



LIFE CYCLE ASSESSMENT SIDE STREAM POTATO STARCH

REGAIN... THE NEW, TRUE WAY OF SUSTAINABLE LABELLING ADHESIVES

This factsheet will gain insight in the carbon footprint, water footprint and land use of side stream potato starch.

KEY FINDINGS

- ✓ The carbon footprint of side stream potato starch is lower than the carbon footprint of potato starch which is processed in a traditional way from the whole potato.
- ✓ Side stream potato starch has also a lower environmental impact than potato starch which is processed in a traditional way from the whole potato, among others, land use and water scarcity.



Side stream potato starch has a **lower carbon footprint** than traditional potato starch



Less water is needed to produce side stream potato starch than traditional potato starch



Less land is needed to produce side stream potato starch than traditional potato starch

1. THE SUPPLY CHAIN OF SIDE POTATO STREAM AND TRADITIONAL POTATO STARCH

Starch originates from potatoes and is used for several applications. The side stream potato starch produced by Novidon is used in food, wall paper paste, paper bag and labelling adhesives (in exclusive cooperation with cph Deutschland Chemie GmbH) and drilling starch. There are roughly two ways to produce starch. The first route is starch processed in a traditional way from the whole potato. Novidon is using another route. She mines starch from process water of producers of crisps and French fries. Which means that the starch is based on a co-product. So no extra potatoes are grown for the starch produced by Novidon.

