

# Not so pleasant mornings: City air has five times more mercury than normal



Pollution, Proximity To Sea May Be Behind Spike In Concentration Levels, Say Scientists

A Ragu Raman | TNN

Four years after rapper Sofia Ashraf's song 'Kodaikanal Won't' brought mercury pollution in Kodaikanal back in public discourse, a study by Institute for Ocean Management (IOM), Anna University has found that Chennai's air is contaminated with gaseous mercury and the levels are more than that found in Kodaikanal or in several cities studied across the world.

Globally, an average of 1.5ng/m<sup>3</sup> of gaseous mercury is found in the atmosphere; In Chennai, it ranges between 3.5ng/m<sup>3</sup> to 8.5ng/m<sup>3</sup>.

"In Kodaikanal, we found that the concentration of natural gaseous mercury is 1.53ng/m<sup>3</sup>. The readings in Chennai were way above the natural concentration and during some seasons it reached more than 20ng/m<sup>3</sup>. But further study is needed to find

out whether power plants, industries and the sea cause a spike in gaseous mercury," said IOM director S Sreenivasalu. The study has been on since 2016.

Naturally, gaseous mercury goes into the air through evaporation and transpiration. In Chennai, the highest concentration of mercury in the air was found between 3am and 8am. "In the wee hours, the boundary of troposphere comes down from about 10km above earth to 8km. This could be the reason for mercury concentration levels being higher early morning," Sreenivasalu said. Gaseous mercury concentration is usually highest near the surface and decreases with altitude.

The study is part of the Global Mercury Observation System which is observing 67 places with a device called ambient mercury vapour analyser. It absorbs air from the atmosphere and removes moisture. The air is then sent into two cartridges

where the level of mercury is analyzed.

"Only when data from both the cartridges concur, we take the results," said Sreenivasalu.

Scientists have found a correlation between wind speed, direction and concentration of gaseous mercury in the atmosphere. "We found seasonal variations in its concentration. It is more in summer but during winter it falls as evaporation is less," said Manikanda Bharath K, one of the researchers involved in the project.

Bharath said besides industrial pollution, proximity to the sea, which is a huge natural reserve of mercury, could be a reason for concentration of gaseous mercury in the city's air. Researchers have collected soil and water samples to ascertain the presence of mercury on the surface. IOM is also procuring three mercury analyzers. However, it is yet to decide on their deployment.

## ALL ABOUT THE GLOBAL STUDY

67 places are being studied as part of a single project

### WHERE

Presence of total gaseous mercury studied in Kodaikanal and Chennai

### WHAT WAS FOUND

> In Kodaikanal, mercury levels are high due to evapotranspiration

> Annual mean atmospheric concentration is 1.53 nanograms/cubic metre (ng/m<sup>3</sup>) with a range between 0.83ng/m<sup>3</sup> to 3.25 ng/m<sup>3</sup>

> In Chennai, average concentration for TGM is 3.5 ng/m<sup>3</sup> to 8.5 ng/m<sup>3</sup>

> Recordings high between 3am & 8am



### HEALTH IMPACTS

> Affects nervous, digestive and immune systems, and lungs, kidneys, skin and eyes

> Considered by WHO as one of the top 10 chemicals or groups of chemicals of major public health concern

> Eating contaminated fish affects brain growth in unborn babies and young children



### MERCURY CYCLE

> Mercury is a key component of rock

> Due to weathering process, it breaks down and mixes with soil

> During rain it's absorbed by trees

> While some mercury evaporates, remaining quantity stays in the tree's outer layer

> While burning a tree or coal, gaseous mercury is released

> Paint, chemical and leather industries that use mercury release gaseous mercury by burning or dumping waste

> Oceans contain mercury and affect atmospheric concentrations through air-sea exchange



## Scientists study 250 residents of north Chennai to ascertain exposure levels

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Scientists are looking into the hair, urine and cord blood samples of more than 250 people to check the levels of mercury exposure North Chennai.

The on-going global study by the World Health Organisation — in which Sri Ramachandra Institute of Higher Education and Research is a collaborator — is analyzing samples for long and short-term exposure to the metal.

Mercury has adverse effects on health, including permanent damage to the nervous system besides kidney and lung diseases. "This kind of biomonitoring has never been done so far," head of environmental health engineering department S Sankar said. "It is very important to do as it will not just give information on the levels of exposure but help us create a baseline value for exposure in a metropolis and in the long run help policy makers come up with protocols and regulations for stringent monitoring," he said.

Scientists have drawn more than 750 samples from the north Chennai region in the past few months. "North Chennai has coal-fired power stations, industries and dumping yard. It would be a perfect place for us to do this study," said the study's national coordinator Krishnendu Mukhopadhyay.

WHO considers mercury as one of the top 10 chemicals of major public health concern. The silvery heavy liquid metal is released into the environment through mining, metal and cement production, using coal as fuel for cooking and the burning of fossil fuels. It remains in the air for a long time circulating through air, water, soil and other living organisms.

In the environment, mercury can be transformed by bacteria into methylmercury, which accumulates in fish and shellfish. Cooking does not eliminate mercury and thus enters food chain. Pregnant mothers pass toxic mercury to their fetus through placenta and nursing mothers transfer to infants through breast milk.