

TOXICITY IN PHYSICAL ENVIRONMENT IN KODUNGAIYUR

The problem of plastic pollution is usually subsumed under the more ubiquitous rubric of solid waste management, where the responsibility for proper disposal of waste is often seen to rest with the individual consumer and the local government. In fact, most attempts to address the waste problem begin and end with a push for proper collection of waste and prevention of littering. However, it is **producers** who have primary responsibility for the impacts of their production and packaging choices, and must be held accountable for the entire lifecycle of the product, including making plastics, using plastics in products, packaging and delivery, and their disposal post-consumption.

The objective of CAG's work on waste is to assess the human rights impacts of business practices with the goal of pushing for tighter regulations and liability laws around producer accountability. In this context, we are working to fill the lacuna of complete and accurate data on unsustainable and inequitable business practices and the adverse impacts on human rights and environment.

Findings

We took samples of groundwater from around the Kodungaiyur waste dump to test for volatile organic compounds and heavy metals: Ezhil Nagar, Sanjay Gandhi Nagar (Old Washermanpet), Krishnamoorthy Nagar, Susila Nagar (Tondiarpet High Road), and a sample of leachate from inside the Kodungaiyur dump yard.

Sample location	Volatile Organic Compounds found in samples
Ezhil Nagar	cis-1,2-dichloroethene (1,2-DCE) - 1.02 µg/L
	naphthalene - 1.86 µg/L
	trichlorofluoromethane - 9.17 µg/L
Sanjay Gandhi Nagar (Old Washermanpet)	trichlorofluoromethane - 3.92 µg/L
Krishnamoorthy Nagar	trichlorofluoromethane - 5.45 µg/L
Susila Nagar (Tondiarpet High Road)	trichlorofluoromethane - 20.3 µg/L
Leachate inside the dump yard	acetone (a common solvent) of 95.8 µg/L

Sample location	Heavy Metals found in samples
Ezhil Nagar	Aluminum, Antimony, Arsenic, Barium, Calcium, Chromium, Copper, Iron, Lead, Magnesium, Manganese, Potassium, Sodium, Vanadium and Zinc

Sanjay Gandhi Nagar (Old Washermanpet)	Aluminum, Antimony, Arsenic, Barium, Calcium, Copper, Lead, Magnesium, Manganese, Potassium, Sodium, Vanadium and Zinc
Krishnamoorthy Nagar	Antimony, Arsenic, Barium, Calcium, Copper, Magnesium, Manganese, Nickel, Potassium, Sodium, Vanadium, and Zinc
Susila Nagar (Tondiarpet High Road)	Arsenic, Barium, Calcium, Copper, Iron, Magnesium, Manganese, Potassium, Sodium, and Zinc
Leachate inside the dump yard	Aluminum, Barium, Calcium, Chromium, Cobalt, Copper, Magnesium, Manganese, Nickel, Potassium, Sodium, Vanadium, and Zinc

Discussion

The heavy metals found in each sample exceeded the permissible limit set by the Bureau of Indian Standards (BIS) and US Environment Protection Agency (US EPA). It is a matter of very serious concern that levels of these toxic metals detected in drinking water are well above the permissible limit as the following impacts on human health have been long-established.

- The presence of trichlorofluoromethane (a common refrigerant gas which has been banned globally) in all samples reveals that large quantities of industrial waste and other non-domestic waste are disposed of in Kodungaiyur dumpyard.
- The presence of acetone also reflects that large quantities of industrial chemicals are being discarded in the dumpyard. Long-term exposures to acetone in animals cause kidney, liver, and nerve damage, increased birth defects, and lowers the ability of males to reproduce. It is not known if humans would have these same effects.
- Drinking water contaminated with heavy metals can result in the accumulation of these heavy metals in the body.
- Cadmium, aluminum, mercury, iron, and lead result in xxx
- High levels of aluminium in the body have been shown to have neurotoxic effects, effects on bone and possibly reproduction
- Excessive levels of iron in the drinking water can lead to hemochromatosis, which can lead to liver, heart and pancreatic damage, as well as diabetes. High levels on iron in the drinking water can also damage healthy skin cells.
- Arsenic is associated with psychological effects, decreased mental performance, hypertension, cardiovascular disease risk, lung cancer, and carcinogenesis.
- Exposures to low levels of lead early in life have been linked to effects on intelligence quotient (IQ), learning, memory and behaviour.
- Several epidemiological investigations have demonstrated a relation between high levels of calcium and magnesium and risk for cardiovascular disease, growth retardation, and reproductive failure.