OUR POTATOES
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Versatile and popular

The potato is a remarkably versatile plant. Thanks to its being easy to cultivate and its excellent nutritional properties, this humble tuber has made itself a permanent feature on the food pyramid in many parts of the world. For example, the potato contains more vitamin C than an orange and more potassium than a banana.

After arriving in Denmark in the mid-1800s, the potato quickly became a basic part of the national diet. Over time, potatoes became widely considered as almost a national dish. However, statistics indicate that the popularity of the traditional peeled and boiled potato is now declining, with Danes having developed a taste for alternatives, such as pasta and rice.

The innovative potato

Nevertheless, while people may be eating fewer potatoes, many other foods are increasingly benefiting from potato starch, protein and fibre. Almost unnoticed, the humble potato ensures that foods have the right texture, helps reduce fat content and makes sure cheese melts as required. Potato starch, protein and fibre are also used to help maintain the structure and appearance of food products, and to extend their shelf lives.

Years of closely targeted product development have endowed KMC potato starch with a broad range of specialised functions in food products sold all over the world. Such endeavours continue to add new dimensions to the versatility of the remarkable potato.
Weather affects potato vulnerability

Just like all other plants, the potato is vulnerable to a wide range of pests and diseases. Some only attack the potato in specific fields or under particular climatic conditions, while others appear in more-or-less every growing season.

A key trait shared by many of the diseases that attack the potato is that the weather not only determines whether an attack will take place, but also how serious the attack will be.

A disease with a lot to answer for

The most serious potato disease is late blight – a severely epidemic fungal disease that infects the green part of the potato plant and can quickly spread to the entire field. If late blight is not tackled promptly and effectively, the pathogen causes the plant to wither, and the potato tubers rot in the soil and while in storage.

The Great Irish Famine of 1845–49 was a terrifying example of what can happen if late blight is not dealt with in time. The blight infestations in Ireland caused the potato harvest to fail disastrously several years in a row, resulting in over a million deaths, and forcing at least a million more people to leave their homes and emigrate to the United States and elsewhere.
Serious consequences in Denmark as well

Fortunately, late blight has never had such a dramatic impact in Denmark. Nevertheless, there were several occasions in the 1920s when the "potato illness" brought many Danish families close to starvation.

So even in Danish conditions, late blight has played – and continues to play – a significant role in determining whether supply meets demand.

First example of treatment

Blight diseases do not just affect potatoes; they can also prove destructive to many other crops. The first plant protection agent was actually developed by a pharmacist in Bordeaux, France, in the 1880s to protect grape vines against serious wine diseases that could sometimes wipe out entire harvests.

The "Bordeaux mixture", as it became known, is a solution of blue vitriol (copper sulphate) and burned lime (calcium hydroxide), and the mixture is simply sprayed onto vines and grapes. Because this agent can also be used to prevent other diseases in apples, pears, potatoes and other crops, it has been used all over the world.

Bordeaux mixture was banned in Denmark many years ago, due to fears about the toxicity of copper, and how it accumulates in the soil. However, the European Commission has extended its authorisation for the use of copper compounds (including copper sulphate) as bactericides and fungicides in organic farming – including potatoes.
Organic farming not the answer

We are sometimes asked why KMC growers don’t use organic farming methods for all the potatoes needed for KMC starch production. Couldn’t that be a viable answer to the vulnerability of the conventional potato varieties?

Unfortunately not. Contrary to widespread popular belief, organic production is not the answer. Organically grown potatoes are just as susceptible to blight and other fungal diseases as their conventionally grown counterparts. In Denmark, the use of fungicides to control blight in organic potatoes is completely forbidden. As a result, the cultivation of organic potatoes is restricted to a short period in the middle of summer, simply because in most years the blight kills the plants in July or August. In some years the harvest therefore fails completely.

This explains why the supply of organic potatoes is always limited as well as unreliable. As a result, organic potato starch currently accounts for only approx. 0.3% of overall KMC starch production, and in one sense it is fortunate that there is very little demand for organic potato starch from our end-user consumers.

There’s also a huge practical hindrance to the widespread adoption of organic operation for potato growing. The yield from an organically grown potato field is approx. 4 tons of potato starch per hectare, while a conventionally grown field yields approx. 11 tons per hectare. This means that if the volume of potato starch KMC produces today were to be grown organically, the company would need to access to 70,000 hectares of land for potato farming compared to the 25,000 hectares we draw on today - i.e. almost three times the current area.
Because Danish disease prevention legislation stipulates that potatoes may only be grown in the same field once every three years, KMC would need to have a total of three times this area at its disposal, corresponding to at least 210,000 hectares compared to 75,000 hectares today.

