



Using Nanotech, Chennai Engineers Are Producing Potable Water From Thin Air!

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CHENNAI WATER WATER MANAGEMENT

Like any engineering aspirant, Ramesh Kumar Soni's dreamed of securing admission in one of the prestigious IITs.

Unfortunately, it did not happen.

However, during his preparations in Kota, Rajasthan, he encountered the exciting field of nanotechnology, and shedding his disappointments aside, he decided to join Chennai's SRM University for a BTech in the subject.

His growing understanding of nanotechnology propelled his interest towards developing atmospheric water generators (AWGs), a device that extracts pure, safe, clean, potable and remineralized water from humid ambient air.

He finished his BTech degree in May 2014, and joined the chemistry department at IIT-Madras, as a project associate the same year.

Here, alongside Professor T Pradeep from the Department of Chemistry, and PhD student, Ankit Nagar, he co-founded Vayujal on September 20, 2017, which develops AWGs.



Drinking water from a Vayujal-developed AWG. (Source: [Facebook/Vayujal](#))

“The company’s patented surface engineering technology and unit design increases water collecting efficiency of AWG units and provides water at a cost 10-20 times less than the current bottled water costs,” says the [company website](#).

The IIT-Madras incubated startup designs and structures the critical components like air filters, water purifiers, heat exchanger coils, condensers, evaporators, compressors and some fans and assembled all of them together.

Ramesh’s expertise in nanotechnology comes into play in the condensation process.

How does this machine work?

Speaking to [The Hindu](#), Ramesh draws comparisons with how an air conditioner works, where there are different surfaces involved and where there is condensation of water.

“This condensed water is filtered, treated, mineralized and made fit for drinking or cooking. The structures used for cooling the air draw inspiration from cacti. Just as the cacti have small thorn-like structures, the cooling surface in the AWG too has some structures that is used to cool the air. When air passes through it, the relative humidity content goes high, and water starts to come out of it. The rate at which water is produced depends on the ambient temperature, humidity level, volume of air passing over the coil and the unit’s capacity to cool the coil,” explains Ramesh, speaking to the national daily.

Speaking to [The Better India](#), Ramesh says that developing AWGs to generate potable water isn’t a groundbreaking innovation, but Vayujal is developing units with higher efficiency.

For a city like Chennai, which is suffering from its worst water crisis in recent memory, these machines are critical.

"Today, many cities in India, particularly Chennai and Bengaluru, are suffering from a severe shortage of groundwater. In some cities, this water is expected to run out soon. Moreover, surface water bodies have been devastated. Right now, we are entirely dependent on the rain, and for drinking water, we are either reliant on water cans or RO purifiers. But conditions in Chennai make RO water a less viable option.

Meanwhile, the supply of water in cans has been completely disturbed. The price of water has been hiked, while there are fears of impurities. In these conditions, a person with the AWG at home can produce their own water on conventional electricity or solar energy. They are ensured of timely supply of water and assured of what kind of water they are getting because ultimately they are making that water. This dependency on water supply goes away. You have independent control over your water. That's a value addition our units can do," says Ramesh.

Vayujal is also currently developing the 30 and 2000 litres per day (on solar backup) units as well.

"The cost of water generated from this machine is somewhere around Rs 1.5-3 per litre if the electricity tariff is at Rs 6 a unit. However, the cost of water depends on electricity tariffs, relative humidity and ambient temperature as well," informs Ramesh.



(Source: [Facebook/Vayujal](#))

What helps Vayujal in generating water at such low prices is the high levels of humidity in Chennai, but Ramesh informs that they are looking to mitigate the effect of ambient humidity. They want this machine to run efficiently in dry and hot states like Rajasthan.

Another challenge is ensuring that the condensation process is more efficient and less power consuming.

"If somebody makes 100 litres of water per day on a particular surface area, can you make 150 litres of water on the same surface area? Moreover, while doing that, can we achieve the same objectives with a little more power efficiency? We are trying to minimize power consumption. By raising the heat transfer and condensation efficiency, there is a real possibility we will consume less power per litre of water produced," explains Ramesh.

"For every litre of water we produce, we consume 0.3 to 0.4 units of electricity. We need to bring that down so that it is affordable. If we go below 0.3 units per litre daily under Delhi's semi-arid like climate, we would be happy. That will be a real milestone," he adds.

That's where we come to the next challenge, which is to reduce the cost. Today, the 100 litres per day unit costs approximately Rs 1.5 lakh, while the 400 litres unit costs Rs 5 lakh. For the 30 litres per day unit, they are trying to keep it below Rs 50,000. VayuJal will soon start scaling up the production of AWGs in Chennai, helping them to reduce the cost of production further.

Also Read: [As Chennai Struggles For Water, This Man Has Enough For 6+ Months!](#)

"We are essentially working on raising operating efficiency and reducing costs. A school may be able to buy our machine, but an individual school teacher may not. A proper manufacturing structure in place will help us reduce capital costs. The objective is to ensure minimal costs for maintenance and power consumption, running these units for 10-15 years," informs Ramesh.

The moment these AWGs are available to individuals at affordable prices, what you'll have is an era of democratized water, where individual households can have complete control over their own supply of potable drinking water.

Imagine that for India!

(You can contact the Vayujal team [here](#).)

(Edited by Gayatri Mishra)

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