

DETECTION OF CHROMIUM IN TANNERY SOLID WASTE SAMPLES IN UNNAO DISTRICT OF UTTAR PRADESH

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ABSTRACT

Chromium is a mineral our bodies use in small amounts for normal body functions, such as digesting food. Human body needs very little chromium and most people get it enough in their regular diet. Chromium occurs naturally by the burning of oil and coal, petroleum from ferro chromate refractory material, pigment oxidents, catalyst, chromium steel, and fertilizers. Unnao is the one of major industrial towns adjacent to Kanpur having most of cotton, leather, pharmaceutical, steel and other industries. Unnao industrial area is situated near Kanpur in northern side of Ganga River having more than 50 industrial units mainly tannery, catering the need of nation. The effluents discharged by the industries, after passing through a common effluent treatment plant, is finally discharged in the Ganga River. Remarkable high concentration of chromium in Tannery solid waste sample dumped in some parts of district is a common feature in the region.

***Keywords:** Chromium, Tannery solid waste, Unnao, Uttar Pradesh.*

INTRODUCTION:

Chromium is the seventh most abundant element on earth. Chromium occurs in several oxidation states in the environment ranging from Cr²⁺ to Cr⁶⁺. The most commonly occurring forms of Cr are trivalent Cr³⁺ and hexavalent Cr⁶⁺, with both states being toxic to animals, humans and plants. Kanpur, India, stands as a prime example of how tannery chemicals and wastewater can negatively affect health and ecosystems. In 2013, the city became the largest exporter of leather. About 80% of the wastewater is untreated and dumped straight into Kanpur's main water source, the River Ganges. Farmland is swamped with blue-tinted water, poisoned with chromium III, lead, and arsenic. Decades of contamination in the air, water, and soil have caused a variety of diseases in the people who live in the area. Health problems include asthma, eyesight problems, and skin

discoloration. A wide range of industrial and agriculture practices increase the toxic level in environment causing concern about the pollution caused by chromium. Pollution of the environment by chromium particularly hexavalent chromium has been the greatest concern in recent years. The presence of excess of chromium beyond the permissible limit is destructive to plants since it severely affects the biological factors of the plant and enters the food chain on consumption of these plants material. Chromium enters in human body by the consumption of polluted water & vegetables. Cr shows many harmful effects.

EXPERIMENTAL:

In this study 12 Tannery solids waste samples were collected from different locations of Unnao and send them to IITR Lucknow for instrumental examination shown in table 1.

Dry Tannery solid waste samples were collected directly into plastic bags, a quantity of solid wastes varying from 100-110 gm. All samples were tested in Atomic Absorption Spectrometer (Perkin elmer pin AAcle 900 F^o).

Table 1: Analysis of tannery solid waste samples for chromium content.

| S No. | Location | Chromium (mg/g) |
|-------|------------------------------------------------|-----------------|
| 1 | National highway, near Gahira village, Unnao | 13.412 |
| 2 | Near JAR inter collage, Unnao | 2.482 |
| 3 | Dahichauki, Unnao | 32.86 |
| 4 | 1 km a head from Dahicahuki, Unnao | 13.432 |
| 5 | Banther village, Unnao | 18.231 |
| 6 | Dakari village, Unnao | 27.842 |
| 7 | Umraokhedha village, Unnao | 15.121 |
| 8 | Poni village, Unnao | 22.122 |
| 9 | Back side road ways workshop, Unnao | 27.222 |
| 10 | Chandpur village, Unnao | 3.421 |
| 11 | Gangauli village, Unnao | 26.148 |
| 12 | Near shyam shanti ucch kshisha sansthan, Unnao | 18.241 |

RESULT AND DISCUSSION:

- In two samples the chromium level is low (2.482, 3.421)
- Many samples shows a high level of Cr in solid waste (32.86, 27.842, 27.222)
- Results show many areas are affected by the excess of Cr and it can enter in their body by water, food or inhalation.
- High level of Cr in body is very harmful and cause many serious problems like renal failure, glaucoma, cancer etc.

EFFECT ON BODY:

Our body use Cr in a small amount. it is a essential mineral for our body in small. Chromium helps to move blood sugar (glucose) from the bloodstream into the cells to be used as energy and to turn fats, carbohydrates, and proteins into energy. Chromium may help some people with type 2 diabetes. It may help them control their blood sugar and may play a role in the management of type 2 diabetes. Chromium supplements are promoted as being helpful in building muscle and burning fat and in helping the body use carbohydrates. But high amount of Cr may affect the eyes. There is a link between low chromium levels and increased risk of glaucoma. Chromium slows the loss of calcium, so it may help prevent bone loss in women during menopause. Taking excessive chromium supplements can lead to stomach problems and low blood sugar (hypoglycemia). Too much chromium from supplements can also damage the liver, kidneys, and nerves, and it may cause irregular heart rhythm.

CONCLUSION:

Chromium is not solely responsible for these diseases. Methyl isothiazolinone, which is used for microbiological protection (fungal or bacterial growth), causes problems with the eyes and skin. Anthracene, which is used as a leather tanning agent, can cause problems in the kidneys and liver and is also considered a carcinogen. Formaldehyde and arsenic, which are used for leather finishing, cause health problems in the eyes, lungs, liver, kidneys, skin, and lymphatic system and are also considered carcinogens. The waste from leather tanneries is detrimental to the environment and the people who live in it. The use of old technologies plays a large factor in how hazardous Tannery solid waste results in contaminating the environment. This is especially prominent in small and medium-sized tanneries in developing countries. However, with updated infrastructures and the implementation of wastewater treatment systems, leather tanneries can become more environmentally friendly.

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