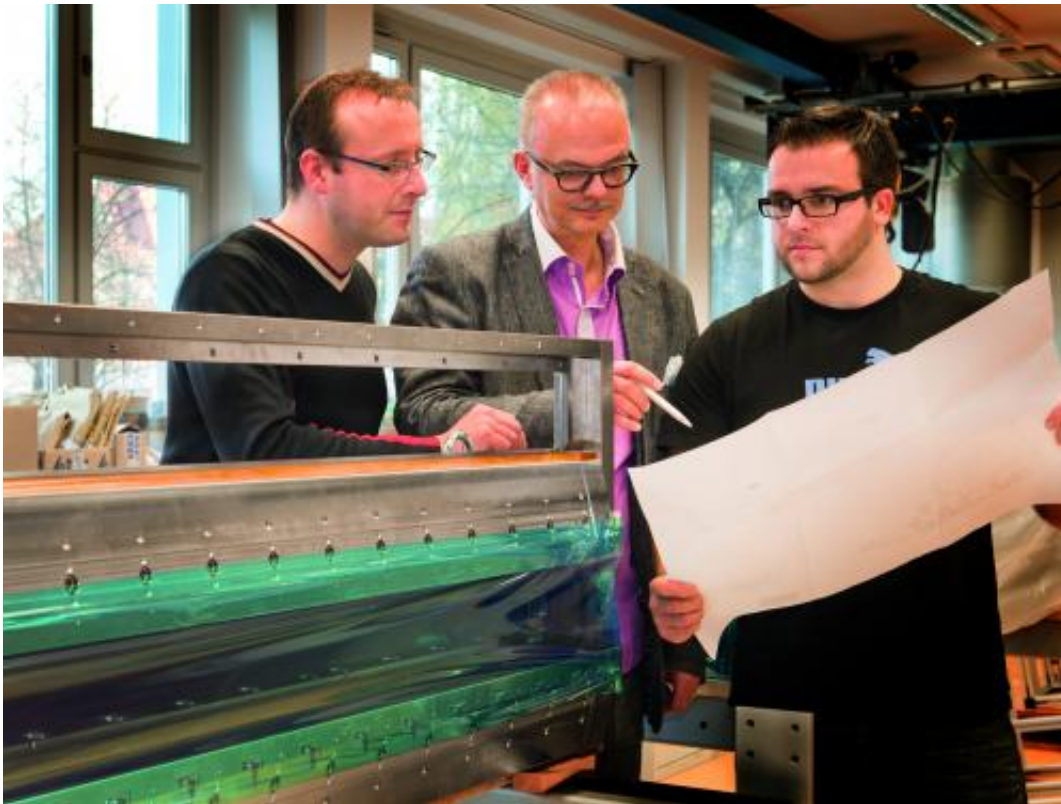


# Healthy seeds: Treated environmentally friendly

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This image shows a manufacturing inspection of a special electron source for the new seed treatment facility at the Fraunhofer FEP. Credit: Fraunhofer FEP

Farmers treat seeds chemically in order to rid them of pest infestation. Now researchers have developed a method that kills pathogens without harming the environment. Pioneering seed suppliers are already implementing the procedure commercially.

Seeds are home to molds and fungi, bacteria and viruses. To kill them off and to thereby prevent [plant diseases](#) from spreading, the seeds are, as a rule, treated chemically. However, recently this method has been discredited. The permits for some chemical treating agents have been withdrawn, but the granting of new permits has declined markedly as well. And lastly, a severe case of *E. coli* infection which was caused by beansprout seeds and which made headlines in summer 2011, also resulted in calls for alternatives. The scientists of the Fraunhofer Institute for [Electron Beam](#) and Plasma Technology FEP in Dresden, Germany have developed an environmentally friendly method for removing [germs](#) from seeds. They treat the seeds with [electrons](#), which within milliseconds destroy the DNA of the harmful organisms. Due to a special device setup, the [elementary particles](#) only act on the surface and in seed coat. The embryo in the interior of the seed is not affected so that the ability of the seeds to germinate is not impaired.

"In cereal seed you will find almost exclusively [fungal pathogens](#) but due to [climate change](#) it has been affected increasingly by bacteria from the south, against which there are no chemical agents as yet. Our treatment with low-energy accelerated electrons on the other hand is effective against bacterial and fungal pathogens. Also, the pathogens cannot build up a resistance against this process," says Frank-Holm Rögner, holder of a master's degree in physics and department head at the FEP. Since the scientist and his team do not use any [chemical additives](#), they destroy the pathogens in an [environmentally friendly](#) fashion with their method. Any leftover seed can be used as feed without any concerns.

Experts have long been able to prove that the germination ability of seeds treated in this manner is equal to that of chemically treated seeds. For two decades they have been attempting to establish and further develop their method. In 2002, they built a mobile demonstration unit which they use to provide test treatments all across Germany. However, even though the EPPO (European and Mediterranean Plant Protection

Organization) recommends the process for conventional as well as for ecological farming, the technology has been unable to significantly penetrate the market and has not progressed beyond demonstration status. According to Rögner, one of the reasons, among others, for the lack of economic success is said to be the farmers, who can be convinced only if good results have occurred over many years, in conjunction with the recommendations of the supplier of their [seeds](#) or specialist advisor, but who rarely would take new ideas by scientists, who are not working in their field, seriously.

Now the researchers are working with the company Nordkorn Saaten GmbH. In 2010, Nordkorn had them demonstrate the process for the first time using the mobile demonstrator – a truck on which the unit is mounted – directly on site at their headquarters in Güstrow, Germany. The seed producer was impressed as the prototype ran for hundreds of hours with a throughput of up to 30 tonnes per hour – the durability of the technology had inspired his confidence. In the meantime Nordkorn has bought the pilot plant, together with the long-standing seed partner company of the FEP, BayWa AG, and has commissioned the FEP with the building a second, custom-fit unit. This unique system is to start operations in Güstrow in late June 2013. Together with BayWa and Nordkorn as well as a plant manufacturer, the further development of the unit has also been planned. Among other things, the technology should become more affordable and more compact. The scientists and their partners are currently looking for project sponsors.

The scientists from the FEP are confident that, in the long term, the treatment with electrons will prove to be a success story. There is some support for this: Starting in 2015, farmers must prove that they are trying to reduce their CO<sub>2</sub> footprint and lower the use of chemical pesticides. "With our unit, we are able to contribute significantly to this," says Rögner. Should the treatment with electrons gain greater acceptance, the scientists from FEP could license their process to plant construction

companies.

The scientists are currently promoting their activities abroad. The FEP is endeavoring to introduce the electron treatment process into the Chinese and Indian markets. "Due to the large amounts of seed produced, we see good opportunities there," says Rögner.

Provided by Fraunhofer-Gesellschaft

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