

N-E varsity researchers patent process to treat industrial waste

'Green process 25% faster, 40% more energy-efficient than existing technology'

RAHUL KARMAKAR
GUWAHATI

Three researchers from the North-Eastern Hill University (NEHU) based in Meghalaya capital Shillong have patented a fast, energy-efficient and low-cost process for treatment and bio-detoxification of industrial effluents contaminated with harmful azo-dye.

Non-toxic discharge

The 'green process' developed by Mihir K. Sahoo, Bhauk Sinha and Rajesh N. Sharan for treating wastewater from industries such as textile, leather and paint is 25% faster, 40% more energy-efficient and more sustainable than the existing technology.

Their process has also been found to leave the discharge environmentally benign and thus likely to be equally non-toxic to other bio-flora and fauna.

"We received the patent for biologically detoxifying

 **My expertise in molecular biology and my colleagues' expertise in chemistry combined to develop the technology**

RAJESH N. SHARAN
Professor in NEHU's Department of Biochemistry

industrial waste-water apart from chemical detoxification, which we feel is quite revolutionary. My expertise in molecular biology and my colleagues' expertise in chemistry combined to develop the technology," Prof. Sharan of NEHU's Department of Biochemistry told *The Hindu* on Sunday.

He worked with Dr. Sahoo and Mr. Sinha of NEHU's Department of Chemistry for four years. The trio perfected the technology and applied for a patent in July 2013. The patent was received in October this year.

According to the trio, the

traditional treatment of environmentally damaging waste-water effluents with appropriate chemicals processes such as chemical precipitation, coagulation and electrocoagulation only transfers the contaminating chemical entities and chemical groups of the waste-water to other media, thereby producing secondary wastes.

Secondary wastes

"In some cases, these secondary wastes, intermediates and by-products formed by the second process of chemical remediation or detoxification may produce equally or more toxic chemical entities than the original toxicants and pollutants," Prof. Sharan said.

It was thus important to ascertain if the treated effluent was also benign to the biosphere (flora and fauna). Although theoretically, modern chemical remediation processes completely eliminate the pollutants from

waste-water, the trio's bio-toxicity evaluation of such effluents using *Escherichia coli*, or *E. coli* based bio-toxicity assay showed that it still continued to be highly bio-toxic.

Most strains of *E. coli*, a common kind of bacteria that lives in the intestines of animals and people, are harmless. Their survival is crucial for bio-flora and fauna, the researchers said.

Therefore, the release of such effluents into the environment could adversely affect the survival of aquatic micro-organisms, flora and fauna, thereby disturbing the entire ecosystem and ecological balance.

"The so-called waste-water is not really suitable for release directly into streams, rivers and other water bodies. We recognised this serious shortcoming of the existing technologies in the domain, and came up with the innovative technology," Prof. Sharan said.