



Clean-up act: Professor T.V. Ramachandra at the Indian Institute of Science lab in Bangalore.

LOW-COST ALTERNATIVE

Coffee husk a potent toxic waste filter, IISc researchers find

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The husk of the coffee bean, Karnataka's main plantation product, may emerge as a low-cost, efficient method of cleaning up industrial effluents.

Researchers at the Bangalore-based Indian Institute of Science (IISc) have shown that the coffee by-product is among the most effective at removing carcinogenic hexavalent chromium found in sewage released by textile and leather plants.

"The hexavalent form of chromium is the most toxic. There are various methods of removing the toxic metal but those are expensive and not altogether effective," said T.V. Ramachandra, head of the research team and a faculty member at IISc's Centre for Ecological Sciences (CES).

Most of the widely prevalent methods are also energy-intensive and thus more expensive.

Ramachandra's team recently published a paper on the cleans-

water treatment facilities, therefore, are required to treat heavy metal-contaminated water to meet the regulatory requirements."

Scientists across the globe have experimented with various materials, including thermal power station fly ash, algal and fungal biomass, waste slurry from fertilizer plants, bengal gram husk and tamarind shells, which have been effective.

"But coffee husk scores because it absorbs the maximum (hexavalent) chromium content. It is easily available in Karnataka as it is a leading producer. Also, the cost would be one-tenth of chemical treatment (methods)," Ramachandra said.

The treatment process involves a primary segment where the waste water is stored in a tank, passed through a bed of reeds to remove nutrients such as nitrogen, phosphorus and potassium, and then filtered through the husk. "The water so released into a water

According to estimates by the Central Pollution Control Board, reverse osmosis, ion exchange and electrolytic methods that can also be used to treat industrial wastes cost at least ₹1 crore for a large firm.

"The cost of coffee husk is one-tenth of the (existing) effluent treating mechanisms," Ramachandra said.

The coffee husk extracted 50mg of poisonous content per gram of chromium, the highest compared with other materials such as olive cake (33.4mg), sawdust (10mg) and others. Reversing the process for analytical purposes revealed that about two-thirds of the extracted hexavalent can be retrieved and recycled.

"Now that we have experimentally proved the capability of the husk, the next step would be building a model," Ramachandra added.

Given that such bioabsorbants are at the research stage, their use is difficult to visualize on a large-scale basis, said Tapas