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## New innovation recovers phosphorus and nitrogen from wastewater

*Startup company NPHarvest in Espoo is the winner of ITU Breakthrough Award. According to the award citation, the company's membrane technology constitutes a technological and commercial breakthrough that benefits the environment and has significant economic value.*

The Finnish company NPHarvest has developed new membrane and sedimentation technology that captures phosphorus and nitrogen from wastewater. The innovation improves profitability in the wastewater treatment sector and extracts products that can be used in agriculture and industry.

"Our hydrophobic membrane technology can capture up to 90 percent of all nitrogen and phosphorus in wastewater and convert it into ammonium salt and solid phosphorus, which can then be used, for example, by companies that manufacture fertilizer," says **Burak Yirmibesoglu**, business developer at NPHarvest.

To capture phosphorus, calcium hydroxide, lime sand, and ballast sedimentation are used, while the extraction of nitrogen is based on membrane technology capable of handling large amounts of suspended material. The innovations are based on eight years of research and development at Aalto University. The company is currently housed at Aalto University's startup hub in Otaniemi.

"Our innovation provides significant savings for wastewater treatment plants, as less money is spent on energy and chemicals," says Yirmibesoglu.

According to NPHarvest's preliminary calculations, the Helsinki Region Environmental Services Authority (HSY) could save up to 1.5 million euros if the company's technology were fully implemented, for example at the Viikinmäki wastewater treatment plant in Helsinki.

"We have tested the technology on a small scale both in Viikinmäki and on a farm in the Netherlands. The financial benefits in both cases are undeniable."

The economic savings are also welcomed in agriculture, especially at a time when fertilizer prices are soaring due to limited availability of phosphorus and nitrogen, and as a result of Russia's war of aggression in Ukraine.

"There is political demand for our technology. As long as phosphorus and nitrogen are globally scarce, it makes no sense to waste this valuable resource at wastewater treatment plants."

In addition to economic benefits, there are major environmental gains. NPHarvest's innovation is estimated to significantly reduce the carbon footprint of wastewater treatment by lowering emissions of nitrous oxide and reducing energy consumption.

“In Viikinmäki, our technology could reduce emissions of CO<sub>2</sub> equivalents by approximately 18,000 tons per year. That was shown in our pilot project conducted in collaboration with the Helsinki Region Environmental Services Authority.”

NPHarvest’s technology also has a positive impact on the Baltic Sea. By capturing nutrients, the overall load on wastewater treatment plants is reduced, and they are able to optimize the purification process more efficiently.

NPHarvest has succeeded in raising €2.2 million in startup capital to test the technology in various pilot projects. Among the company’s financiers are the Ministry of the Environment, Nordic Food Tech VC, Stephen Industries, as well as the Maa- ja vesitekniikan tuki foundation. Commercialization and internationalization of the business now follow.

“Our most important market is in Europe outside the Nordic region, where the volumes are larger. In addition to fertilizer sales, these chemicals can be utilised in cosmetics and pharmaceutical industries.”

The membrane components are currently imported. The rest of the technical equipment will be procured both in Turkey and Finland.

NPHarvest has been showered with awards over the past year, with a total of seven shiny trophies in its display cabinet.

“We are incredibly grateful for the ITU Award. It feels like we’ve made waves and are receiving great recognition.”

**For more information:** Burak Yirmibesoglu, Business Developer,  
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### **Breakthrough Award for innovators in technology**

TEK and TFIF give the Breakthrough Award to a person, team or work group behind an act, idea or innovation that creates something new in the field of technology. The breakthrough can be big or small. What matters is that it has brought something genuinely new to the field of technology.

The winner was selected by a jury of distinguished professionals in technology and science, chaired by futurist **Elina Hiltunen** who holds a DSc in Business Administration and an MSc in Chemical Engineering.

“What particularly impressed me about the team was that they had worked on this topic for a long time and produced new, ground-breaking research,” says Hiltunen.

The prize money is €15,000.

The application period for next year’s ITU Awards will open in November 2025.

Read more: [www.tek.fi/breakthrough](http://www.tek.fi/breakthrough)

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*Tekniska Föreningen i Finland TFiF is the only organization in Finland for Swedish-speaking engineers, architects, and students in these fields.*