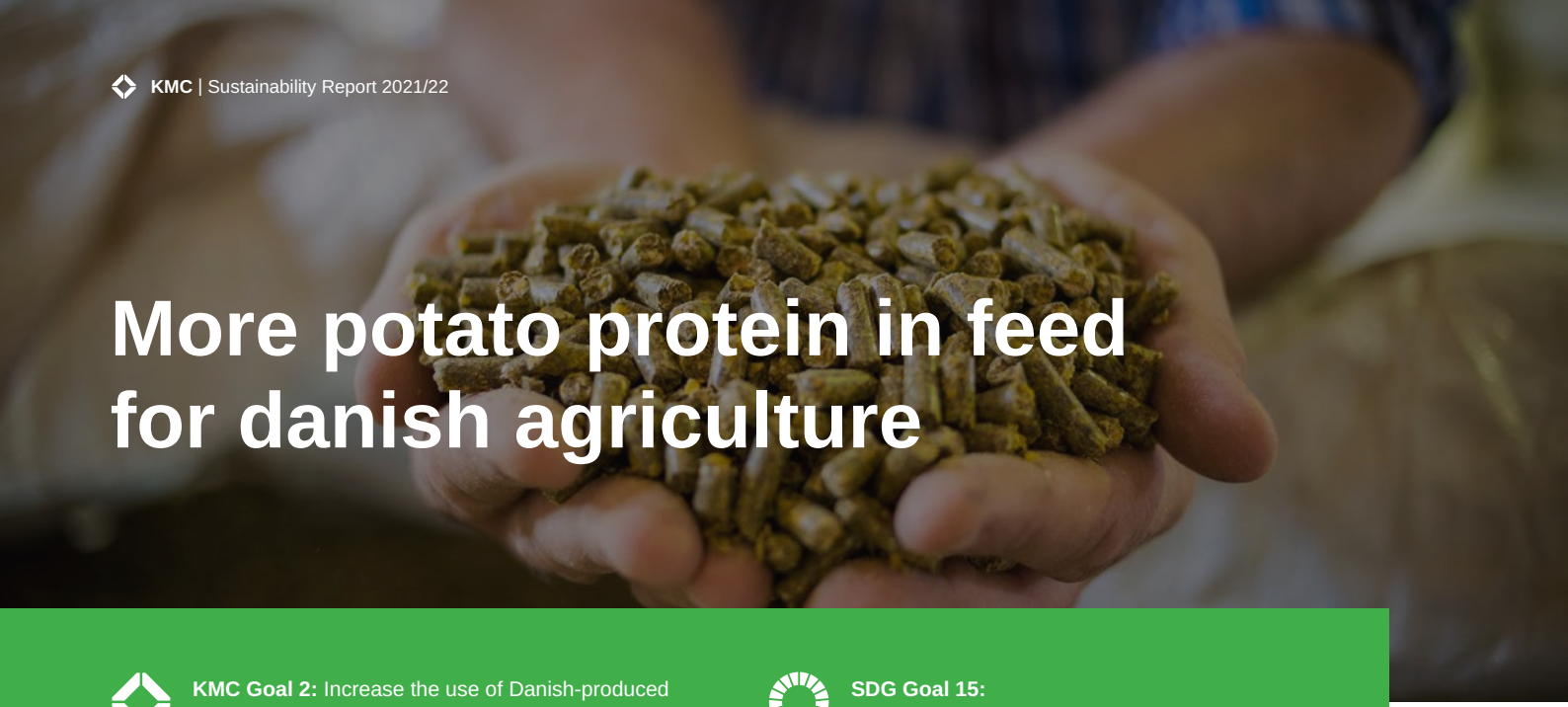


Statement: A food system focused on food security and safety throughout the value chain is important for health.



Source: Food Nation, October 2022

“At 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.”



More potato protein in feed for danish agriculture

KMC Goal 2: Increase the use of Danish-produced feed protein over imported alternatives

SDG Goal 15: Life on land

To reduce the use of imported feed protein, KMC aims to supply 10,000 tons of potato protein to Danish agriculture by 2024/25.

6,400 tons. This is how much potato protein KMC supplied to Danish agriculture in 2021/22. Thus, we have made significant progress towards delivering 10,000 tons of potato protein by 2024/25.

