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# Jawaharlal Nehru Centre's researchers develop OxyJani

02 July 2021 | News

**The mobile group oxygen concentrator can be used in rural settings and also be rapidly deployed in emergencies in any location**



Indian researchers have designed a robust, mobile group oxygen concentrator that can be used in rural settings and also be rapidly deployed in emergencies in any location. A team from Jawaharlal Nehru Centre for Advanced Scientific Research, an autonomous institute under the Department of Science & Technology, Government of India, developed a new solution with the name ‘OxyJani’ for addressing these novel challenges in adsorption science and engineering.

OxyJani is based on the principles of Pressure Swing Adsorption (PSA) technology. The team replaced lithium zeolites (LiX) which is usually used in oxygen concentrators, with sodium zeolites which does not generate toxic solid waste and can be manufactured in India.

Although the science behind it is well understood, developing an engineering solution that can work with sodium in a portable device and fill this specific market gap when there are severe sourcing problems posed engineering challenges. Obstacles had to be overcome at each stage of the cycle, from working with the available zeolites to effective ways of dehumidifying and designing the right adsorption-pressure cycle.

The concentrator is modular and capable of delivering a range of solutions, conversion of medical air to medical oxygen, and is an entirely off-grid solution including all modules that can facilitate deployment in rural areas. Moreover, the waste from the 13X zeolite plant can be potentially a good agricultural input material.

In this multi-group initiative, Dr SV Diwakar, Dr Meher Prakash, Professor Santosh Ansumali from JNCASR, and collaborators, Professor Arvind Rajendran from the University of Alberta and Arun Kumar (Eiwave Digitech) executed the OxyJani developmental efforts with the help of Ritwik Das (MS student). Technical advice was provided by Prof M Eswaramoorthy, Prof Tapas Maji, and Prof Sridhar Rajaraman. Professor G. U. Kulkarni, President, JNCASR and Professor Amitabha Bandyophyay of IIT Kanpur mentored developmental efforts. The financial assistance for the prototype was provided through JNCASR and the Nidhi Prayaas scheme of IIT Kanpur. The zeolite material was obtained through a generous donation from Honeywell UOP, Italy.

This new class of technology called “group concentrators” has the robustness of large PSA plants, portability similar to the personal concentrators, and is affordable too. The device is in the range of 30-40 lpm, which is potentially useful for ICU uses too.