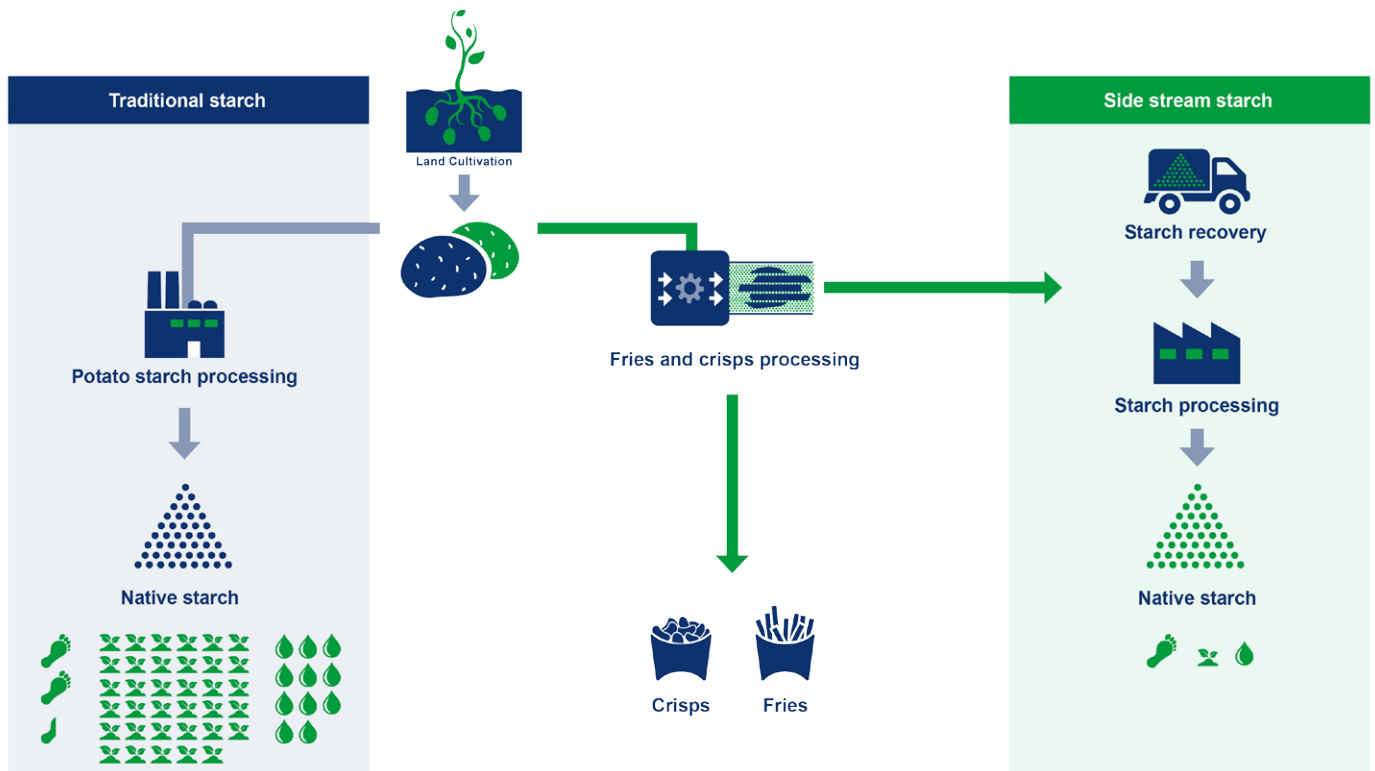


Figure 1 Production process traditional and side stream starch

2. LOWER CARBON FOOTPRINT SIDE STREAM STARCH CAUSED BY USE OF CO-PRODUCT

Side stream potato starch has a lower carbon footprint than traditional potato starch. The main reason for this is that for traditional potato starch potatoes are specially grown for starch production. So by traditional potato starch most environmental impact of starch potato cultivation is allocated to the starch (as the main product). Side stream potato starch is made of potato co-products. All the impact of potato cultivation is allocated to the fries and crisps.

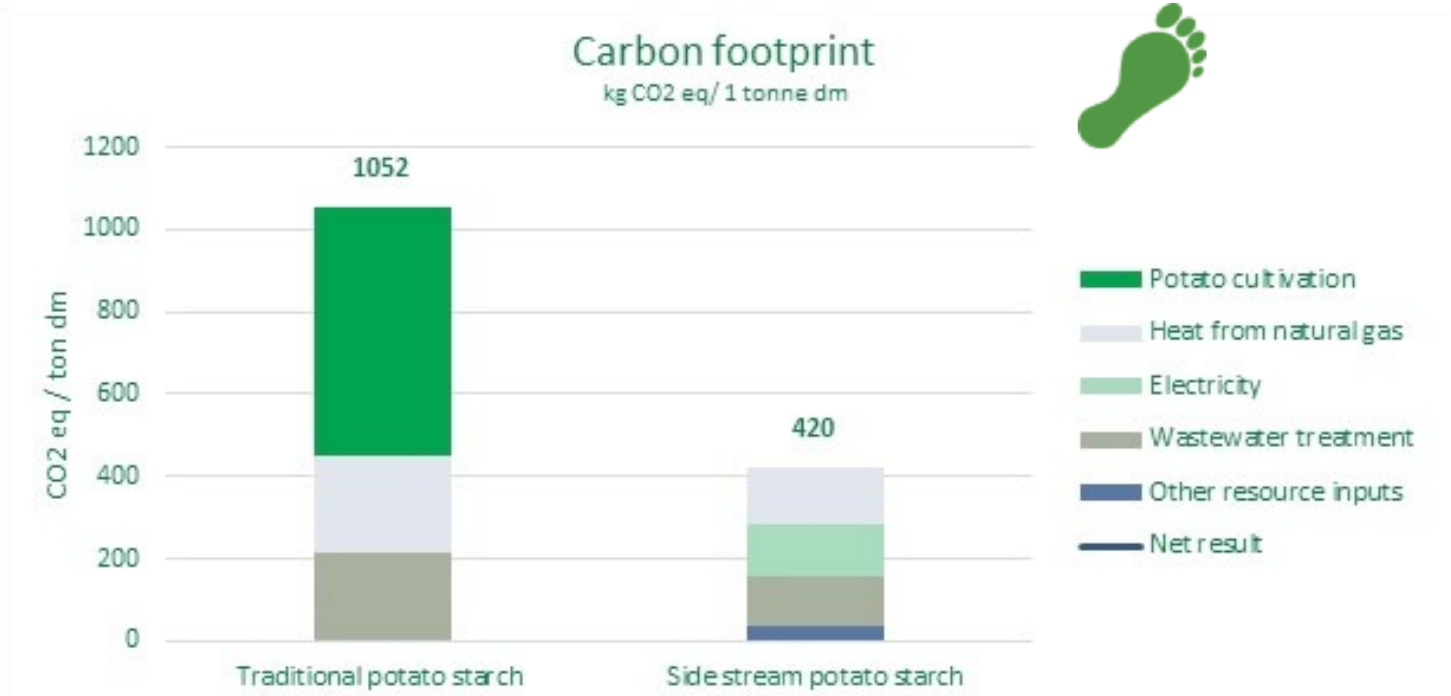


Figure 2 Carbon footprint of 1 tonne dm side stream potato starch and 1 tonne dm traditional potato starch
Starch recovery not included in carbon footprint since zero allocation is used.
Other resource inputs: water use and transport from potato processing company to Novidon factory