At KMC, we have gone out of our way to dispel old myths about potato protein. New knowledge about the product's positive properties as feed for piglets and other livestock has been very well received by the industry, which acknowledges the benefits of a sustainable alternative to imported feed protein – especially as the potato protein is also competitively priced.

> **It is about ensuring sustainable development in agriculture.**

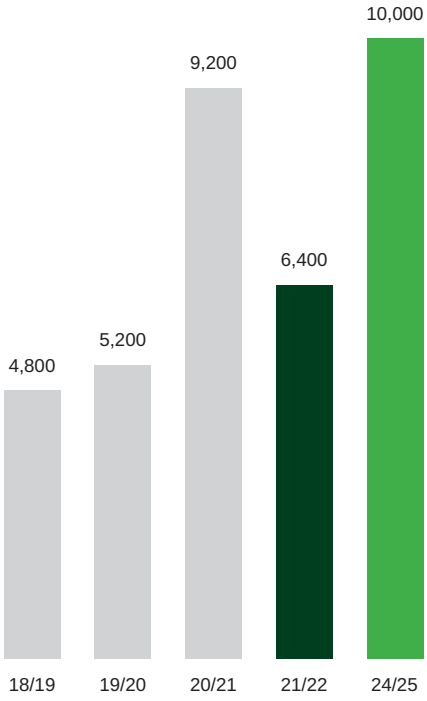
Being able to use Danish-produced raw materials with a low climate footprint is highly relevant, and many Danish livestock farmers even grow their own potatoes. In other words, the potato protein is returned to them as feed for their animals – which makes good sense.

More awareness of potato protein

KMC's product is called PotaPro 1500, and it is included in SEGES Innovation's feedstuffs table, which is consulted by farmers. This is a stamp of approval and helps raise awareness. Additionally, KMC has done some research and carried out feeding trials with varying doses of potato protein, where higher doses of the protein have been shown to have a positive effect.

Development in sales of feed protein

(Tonnes of potato protein sold to the Danish agricultural sector)



6,400+

In 2021/22, we have implemented 6,400 tonnes of potato protein in Danish animal feed. The decline is due to limited supply and not falling demand.

“We are part of a trend of using more Danish raw materials in feed – an area which is currently receiving a lot of attention. We are happy to contribute our new knowledge and research to help dispel the old myths and work towards more sustainable agriculture instead.”

Jesper Burgaard, CEO at KMC

KMC has also conducted trials with potato starch, another ingredient that can be used in compound feed. This not only binds the feed better together; it ensures that feed mixtures contain even more Danish raw materials.

Local ingredients

KMC has a goal of supplying more potato protein for Danish feed mixtures, because protein is typically a major component of feed, but is often imported. Here, potato protein can play an important role, as the potatoes are grown in Denmark and the protein is extracted from a side stream of existing potato starch production. This enables the extraction of Danish-produced protein without adding to the area of land used for agriculture or increasing the environmental impact.

It is not just about achieving our goal of supplying 10,000 tons of potato protein annually, but about ensuring sustainable development in agriculture. Therefore, KMC is engaged in several exciting projects, looking for example into ways of expanding the use of potato protein to other livestock groups.

Did you know that…

Potato protein has a better amino acid profile than most other plant-based protein sources. This means that animals can digest the protein optimally, which reduces the nitrogen emitted with the slurry used as fertilizer on Danish fields.

New product on its way

A status of textured potato protein

At KMC, we work every day to optimize how Danish potatoes are utilized. Textured potato protein is the latest addition to KMC's product portfolio and is expected to be launched in 2023.

Carsten Kirkegaard Jensen,
Head of Strategic Projects at KMC

The potato offers many unique properties for numerous applications. The tubers consist mostly of starch, while about 2% is protein. And what we previously saw as a side stream from production is today a promising independent product with considerable potential. The potato protein can be isolated, converted, and used as an ingredient in protein-rich products such as plant-based meat substitutes.

The development of the world's first textured potato protein has been underway since 2021 when we began product development based on the many thousands of tons of potato protein. It is a process that is slowly but surely moving forward. Today, the product itself is in place. Textured potato protein is based on a protein dough that is extruded – a technology that is used to produce breakfast cereals such as Quaker's oatmeal squares.

Challenge is taste

Others have launched similar TVP products based on soy, peas, beans, or wheat on the market, but the taste has been far from optimal. We want to avoid making that mistake. Together with world leaders within taste systems, we are therefore working to find a solution that, in the short term, can reduce the natural taste of the potato protein and make it attractive to our customers. So far, the feedback from our customer tests is positive, but there is still some way to go before we have the right recipe to launch on the market.

