

BARC develops portable kit for detection of Chromium contamination of water

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Mumbai: Chromium is widely used in various industries like leather, steel, chrome plating, paint manufacturing, wood preservation etc. Untreated effluents from these industries cause widespread contamination of water as been reported in several parts of the country. Chromium in the environment primarily exists as Trivalent Chromium Cr(III) and Hexavalent Chromium Cr(VI). The later is toxic and the World Health Organization has classified it as carcinogenic and can cause stomach ulcers and cancers and severe damage to kidneys and liver.

As per Indian standard IS10500 for drinking water, the maximum permissible concentration of Cr(VI) in drinking water is 50 microgram per litre. The US Environmental Protection Agency (EPA) recommends a still lower permissible concentration of 10 microgram per liter.

Detection of Cr(VI) at such low levels is not only technically challenging but also expensive and time consuming since it involves collection of water samples from affected areas, transport to laboratory, storage and finally analysis. The method can be used for limited water samples with errors due to conversion of Cr(III) to Cr(VI) and vice versa during transport and storage.

Now Bhabha Atomic Research Centre (BARC) has developed a simple, user friendly, quick and cost effective kit for onsite determination of Cr(VI), which meets IS10500 as well as EPA criterion. It provides the much needed solution to measure the level of Chromium contamination in drinking water and tap water, lakes, rivers as well as ground water. The procedure involves adding a specified amount of specific reagents to the water sample and identifying the developed colour.

The colour develops within 5 minutes and the distinction can be made with naked eye. For ease of comparison a colour chart is provided with the kit. Water samples can be immediately categorized as being safe or toxic for drinking from Chromium(VI) point of view. The kit provides several advantages including onsite detection and instantaneous results, elimination of use of sophisticated instruments for analysis, low investment on infrastructure for production of the kit, easy availability of raw materials and very good accuracy for the intended purpose.

Existing kits for onsite detection of Chromium (VI) are currently imported and the cost of analysis is beyond Rs 100 per sample. In comparison, analysis using BARC kit costs Rs 16 per sample. This is yet another example of BARC's efforts towards 'Make in India' campaign of the Government of India.

The technology of the BARC kit for Cr(VI) detection has been transferred to LTEK Industries, Nagpur recently.