3. SIDE STREAM POTATO STARCH HAS A LOWER ENVIRONMENTAL IMPACT THAN TRADITIONAL POTATO STARCH

Side stream potato starch has a lower environmental impact than traditional potato starch regarding relevant impact categories such as, carbon footprint land use and water scarcity.







	Traditional <u>potato starch</u>	Side stream <u>potato starch</u>
<p>Carbon footprint</p> <p>Concentration of greenhouse gases (GHG's) in the atmosphere expressed in CO₂ equivalent.</p>	 <p>1052 kg CO₂ eq / ton dm</p>	 <p>420 kg CO₂ eq / ton dm</p>
<p>Land use</p> <p>The area of land that is occupied for a certain time-period.</p>	 <p>1061 m²a / ton dm</p>	 <p>0.013 m²a / ton dm</p>
<p>Water scarcity</p> <p>The amount of water used (adjusted for local scarcity).</p>	 <p>7.7 m³ water <u>eq</u> / ton dm</p>	 <p>0.7 m³ water <u>eq</u> / ton dm</p>

Figure 3 Comparison environmental impact side stream potato starch and traditional potato starch

Reading guide:

Explanation by an example. The carbon footprint of traditional potato starch is approximately 2.5 times higher than side stream potato starch.

GOOD TO KNOW

WHAT IS AN LCA?

A Life Cycle Assessment (LCA) is an analytical method and tool for calculating the environmental impacts of a process or a product along its life cycle. The outcome is a list with scores on each of the environmental impacts. International guidelines describe the framework and provide guidelines on how to perform an LCA study.

CALCULATION METHOD

This LCA is conducted by independent agency Blonk Consultants based on:

- International ISO guidelines 14040 and 14044.
- The model is developed in the LCA software Simapro 8.4
- ILCD 2011 Midpoint+ v1.10 is used as the main impact assessment methodology.
- Product Category Rules for Starch Industry Products

ALLOCATION

In the LCA both economic allocation as well as zero allocation was studied. In this factsheet the results for zero allocation are presented.

- This conforms with the feed PEFCR: "If primary data are collected for feed ingredients economic allocation shall be done according to the procedure described in the LEAP feed guidelines".
- In the LEAP Guidelines set by the FAO it is set that wet residues of the food industry have zero allocation at the point of production.

BOUNDARIES

The system boundaries are set from cradle to gate, or else from the potato cultivation through the potato chips and fries industry and the final processing to the reclaimed starch produced by Novidon.

DATA

Data	Source
Potato cultivation	Agri-footprint database
Potato processing	Modeling by Blonk Consultants based on previous studies
Sales prices at potato processor	Duynie Group
Starch recovery	Modelled based on publicly available data on electricity consumption
Side stream potato starch production	Novidon, part of Duynie Group
Traditional potato starch production	Agri-footprint database
Other data and background datasets	(Mainly) Agri-footprint database

MORE INFORMATION

The full report is available on request via your contact person at Novidon or via c.kroft@novidon.com.

For more detailed information about the new labelling adhesive range (brandname REGAIN) of cph Deutschland Chemie GmbH, which are based on the side stream starch of Novidon, please contact info@cph-group.com.