In the longer term, our R&D department is working on a solution whereby the taste is removed even earlier in the process. This is more difficult and might require a larger production setup to see it through to completion.

TVP market trends

Many people have been wondering whether the market for plant-based meat alternatives will explode as part of a green movement, but so far this has not happened – neither when looking at the number of products nor sales.

This is due, among other things, to the extensive problems with taste and texture, prices, lack of consumer confidence in new products, and concerns about greenwashing, as well as a perception that the products are highly processed.

KMC's go-to-market strategy

It is crucial that KMC goes to market with a tried-and-tested product that can live up to customer expectations regarding both quality and price. We already know that we are leading the way when it comes to texture. Our potato TVP has an extraordinary structure which no other TVP can match. In addition, it offers a number of nutritional benefits in the form of amino acids, which in other cases can only be obtained by combining different protein sources.

> **Our potato TVP has an extraordinary structure which no other TVP can match.**

We can and must reap the benefits offered by our solution. The market has stagnated after too many products of an inferior quality have been launched in too short a time, and therefore it is extremely important that our TVP is made properly if we are to fill the gap that currently exists in the market.

We want to deliver a product that lives up to our own high standards as well as our customers' expectations. This calls for patience – both on our part and also from customers.

The provisional plan is to optimize the taste and texture of the product over the coming year. We are going to work with external consultants, and test the product in collaboration with selected customers with the aim of being able to present a finished TVP product in 2023.

We are not there yet. But we are well on the way!

Potatoes on a green mission

How much impact does a potato actually have on the climate? In April 2022, Starch Europe published the results of a life cycle analysis study, which shows a positive trend in the European starch industry as a whole.

Thomas Hannibal,
Application Director at KMC

European starch producers have cracked the code when it comes to reducing CO_2 emissions and the climate impact of their products. This is evident from the results of Starch Europe's 2022 Life Cycle Analysis (LCA) Study. The analysis is based on data from Starch Europe's members, which comprise 34 European starch producers, and the results provide an overall picture of the industry's environmental impact.

The LCA is the first of its kind in which all members have collected and reported data in the same way, after which Starch Europe has processed the data in compliance with EU standards. The methodology used also complies with PEF and LCA methodology as prescribed by the ISO 14040 and 14044 (ISO, 2006) standards. According to these standards, an LCA is carried out in four phases, as was Starch Europe's LCA.

KMC's climate efforts

At KMC, we are using the recent LCA as a benchmark for our own green mission. Since Starch Europe's results are industry figures, own performance is not evident from the table. However, if we look at our own data sets in isolation, we have reason to believe that we are doing well.

> **We remain strongly focused on reducing our CO_2 emissions.**

We remain strongly focused on reducing our CO_2 emissions. Both in our production and out in the fields. Next, we are actively trying to use innovative solutions to achieve improvements, for example by integrating new technologies across the organization. Based on our existing knowledge and data and the technological advances being made, we are continuously working to become better.

Moreover, we are starting up a pilot project that will be able to say something about our growers' climate footprint in the individual fields based on collected data.

Using this tool, we hope that we can maximize the potential for each grower and learn more about the actual climate impact of growing our raw materials.

Towards a common goal

We still have a lot of work ahead of us before we have achieved our goals – both individually and at industry level, but we are seeing and feeling a growing trend. More and more of our customers want to work with climate-conscious suppliers, and we want to be right at the front of the queue.

Consequently, we have set ourselves a goal: We want to lead the way and be among the first in the starch industry to become carbon-neutral.

It is a bold, but not an impossible ambition. From 2009 to 2019, total emissions by the industry decreased by 7% despite increases in production. In other words, we are on the right track, but still some way from the goal of reducing the industry's environmental impact through a 25% reduction in CO_2 per ton of starch by 2030, compared to 2019.

With our various initiatives, we hope to be able to move not just KMC, but also our colleagues in Starch Europe towards a greener future.