At a time when it is increasingly common to convert agricultural land into uncultivated areas and natural habitats for wildlife, it would therefore be very difficult to find the cultivated area needed to make the switch to organic farming.

**Preventive measures preferred**

In order to protect potatoes against blight, KMC potato growers therefore use a range of modern plant protection methods – also called Integrated Pest Management (IPM).

Many of the plant protection products used here function as a kind of protective “raincoat” for the plants. Most take the form of a combination of active ingredients, a micronutrient (such as manganese, which plants need to grow) and some additives that help the agent adhere to the leaves of the potato plant.

The agents are sprayed out over the potato plants and form a protective barrier on both leaves and stems. This makes it difficult for the blight spores to penetrate and grow in the leaves, thus protecting the plants against blight.
The potato growers have to repeat such treatments at regular intervals to maintain the efficacy of the protective “raincoat” because the new leaf and stem growths are completely unprotected, and the UV light from the sun is constantly degrading the protective barrier.

These preventive measures therefore usually involve 8–14 fungicide applications, 2–3 applications with herbicide to combat weeds and 2–3 insecticide applications to protect against insect pests.

**Strictest plant protection regulations in the world**

The Danish regulations for the approval and use of plant protection methods and products are world-renowned as some of the most stringent in the world.

All the protective agents used by KMC growers have been approved with regard to both efficacy and environmental impacts by the relevant environmental authorities in the EU as well as Denmark.

**Monitored and documented**

KMC and the specialist potato growers that own the company have a uniquely close relationship in which both parties are dependent on the other’s compliance with relevant legislation and commercial success. KMC has access to all the growers, and is able to monitor all field operations and provide support and advice from specialists when needed.
This also means KMC can ensure full field-to-factory documentation of growing conditions, pesticide use and quality standards.

**Targeted work to prevent and combat disease**

Through ongoing consultancy and collaboration with the potato growers who actually own KMC, the company is working actively to ensure that the newest and most environmentally responsible products are used to protect the plants.

KMC also focuses on cultivating and testing new varieties of potato with the best possible natural disease resistance in the plant. Breeding for new varieties with high disease resistance is ongoing because the natural sources of plant resistance are constantly being broken down as a result of the emergence of new aggressive strains of plant diseases.

For the same reason, it is unlikely that it will ever be possible to breed a potato variety that is fully resistant to all fungal infections and diseases and therefore requires no protection.

The KMC website provides the growers with advice about decision support systems that can help the farmers optimising the use of fungicides, herbicides and insecticides and reducing the number of applications needed. This means KMC growers can treat their fields at times when the risk of attack is greatest, and spray less during periods when the disease level – and thus the risk of infection – is lowest.
New technologies open up new options

New technologies – such as surveillance from satellites, drones fitted with advanced vision technology and site-specific GPS-based spraying systems – are now available. This growing range of new tools brings plant protection into a new era of accuracy with regard to monitoring as well as preventive measures. Development is ongoing, and it is now already possible to protect fields of plants with a previously unheard level of precision and efficacy.

Healthy plants live a long, robust life, producing the consistently high-quality tubers KMC requires for its production processes. Whereas any disease attack results in inefficient cultivation and poor utilisation of the natural resources in the soil.

That’s why it is in the clear interest of KMC and the potato farmers to keep the plants as healthy as possible at the same time as doing everything realistic to restrict and limit the use of plant protection products.

But despite all these efforts and the technological improvements of recent years, it is still hard to imagine a point where there is no need to protect potato plants against diseases that are constantly evolving.
Your response is welcome

KMC is committed to making sure its staff, suppliers and working partners comply with the highest standards – both written and unwritten – when doing business.

We would welcome any ideas that could lead to improvements.

If there’s anything you would like to know about how we at KMC conduct our operations, please contact our CEO Jesper Burgaard at jbu@kmc.dk

If you wish to express an opinion on any particular point, or draw our attention to something you disagree with, please contact Chief Agronomist Christian Feder at cf@kmc.dk

You can download this document from the KMC website, at www.kmc.dk/about-kmc/about-kmc/responsible-business

If you’d prefer a printed version, please contact Chief Agronomist Christian Feder at cf@kmc.dk

Please note that this document will be adjusted and updated, when appropriate.