ANNEX: WATER FOOTPRINT

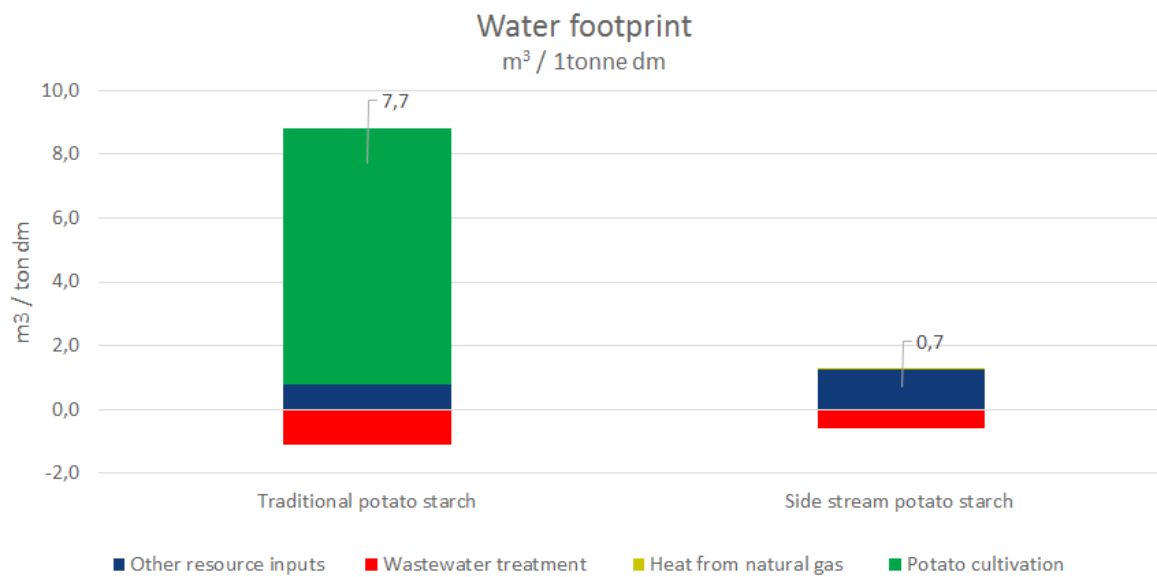


Figure 4 Water footprint of 1 tonne dm side stream potato starch and 1 tonne dm traditional potato starch
Starch recovery not included in carbon footprint since zero allocation is used.
Other resource inputs: water use and transport from potato processing company to Novidon factory

ANNEX: LAND USE

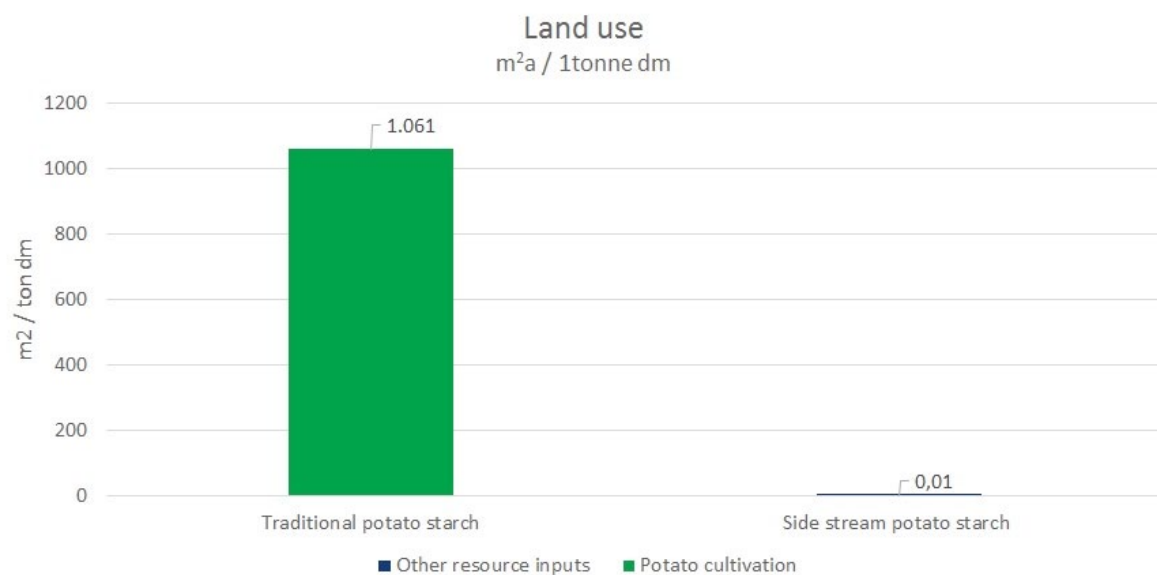


Figure 5 Land use of 1 tonne dm side stream potato starch and 1 tonne dm traditional potato starch
Starch recovery not included in carbon footprint since zero allocation is used.
Other resource inputs: water use and transport from potato processing company to Novidon factory