Reduced use of plant protection products

– in the short and long term

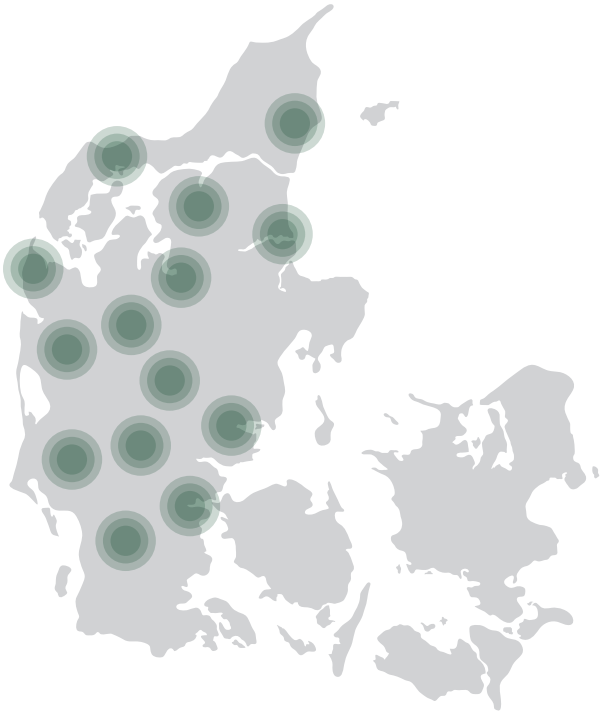
KMC Goal 3: Less use of plant protection products

SDG Goal 15: Life on land

Potato growing accounts for 2% of Danish farmland. Nevertheless, the crop accounts for a large share of agriculture's total consumption of plant protection products. This is largely due to the fact that potatoes – and vegetables in general – are more sensitive to disease than other crop types.

Fungal diseases such as mold and leaf spot are very weather-dependent – dry, hot summers inhibit the diseases, while humid weather with temperatures between 18 and 22°C allows them to spread. During the growing season, it is necessary to spray intensively – especially against fungal diseases, which can potentially destroy a field completely in just five days.

Each of the green circles marks an adjusted spray recommendation based on local weather data:



Plant protection products are expensive and labor-intensive, so we all have an interest in minimizing consumption. Therefore, we are putting a lot of effort into advising farmers on their use of plant protection, and into creating new varieties that are more disease-resistant.

Effort 1: Mold warning

During the growing season from 1 June to 15 September, KMC offers twice-weekly guidance for potato growers based on local weather information. In this way, growers know exactly how much to spray to prevent mold. The website has more than 20,000 visitors during the growing season.

In summer 2022, the potato growers who followed KMC Agro's guidance reduced their consumption of plant protection products by 14%. This is on par with previous years – except for summer 2018, which was very hot and dry.

Calender year	Recommended reduction
2022	14.1%
2021	18.8%
2020	15.3%
2019	10.3%
2018	32.6%

Financial year	Number of hybrids
2019/20	3,200
2020/21	7,500
2021/22	14,000
2024/25, goal	10,000

14,000+

In 2021/22, KMC created more than 14,000 new hybrids, which is 40 percent more than the set target for 2024/25.

Did you know that…

Every year, KMC conducts its own experiments with new potato varieties? The experiments involve testing new varieties, optimum disease control, testing new techniques, etc.

Effort 2: New varieties

We can also reduce the need for spraying by developing new varieties which are more disease-resistant. It is a method that has existed for as long as we have been growing potatoes. The challenge is that it takes up to 12 years to develop a new variety – without any guarantee that the more fungal-resistant potato variety also delivers on other key parameters such as starch content.

KMC is committed to getting a new, resistant variety in the ground. This requires the creation of many genetic make-ups. Therefore, we are pleased that we have already exceeded our target for the number of hybrids. In the 2021/2022 financial year, we created 14,000 hybrids, which is 4,000 more than the target that was set for 2024/2025. Thus, we are already well ahead of our goal.

New possibilities with CRISPR technology

One way to preserve the positive characteristics of a particular variety – and simply add resistance – is by using the CRISPR technique. The technique uses a bacterium to create mutations in the plant's DNA, thereby producing a mutation that is more resistant to the disease. Just like a vaccine that improves our immune system.

In other words, you simply add a new property to a known variety. If successful, it can halve the use of plant protection products – and reduce the time needed to develop a new variety by 3-6 years.

Today, the technology can only be used in European laboratories – and not in the fields – because it is covered by the EU's GMO legislation. However, CRISPR is widely used in the USA and Canada. At KMC, we are working together with Aalborg University and the University of Copenhagen, so we are ready to get started immediately as soon as the EU hopefully approves the technology.

At 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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