

Green processes, thanks to H₂O₂

Hydrogen peroxide and electric current have had a close relationship for a long time. The Weißstein process for producing H₂O₂ on an industrial scale, which was invented more than 100 years ago, is based on electrolysis. Nowadays industrial companies almost exclusively use the anthraquinone process (see the box on page 20), in which hydrogen peroxide is produced with the help of a

reaction carrier. The Danish company HPNow, a startup based in Copenhagen, is now developing a process that harks back to the origins of H₂O₂ production. It has developed a technology that uses a fully automatic system to transform water, air, and electricity into hydrogen peroxide. This technology looks so promising that Evonik's venture capital arm acquired a minority share in the young company as part of its Series A financing round at the end of 2017. "HPNow can help the electrochemical production of H₂O₂ to achieve a breakthrough," says Bernhard Mohr, the Head of Venture Capital at Evonik.

The core of the system is a modular generator that can produce hydrogen peroxide. In a catalytic cell, water and oxygen are converted into H₂O₂ in a single electrochemical step. Thanks to this distributed approach, the peroxide could be used in the future even in places where its use has been limited because of the costs of transportation and storage—for example, in greenhouses for vegetables or flowers. To make sure that the hoses for drip irrigation don't get clogged, they have to be rinsed regularly. In the past,

many growers used fairly aggressive cleaning agents or chlorine-based products instead of environmentally friendly hydrogen peroxide. The use of H₂O₂, whose only byproduct is water, used to be too expensive for growers. "The technology developed by HPNow is making it possible for the first time to produce hydrogen peroxide when it's needed and to use it directly on site," says Mohr.

The new system has already passed the first set of practical tests with great success.



Far from the factory:
Distributed H₂O₂ production
in a greenhouse in Denmark