

Egypt finds way to make salt water drinkable with half the energy

Lucy Schouten, Christian Science Monitor, 10-28-15

The Nile River has long been central to the life of Egyptians, who have crowded along its banks since before the time of the pharaohs.

But today, Egypt operates under a water shortage that is only worsening as the population grows. With rapid growth and development, Egypt has a fixed supply of water available from the Nile, due to treaties with upstream nations, according to a news release by the American University in Cairo. The country is limited to 55 billion cubic meters annually, but the demand is closer to 80 billion cubic meters, according to a 2011 study by the United Nations Environment Program.

So, researchers have sought to find an inexpensive way to turn abundant saltwater into drinking water.

It looks like the quest may soon be over. Scientists at Alexandria University in Egypt are developing an innovative water-purifying technique that uses half the energy as previous methods.

They have created a membrane that can both clean and desalinate water that could offer Egypt and other developing countries an inexpensive new water source. The method uses materials from North Africa and could make water desalination a more affordable process, according Digital Trends. Researchers ultimately plan to mass-produce the membrane and print sheets for individual use.

A study, published in the journal *Water Science and Technology*, describes the pervaporation process, in which water passes first through a membrane before it is heated and vaporized. In the second step, the vapor, containing pure water, is then condensed and collected for drinking purposes.

The breakthrough by Alexandria researchers lies in the new kind of membrane with just five "ingredients" that could be made in other labs without great difficulty. It binds with the salt in the water – it even works with the very salty water found in the Red Sea.

"Using pervaporation eliminates the need for electricity that is used in classic desalination processes, thus cutting costs significantly," Ahmed El-Shafei, an agricultural and biosystems engineering professor at Alexandria University, told Digital Trends.

The technique requires half the activation energy to purify the same amount of water as other desalination methods. The process uses about half the energy required by a comparable method currently used in the US, claim the researchers.

"If desalination is made more cost-effective, it could be used on a much wider scale in fresh water production for use in agriculture and for the increase of human capital in new settlements," Adham Ramadan, a chemistry professor who specializes in water desalination at the American University in Cairo said in a news release. "It would significantly contribute to wide-scale development in Egypt."