

## Technology Transfers

During April-July 2016, the Bhabha Atomic Research Centre (BARC) has transferred ten technologies to various industries and also established Technology Display and Dissemination Facilities (DTDDF) across five states in collaboration with various technical and educational institutions in the country. Full details are provided below:

### **“Fluoride Detection Kit for Ground Water (FDK)” Technology was transferred to M/s MAX Chemicals (India), Indore, (Madhya Pradesh) on April 1<sup>st</sup>, 2016**

This technology was developed by BARC's National Centre for Compositional Characterization of Materials (CCCM), Hyderabad. This field-kit has been devised for a quick and easy estimation of fluoride levels in groundwater for establishing its suitability for drinking needs. The testing procedure is quite simple. Just add a specified amount of fluoride detection (FDK) reagent to water sample and identify the color developed. The color develops instantaneously and the distinction can be made with the naked eye. Water sample can immediately be categorized as safe, marginal or unsafe for drinking from fluoride point of view. Generally, this kit can be an excellent tool for individual and community level identification of safe groundwater sources. Importantly, the cost incurred per analysis works out to be nominal.

### **“Handheld 12-Channel Tele ECG Instrument” was transferred to M/s Star Automation, Puducherry on April 27<sup>th</sup>, 2016**

The Electronics Division, BARC, has developed a Handheld 12-Channel Tele-ECG Instrument that operates with the help of a mobile phone and the available Bluetooth feature. The instrument records all the 12-leads of ECG simultaneously and displays the same on the mobile screen. After complete recording, the report is generated in the form of an image, which can be transferred to the lab technician's mobile through Multimedia Messaging Service (MMS) or any other file sharing apps. The device is ideally suited for rural healthcare. Across hospitals in metros, this machine can be operated using a laptop/desktop and the report can be shared on Local Area Network (LAN). The final ECG report in standard graphical format can be generated on a blank A4 size paper.

### **“High Salt Rejecting Composite Polyamide Reverse Osmosis (RO) Membrane For Desalination” and “DIP-N-DRINK Membrane Pouch” technologies were transferred to M/s Permionics Pvt. Ltd., Vadodara, (Gujarat) on June 8<sup>th</sup>, 2016**

**“High Salt Rejecting Composite Polyamide Reverse Osmosis (RO) Membrane For Desalination” Technology** was developed by Membrane Development Section, Chemical Engineering Group (ChEG), BARC. Reverse osmosis (RO) is an efficient and an increasingly common solution for providing safe drinking water from saline water sources. The thin film-based composite polyamide membranes with high salt rejection characteristics are capable of removing more than 97% salinity from saline water besides removing most of the dissolved contaminants with high level of reproducibility from highly saline water with levels up to 35000 ppm salinity (seen in sea water). The Thin-Film Composite (TFC) membranes in spiral module can be applied for desalination of highly saline water and sea water (in two stages), water reuse (in pharma /biotech, waste water, electrocoating, food and beverage industries) and radioactive waste treatment. The membrane prepared in this process has potential bigger industrial applications

**“DIP-N-DRINK Membrane Pouch” technology** was developed by Membrane Development Section, ChEG, BARC. The Membrane Pouch is based on Osmosis process to get sterile drinkable solution from biologically contaminated water especially during disaster conditions like flood, cyclones, tsunami and earthquakes. It is also useful for concentration of high-value-low-volume product in food, pharmaceutical, chemical industries. It can also be used in Oral Rehydration Therapy in villages and remote locations.

### **“kVp Meter and Exposure Timer” Technology was transferred to M/s General medical Equipments, Noida, UP on June 29<sup>th</sup>, 2016**

The “kVp Meter & Exposure Timer” provides a convenient and fast method of measuring the effective kilo Peak Voltage (kVp) and exposure time of Diagnostic X-ray machines. It follows a non-invasive method, wherein the ratio of response of X-ray detectors located under filters of different thickness, is correlated for the measurement of kVp.

