NFFOODS Spectrum
perspectives on food technologies & business
ASIA

NIT Rourkela Develops Jackfruit Peel-Based Material to Remove Fluoride from Groundwater

15 October 2026 | News

The patented innovation can remove more than 90% of fluoride from contaminated water in about 10 minutes

Researchers at the National Institute of Technology Rourkela (NIT Rourkela) have developed a material that can remove excess fluoride from contaminated groundwater. By using activated carbon made from jackfruit peel and modifying it with zirconium to improve its fluoride-capturing ability, the patented material offers a promising approach to addressing a drinking water challenge that affects communities across India.

According to a World Health Organization (WHO) report, excessive fluoride in drinking water can harm human health. It can cause dental and skeletal fluorosis, affecting both children and adults.

Fluoride contamination has been reported in groundwater in several parts of the country, making affordable and sustainable water treatment an important public health priority.

While multiple conventional methods remove fluoride from groundwater, each has limitations that limit wider adoption. For example, the reverse osmosis method discards a large amount of water in the treatment process and removes beneficial minerals like calcium and magnesium from the treated water. On the other hand, processes such as ion exchange and activated alumina use harsh chemicals, making them non-eco-friendly.

To address these limitations, the NIT Rourkela research team converted discarded jackfruit peel into activated carbon.

Explaining the science behind the developed technology, Prof. Susmita Mishra, Professor, Department of Chemical Engineering, NIT Rourkela, said, “The key idea behind this technology is to use an agricultural waste material as a resource for water purification. We prepared activated carbon from discarded jackfruit peel and modified it with zirconium to improve its ability to capture fluoride from water. The material showed promising results in laboratory tests, removing over 90 per cent of fluoride within approximately 10 minutes under the tested conditions.”