

Potatoes - that's all you need!

Maria Zamkova, CEO at Fenix Legal, details the weird and wonderful uses and inventions born from the humble potato in advance of Sweden's annual Potato Day.



Maria Zamkova

On October 26, when the potatoes are freshly harvested, the yearly traditional Potato Day is celebrated in Sweden. It is organized by the Potato Academy in connection with the Potato Industry Foundation.

The academy's motto is "For the potato in time". So, what is so special about potatoes?

The potato, originating in the Bolivian-Peruvian Andes region around 10,000 years ago (according to Wikipedia), arrived in Europe, via Spain and the British Isles, by the end of the 16th century. Today, it is the world's fourth most important food crop, according to the CABI Digital Library.

In Sweden, the potato was first mentioned in print in 1658, when the botanist and professor of medicine Olof Rudbeck (1630–1702) published a Latin text listing the plants in Uppsala University's botanical garden, which he had recently founded, with "botanical plants" brought from the Netherlands. Rudbeck classified the plant, *Solanum tuberosum*, as both an ornamental and edible plant.

However, this plant is useful for so much more than just food. Some practical examples found when searching on the Internet:

- Fertilize plants: just make a hole in a large potato and pop a geranium stem inside and the potato will help the plant get off to a great start, whether independent of where it is planted;
- Soothe burns: apply a slice of raw potato in a compress to help relieve a minor burn;
- Remove rust: cut a potato in half, dip the cut side in baking soda and then rub the baking soda-covered side against the rust spot;

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- Avoid fogging up the bathroom mirror: Cut a potato in half, rub the cut surface against the mirror and let the juice dry thoroughly before showering.
- Potato face mask: puree some raw potato with water to form a paste, then spread over your face. Leave for around half an hour, then rinse off thoroughly.
- Remove broken light bulbs: Cut a potato in half, then press gently onto the remaining glass and carefully unscrew.
- Stop ice forming on windshields and glass cold frames: just rub a potato on the glass during winter.
- Reduce puffy eyes: a perfect alternative to the traditional cucumbers – put slices of raw potato around the eyes.
- Soothe itchy skin: apply sliced raw potato under a compress until the itchiness is relieved.
- Stamps: halve a potato, pat the cut ends dry, press your chosen cutter into the cut end of one of the potato halves, remove the cutter from the potato – You have a stamp
- Soothe a headache: try massaging your temples with slices of raw potato.

(Sources: netto.se, ruralsprout.com, cookist.com, bbcgoodfood.com, etc)

Well, while many of the abovementioned examples are old traditional folk uses, which are not always fully scientifically tested (but work well in practice), and not patent protected, there is a lot of intellectual property protection where potatoes are the main (or at least important) ingredient.

Some examples (around 600) are listed at JUSTIA Patents (patents.justia.com), and a search in the Swedish PTO's database gives close to 4,300 examples of patents associated with potato biotechnology or other technical solutions related to potatoes.

Potato-based vodka

As noted, potatoes came to Sweden in the 17th century, but were initially not much appreciated as food, other than for livestock and poor farmers. That changed in 1746 when Countess Eva Ekeblad invented potato flour (to be used for makeup) and a productive way to make potato-based vodka ("brännvin"). She wrote to the Swedish Royal Academy of Sciences and presented her inventions, which resulted in her being elected

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two years later – at the age of 24 – as the first female member of the Academy.

Her inventions were very important: when the spirit was now made from potatoes, the traditional grain could instead be used for more general useful things, like bread. And using potatoes as an arsenic-free powder became very popular at a time when powdering the face and wig was a necessary part of the daily dressing routine for both men and women from the upper class.

It is rumored that Mrs Ekeblad decorated her wig with potato flowers, thereby also showing the possible use of potatoes in the fashion industry of the future.

Today, Swedish vodka is back to being made with traditional grain (rye, wheat, barley), like the internationally famous vodka ABSOLUT. Potato is more common in Norway and Poland. However, there is a new local Swedish vodka made of 100% Swedish potatoes, from Bergslagens Destilleri. The trademark is, of course: GOLDEN POTATO.

