

Compostable nappies

Nappies for a sustainable bioeconomy

In an EU-funded project, the Tübingen-based biotech company Novis is working with international partners to develop a fully compostable nappy that contains no plastic parts. This could reduce the huge quantities of used disposable nappies that have been produced to date and the enormous costs of disposal, as well as avoiding the greenhouse gases produced when they are incinerated.



Superabsorbents made of sodium polyacrylate (left: dry; right: after absorption of water).

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Germany's babies use ten million nappies every day in their first two years of life. 95 percent of these are disposable nappies, which cannot be composted or disposed of in landfills because of their plastic components; the only solution is to incinerate them. In a city the size of Berlin more than 40,000 t of disposable nappies accumulate each year (that's up to ten percent of all household waste). These need to be disposed of and incinerated at an estimated total cost of over ten million euros.¹⁾ For cities and municipalities, the disposal of nappies and similar hygiene products not only represents an important cost factor, but also, because of the associated CO₂ emissions, an environmental burden that needs to be taken into account by municipal waste management companies when seeking to meet the obligation to reduce their greenhouse gas emissions to create a climate-friendly bioeconomy. Incinerating used nappies is also not good in terms of energy consumption due to their high moisture content.

Nappies contain plastics in the elastic cuffs around the legs, closures and tapes, as well as in the adhesives, and the superabsorbents (superabsorbent polymers) in the liner. Superabsorbents can absorb moisture many times their own weight and have become indispensable for all absorbent incontinence products. Although a number of supposedly biodegradable products are now on the market, a glance at the product information reveals that this is not a hundred percent true as they still contain various plastics. The British newspaper 'The Guardian' wrote in 2010 that such biodegradable nappies "could take up to 50 years to decompose" in a landfill site, and also produce methane, a potent greenhouse gas that is highly damaging to the climate. Within the EU, regular composting is out of the question as long as nappies with plastic content remain on the market. Composting plants do not recognise degradable nappies and therefore select them for incineration along with all the others.

The PAWN development project

The Tübingen-based biotech company Novis GmbH, founded in 2009 by Dr. Thomas Helle, has joined forces with four other companies in Germany, Slovakia, Cyprus and Israel to form a consortium that aims to develop a fully biodegradable nappy. In late 2020, the development project called PAWN - an acronym derived from the first letters of the partner companies Polygreen, Avgol, Wilogis and Novis - was awarded funding under the EU's Horizon 2020 - Fast Track to Innovation (FTI) programme. The four-million-euro funding project is linked to the EU's plans to limit the consumption of plastics in Europe as much as possible. The consortium partners are working to take a nappy made from renewable raw materials to market maturity, in which all parts previously made from plastics - cuffs, closures, adhesive and superabsorbents - are replaced by renewable materials, making the PAWN nappy 100 percent compostable.

Within the project, Novis GmbH is responsible for life cycle management, in particular the successful composting of all parts of

the nappy. Novis is analysing and evaluating individual steps relating to the environmental balance of the overall product. For the project to achieve its objectives, the environmentally compatible disposal of the end product needs to be considered from the early stages of development. Novis is also working on identifying and composting degradable nappy preproducts.

To replace the disposable nappy - a typical product of the throwaway economy - PAWN is creating a product that will fit into the circular economy's regenerative system through orderly recycling. It will be an integral part of the EU's major strategic goal to transform the European economic area into a sustainable, climate-neutral bioeconomy. As Helle emphasises, the EU is expected to ban plastic content in nappies as soon as alternatives are available.

Take-back system needed for orderly recycling



Dr. Thomas Helle, CEO of Novis GmbH, Tübingen.
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Novis has been active in the fields of bioenergy, value-added generation and sustainable waste management for years and is well equipped for its tasks in the PAWN project. The company has built biogas plants in southern Europe and Africa based on sheep manure, mushroom compost and other waste. Its current projects include extracting cocoa from cocoa shells, using mushroom compost as a peat substitute, extracting heavy metals and reusing incineration slags from waste-to-energy plants, as well as recovering and using the CO₂ produced during red wine production (see BIOPRO article "The REDWine project and climate change"). The common aim behind all these projects, as Helle explains, is for each product to make the world a little better than it was before.

Within the PAWN consortium, the Israeli hygiene products manufacturer Avgol Nonwovens and the Polygreen - Circular Economy Solutions group of companies are developing the biodegradable superabsorbents and nonwoven materials. Celltex in Slovakia will manufacture the nappies; Wilogis Hygieneprodukte in Völklingen/Saar is responsible for product marketing. The consortium is now examining the extent to which its own take-back systems for hygiene products can be introduced onto the market, and used to feed nappies and incontinence products into an orderly recycling process. As a first step, a pilot plant is planned in which the nappies are fully fermented and the residual materials further recycled. Such a process could also be used to supply new raw materials to biogas plants that benefit from the current subsidy regime during 20 years of their commissioning. As Helle points out, this would be profitable for all concerned.

Source:

1) Senate Department of the State of Berlin - Waste Management Concept 2010-2020.

Further information

Dr. Thomas Helle
CEO Novis GmbH
E-mail: [thomas.helle\(at\)novis.com](mailto:thomas.helle(at)novis.com)

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The alternative: “bioplastics”

renewable
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recycling

sustainability

bioeconomy

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Further reading

🔗 [The REDWine project and climate change](#)



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