Pioneering Sustainability in Pharma Excipients

Harnessing the Power of Lignocellulose to Create Sustainable Solutions

As the pharmaceutical industry faces mounting pressure to reduce its environmental footprint, a Finnish company is setting a new standard in sustainable manufacturing. Nordic Bioproducts Group (NBG) has developed AaltoCell technology, a patented process for producing microcrystalline cellulose (MCC) with an impressively low carbon footprint. In this interview, NBG's CEO and co-founder Olli Kähkönen, discusses how the company's proprietary technology is reshaping the excipient landscape by delivering sustainable, safe, and innovative solutions rooted in Finnish expertise.

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Olli Kähkönen, Co-Founder, Nordic Bioproducts Group

Personal Profile

Olli Kähkönen, co-founder & CEO of Nordic Bioproducts Group, has over 30 years of experience in marketing, international business, and product commercialization. In 2019, inspired by a passion for sustainability, he co-founded Nordic Bioproducts Group with Professor Olli Dahl. Holding Master's Degrees in Finance & Marketing, and Economics, Olli Kähkönen combines business expertise with a deep connection to nature. Born in Rauma, Finland, he finds inspiration in Finland's forests, balancing his professional mission with a love for family, music, and outdoor adventures.

CHEManager: What inspired the development of AaltoCell technology and the founding of Nordic Bioproducts Group?

Olli Kähkönen: The journey began at Aalto University's School of Chemical Engineering, where I had the privilege of collaborating with Professor Olli Dahl, a distinguished researcher in sustainable biomass refining. We were united by a shared commitment to addressing climate change, driven by the belief that innovative technologies could create meaningful impact.

Among Dahl's research projects, one breakthrough stood out: a novel method to transform cellulose-rich wood pulp into high-value materials like MCC. Remarkably, his innovation proved to be a sustainable solution related to chemical use, energy efficiency, and process performance. Inspired by its potential, a dedicated team was formed to further develop the innovation.

The result was AaltoCell—a patented technology that harnesses the power of cellulose for a wide range of applications, from pharmaceuticals to cosmetics and more. In 2019, we founded Nordic Bioproducts Group to bring this groundbreaking innovation to the market.

How does AaltoCell technology transform MCC production?

O. Kähkönen: AaltoCell is designed to revolutionize MCC production by dramatically reducing its environmental impact. Compared to conventional methods, it uses 95% less water, 69% fewer chemicals, 90% less energy, and reduces the global warming potential (GWP) of MCC production by 81%. The process also minimizes waste by capturing valuable by-products like sugars through a closed-loop system.

These benefits are confirmed by a third-party life cycle assessment (LCA) at our new commercial-scale production facility in Lappeenranta, Finland.

Can you tell us more about your new facility in Finland?

O. Kähkönen: Our facility in Lappeenranta addresses three critical needs of the pharmaceutical industry: demand for sustainable solutions; need for safe, pure ingredients; and importance of supply chain security.

Opened in April, it's the first commercial-scale plant to utilize our AaltoCell technology. It features the world's first continuous MCC production line with a capacity of up to 10,000 tons annually.

The LCA figures mentioned earlier come directly from this facility, showcasing how our technology can deliver significant environmental benefits at scale. Our achievement in Lappeenranta was underscored when we were recognized as a finalist in the sustainability category at this year's CPHI Milan Awards.

Let's talk about safety and purity, how does AaltoCell address these issues, especially the hot topic of nitrosamines?

O. Kähkönen: Nitrosamines have become a critical concern due to their potential presence in medicines and their classification as probable human carcinogens. This issue has drawn attention from regulators like the FDA, which recently issued guidance urging manufacturers to assess and mitigate these risks.

Our PURA Series MCC is designed to meet these requirements. By starting with pristine raw materials—softwood pulp from sustainably managed Finnish forests and water from Lake Saimaa, considered one of the purest in the world—we're able to achieve unmatched purity in our product. In fact, our PURA Series MCC maintains nitrite levels below detection—a significant factor in mitigating nitrosamine risks and meeting the highest regulatory and safety standards.

We're also proud that our production facility meets ISO 9001:2015 and Excipact certification standards, reinforcing our commitment to stringent quality management and manufacturing practices.

What is PURA Series, and how does it stand out in terms of performance?

O. Kähkönen: PURA Series MCC represents the full potential of AaltoCell technology, combining exceptional functional properties with environmental responsibility to meet the evolving needs of pharmaceutical manufacturers.

Performance-wise, it combines high bulk density with a unique spherical shape, ensuring ultimate flowability and high compressibility. It also improves disintegration, facilitating the efficient release of active ingredients for better efficacy.