Potato-based inventions are continuously seeing the daylight in today's Sweden.

Potato-based vaccine

In 2004, at the University of Uppsala, Sweden, the researcher Niclas Rydell doctorate on the development of a new, drinkable vaccine against diphtheria ("Development of a New Oral Vaccine against Diphtheria and the Study of its Immunogenicity in Mouse and Man", ISBN 91-554-6069-0). Diphtheria is a bacterial disease that spreads in much the same way as the common flu, that is, through mucous membranes in the mouth and nose. The disease is serious and often leads to death. The best protection is preventive vaccination. But today's diphtheria vaccine must be injected. A potable vaccine would make mass vaccinations easier and less expensive, and at the same time provide better protection against the disease. Rydell's solution is based on a genetically modified variant of the traditional bacterial toxin. The

Résumé

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substance is 99% identical to the original bacterial poison, but without the toxic effect. It has then been linked to porous microparticles of starch. The particles make the response from the body's immune system stronger and the protection better, at least as long as the vaccine is tested on mice. When tested on healthy human volunteers, the protective effect disappeared, likely – according to Rydell – because the starch particles break down in the digestive system. The idea is however still alive, and modified versions are being tested.

“Potato Plastic”

In 2018, the Swedish industrial designer Pontus Törnqvist, was the Sweden National winner of the James Dyson Award for his “Potato Plastic”. The fast-food industry consumes massive volumes of single-use plastic every year – and researchers calculate it often takes 450 years for plastic to decompose after serving human needs for an average of just 20 minutes. In Sweden, around 40% of plastic packaging is recycled. This means that 60%, or 98,550 tonnes, is still not taken care of. Much ends up in the oceans and causes great damage. At the same time, the plastic that is incinerated contributes to greenhouse gases and global warming. There is indeed a need for alternative solutions. Törnqvist developed a material that is similar to plastic but consists of potato starch and water. With the help of heat, a thick liquid is created that can be placed in molds. Through further heating, the material takes on a malleable solid form. The material is perfect for use in disposable items that do not require a long service life, such as eating utensils, condiment bags, and to replace plastic straws.

“My aim with this project was that we should question the way that we are using and producing plastic, and therefore illustrate an example of a material that could work as a substitute material for it. This material is made of what comes from our earth, and it can later on just as well end up in the soil without any risks to nature,” said Törnqvist when he received the award.

Potato-based ice cream

One of the most recent examples of potato-based inventions is the company Veg of Lund AB's Swedish patent (SE 2250375-9) for a vegetable ice cream, based on a combination of potatoes, rapeseed oil, and a vegetable protein in the form of a frozen emulsion.

Professor Eva Tornberg, founder of Veg of Lund, said in a press release, “The fact it is based on such an everyday crop as potatoes shows the uniqueness and strength of the patent.”

This is not the first potato invention from Veg of Lund. The company has also a patent for a plant-based potato drink, “vegan potato emulsion”



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(EP3687298), trademarked as DUG and available in food stores around Europe. As to the summary of the invention: “It has surprisingly been provided according to the present invention a vegan, potato emulsion which is an excellent substitute for milk. The potato emulsion has similar properties to milk and can be consumed as such or used as an additive in a drink such as tea or coffee”.

Potatoes as fuel

And food becomes gas, which runs factories for the manufacture of food, whose remains become gas which... The Swedish potato chip factory Estrella in Angered outside Gothenberg, is the leading producer with millions of snack bags yearly. The chip factory has switched from natural gas to biogas and reduced its carbon dioxide emissions by 92% since 2017. In addition, the potato residues from chip production contribute to increased biogas production.

So, have that in mind next time you buy potatoes. It is not just for making pommes frites. You can drink it, clean your car, reduce your puffy eyes, and get a clear bathroom mirror. Make sure you have potatoes in your home. That's all you need.

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