The instrument has several features, including automatic reset before new measurement, distance independent operation between Detector unit and X-ray target, measurement of kVp and exposure time in a single exposure and user friendly 16 digits and two line alphanumeric Liquid Crystal (LC) display. The instrument is light weight and is calibrated in standard X-ray machines, which are in turn calibrated with a standard potential divider method.

**“Ambient prolonged storable meal for natural calamities and other targets” Technology was transferred to M/s. Cheftalk Food and Hospitality Services Pvt. Ltd. Mumbai on June 30<sup>th</sup>, 2016.**

The BARC-developed Ambient prolonged storable meal for natural calamities and other targets deals with the development and optimization of a product called stuffed baked food (SBF). It was conceptualized on an ethnic product called 'Litti' or 'Bati', which is predominantly used as a regular food preparation in north India. The developed product is ambient storable up to 8 months and can be used to meet food needs of victims of natural calamities. It can also be used by defense personnel, for school lunch programme, and by space scientists. The extended shelf life of this product under ambient conditions is achieved by employing vacuum packing and gamma irradiation.

Radiation processing of food is a well-known technology based on application of physical energy where no chemical preservatives are involved and does not increase the temperature of the food. It has been approved by various international and national organizations to ensure 'Food Security & Safety'.

**“On-Line Domestic Water Purifier Based on Ultrafiltration Polysulfone Membrane” technology was transferred to M/s. R. D. Aquatech, Mysuru (Karnataka) on June 30<sup>th</sup>, 2016.**

The On-line domestic water purifier” technology has been developed by Desalination Division, BARC. The device is based on polysulfone ultrafiltration membrane coated on a unique cylindrical configuration. The device on connecting to domestic water source purifies running water from micro organisms, color, odour, suspended solids and organics. It is very effective in removing bacteria to the extent of > 99.99% (4 log scale) and also removes complete turbidity to produce crystal clear water. This device does not need electricity or addition of any chemicals. It is almost maintenance-free except for occasional cleaning of suspended solids which deposit on membrane surface and this does not take more than few minutes. It produces about 40 liters of pure water per

day at about 5 psig head pressure and works in the range of 5 psig to 35 psig head pressure. The device completely filters out dead bacteria from the final filtered water.

**“Solar Energy Driven Portable Domestic Brackish Water Reverse Osmosis (BWRO)” technology was transferred to M/s Surya Water Treatment Systems, Sangli (Maharashtra), on July 12<sup>th</sup> 2016.**

The “Solar Energy Driven Portable Domestic Brackish Water Reverse Osmosis (BWRO)” technology has been developed by Desalination Division, BARC.

This technology is based on solar photovoltaic (PV) system. It has an inbuilt capacity of 10 litres per hour (lph) and can desalinate contaminated water having salinity ranging from 1000-3000 ppm (mg/lit) and provide drinking water of salinity in the range of 50-300 ppm. The processed water is free from toxic elements, pathogens & turbidity. It is best suited for remote areas where electricity is not available and in locations where there is no stable voltage supply. Further, it can also be useful in urban areas. As it is portable, it will be of great help for people stationed in desert areas, especially in case of defense personnel. Importantly, it doesn't require external source of power and is an off-grid standalone system.

**“Production of Turmeric-based Nutraceutical – Turbovita” Technology was transferred to M/s Veena Industries, Nagpur on 28<sup>th</sup> July, 2016**

The product was developed by Radiation & Photochemistry Division (RPCD), BARC, under a Technology Incubation understanding. After successful completion of incubation, the technology was transferred to Incubatee M/s Veena Industries, Nagpur.

Globally, there is a huge demand for turmeric/curcumin based supplements and nutritional products. Presently, these are not widely available in India. With growing health consciousness among the people, this nutraceutical can provide the beneficial effect of curcumin for patients undergoing treatment for chronic diseases like diabetes and arthritis. It also can reduce the physiological troubles associated with long-term exercise.