

Improved starch for health and environment

Mariette Andersson uses the new technology genome editing to design tailor-made plants with better properties. Her focus is on potato starch. Starch that can be used for bioplastics and healthy starch with a low glycemic index are just two examples of all options with genome editing.

– Genome editing is a very powerful tool, and it can be used in many ways to improve sustainability and health, she says.

Mariette and her colleagues develop new potato varieties where they tailor the starch quality for various purposes. Potato starch is made up of the molecule *amylose* (20-30 percent) and *amylopectin* (70-80 percent). By editing various stages in the starch biosynthesis, they have been able to develop varieties with either only amylopectin or with mostly amylose, instead of a mix between the two.

The starch with amylopectin is, when used in products, storage stable and can pass through several processes in food production without losing its function. This starch can be used to give texture to soups, sauces and creams without the need of chemical modification. The content list on food packages sometimes shows “modified starch”. This chemical modification is energy- and resource-demanding. Amylopectin potatoes would thus be a more environmental-friendly alternative.

– A cooperation with Lyckeby Starch AB has resulted in an amylopectin potato that is ready for upscaling, and later on commercialization, says Mariette.

Starch with only amylose has other benefits. It has a low glycemic index and acts more as a dietary fiber than a carbohydrate. The reason is that the amylose molecules have long straight glucose chains. The amylopectin has, in cont-

rast, short branched chains. The properties of the amylose make it suitable also for environmental-friendly packaging materials.

Much of the attention that has landed on Mariette Andersson in recent years has been about genome editing, method development and the advanced amylopectin and amylose starch products. Products which might have difficulties to enter the market due to EU regulation.

- If we shall achieve the sustainability goals, we must change our lifestyle. But we must at the same time come up with technological innovations that can contribute to sustainability. Our research is an example of how new technology can contribute to sustainable development, but the European legislation that regulates genetic modification and genome editing is unfortunately a hurdle, explains Mariette Andersson.

Mariette Andersson has studied potatoes and starch quality during most of her career. She wrote her doctoral thesis when she was employed in the plant biotech industry.

– My industrial background has made me interested in applied research. I am glad that my results are applicable and of interest for the industry.

/ Text Lisa Beste. Portrait photo Viktor Wränge.



Genome editing can make this potato healthy.
Photo: Mariette Andersson.

Genome editing

Genome editing, or genome engineering, is a type of genetic engineering in which DNA is inserted, deleted, modified or replaced in the genome of a living organism. Unlike early genetic engineering techniques that randomly inserts genetic material into a host genome, genome editing targets the insertions to site specific locations. (Wikipedia)



About Mariette Andersson

Mariette Andersson is a Researcher and Deputy Head of Department at Swedish University of Agricultural Sciences, Department of Plant Breeding, SLU, Alnarp. Her main research interest is to design plants to produce tailor made compounds with health- and/or environmental benefits, by using genome editing or genetic modification. Prior the current position, she was working 12 years in the plant biotech industry, focusing on the development of different potato traits and characterisation of GM elite events for deregulation in EU. Mariette received her PhD in Biochemistry from Lund University 2004.

