Research

Associate Professor Ts. Dr. Norhayati invents water treatment process using resin

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GAMBANG, 6 April 2021 - A lecturer from the Faculty of Chemical & Process Engineering Technology, Universiti Malaysia Pahang (UMP), Associate Professor Ts. Dr. Norhayati Abdullah, 42, conducted research on the water treatment process using resin.

The research project titled Ion Exchange Resin for Innovative Water Treatment System started in 2014 and completed in 2017.

“Resin is a medium designed specifically for certain ion exchange processes in water bodies.

“Therefore, the Super Ion Exchange resin, known as SIEx, is created using local technology at UMP and used in a specially designed integrated water treatment system.

“In 2017 until 2020, this research was conducted more intensively in an integrated water treatment system for industrial water treatment and also treatment for fish pond,” she said.

She added that the idea sparked when she realised the potential of ion exchange resin for use in water treatment systems.

“The industry in Malaysia does not use ion exchange resin because of its relatively high price.

“Looking at this problem, I continue to conduct research using local technology to produce my own ion exchange resin.

“This study was conducted with my master’s students, Muhammad Zuhaili Yahya, Rabiatul Adawiah Mahmod and Aimi Asyiqin Abu Kassim, and Computer Technician, Ahmad Fitri Hassan from the Centre for Information and Communication Technology (PTMK),” she said.

This Terengganu-born researcher explained this specially designed integrated system serves as a tool to clean polluted water.

“It is equipped with a solar system as an energy generator for the water pumping process.

“Dirty water will be pumped into the system containing SIEx resin and some other mechanisms such as bio-span, bio-ring, coral, and others.

“Excess dirt and ions in the water can be filtered using this integrated system,” she said, who received a Doctor of Philosophy degree in Polymer Chemistry from Strathclyde University, Glasgow.

The resin from this research is expected to be widely applied in Malaysia, especially in industrial

sectors, not only in water treatment systems but also in appropriate applications.

“With this resin, it also reduces the purchasing cost that is much cheaper than buying from abroad and the handling of the resin is also easier.

“In the future, it is hoped that artificial intelligence can be applied in the water treatment system and able to operate independently without monitoring.

“This study started with a grant Fundamental Research Grant Scheme (FRGS) RDU140133 from the Ministry of Higher Education (MoHE) and internal grants, RDU130378, GRS1503114, RDU160331 dan RDU1803172.

“The estimated material/mechanism cost is approximately RM230.00 (system and SIEx resin),” she said.

She hopes that this system can be applied not only for water treatment but also in all related processes.

“In the future, I intend to upgrade the existing system.

“I am currently in the process of producing a material that can be used as an inhibitor of wax formation during the oil production process called pour point depressant and also a material called a chelating agent to dissolve the scales formed in the reservoir.

“The function of these two materials is more or less the same as the ion exchange resin that has been produced.

“The only difference is the ion exchange resin is in solid form while the pour point depressant and chelating agent are in liquid form.

“Both of these materials will be used in the petroleum field,” she said.

This study bagged gold medals in the International Invention & Technology Exhibition (ITEX) 2020, Kuala Lumpur, Malaysia and Creation, Innovation, Technology & Research Exposition (CITReX) 2020, UMP, a silver medal in the International Invention & Technology Exhibition (ITEX) 2019, Kuala Lumpur, Malaysia and another gold medal in the Creation, Innovation, Technology & Research Exposition (CITReX) 2019, UMP.

This study also received a gold medal in the International Festival of Innovation on Green Technology (i-FINOG), 2019, UMP, a Grand Prize Award and a gold medal in the International Festival of Innovation on Green Technology (i-FINOG), 2018 UMP, gold medals in the Creation, Innovation, Technology & Research Exposition (CITReX), 2016 UMP and International Invention & Technology Exhibition (ITEX), 2016, Kuala Lumpur.

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