Beyond its functional advantages, PURA Series provides supply chain resilience within Europe. By producing locally, we enable reliable sourcing and supply chain security—essential factors for manufacturers prioritizing both reliability and sustainability in their operations.

What's next for Nordic Bioproducts Group?

O. Kähkönen: The launch of PURA Series at CPHI Milan was just the beginning. We were excited to showcase our team's expertise and introduce our innovative MCC products to the pharmaceutical community.

Looking ahead, we're expanding the scope of AaltoCell to support other products, including nanocellulose crystals, and pursuing new applications for PURA Series.

Any final thoughts on the future of sustainable pharmaceuticals?

O. Kähkönen: Sustainability is no longer optional—it's an industry imperative. Our journey with AaltoCell is a testament to what can be achieved when we blend scientific rigor with environmental stewardship. We're excited to continue leading this charge and hope to see our efforts inspire others to innovate in the pursuit of a cleaner, more sustainable future for pharmaceuticals.

Business Idea

Cellulose Reborn

Nordic Bioproducts Group (NBG) is redefining what's possible with biomass, transforming nature's most abundant renewable resource into innovative solutions to address global sustainability challenges. Based in Finland, NBG is more than a biomaterials innovator—it's a strategic partner helping companies transition to renewable, circular solutions with measurable business impact.

NBG's expertise spans biomass chemistry, engineering, smart technology design, scalable manufacturing, and commercialization—creating a seamless pathway from lab to market. This holistic approach positions NBG as a key enabler of the green transition, helping industries reduce reliance on both fossil-based and virgin materials and adopt renewable solutions.

At the heart of NBG's innovations is its patented AaltoCell technology, a groundbreaking method for producing microcrystalline cellulose (MCC) and other biomass derivatives. These advanced materials empower industries to integrate high-performance bio-based solutions into their products while addressing global sustainability goals.

Complementing its technology, NBG's BioInnovation Garage (BIG) serves as a collaborative platform for R&D, feasibility testing, and scaling sustainable innovations. By bridging the gap from concept to commercialization, BIG empowers partners to turn visionary ideas into tangible results.

In 2024, NBG launched its first commercial-scale production facility for sustainable MCC. With an annual capacity of up to 10,000 tons, its facility in Lappeenranta, Finland ensures a reliable supply of high-quality materials to meet regulatory demands and customer expectations for greener products.

As a pioneering force, the company is dedicated to introducing breakthrough technologies and biomaterials that redefine the landscape of sustainable solutions and enable a more circular future.

■ Nordic Bioproducts Group, Espoo, Finland
https://nordicbioproducts.fi

NORDIC BIOPRODUCTS GROUP

Elevator Pitch

Biomaterial Innovation

Microcrystalline cellulose (MCC) and other cellulose derivatives are valuable ingredients utilized across diverse industries, enriching product properties and performance. Moreover, the use of cellulosic materials fosters environmental sustainability by replacing non-sustainable and potentially harmful substances in a range of applications.

As the purest and most versatile form of cellulose, MCC has been used in a range of industries for decades—from pharmaceuticals and food supplements to food ingredients, cosmetics, and skincare. The global demand for MCC is high, and the market is projected to grow exponentially by 2030.

Enter Nordic Bioproducts Group. The company's AaltoCell technology was developed to be the most sustainable and efficient technology to produce MCC in the world. It harnesses the power of cellulose to create high-value biomaterials for use across a wide range of industries —from pharmaceuticals, supplements, food, cosmetics, textiles, composites, packaging and beyond.

Milestones:

2019
- NBG founded by Olli Kähkönen and Olli Dahl

2020–2021
- AaltoCell IPR & patent portfolio transferred from Aalto University to NBG
- First commercial R&D projects
- Team of ten academics

2022
- CMPC collaboration & equity investment
- Business Finland funding for piloting plant
- Lappeenranta MCC pilot factory building starts
- Team of 15 academics

2023
- Taaleri equity investment
- Team of 25 academics

2024
- Marubeni and PTTMCC MOUs signed
- AaltoCell commercial-scale MCC production starts in Lappeenranta
- Excipact certification achieved
- 45 employees
- Marubeni 1st production trial a success
- Pharma concept approved at CPHI Milan 2024
- First distributor agreements signed
- CPHI 2024 Award finalist—Sustainabilty

The co-founders of Nordic Bioproducts Group: Olli Dahl and Olli Kähkönen.

NBG has developed AaltoCell, a patented process for producing microcrystalline cellulose (MCC), which achieves a significant 72% reduction in greenhouse gas emissions compared to traditional methods.