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The Determination, in Forensic Toxicology, of Metallic Poisons by Paper Chromatography[1])

Von DHARAM NARAIN TRIPATHI and SWARUP NARAIN TEWARI

The metallic salts may be taken accidently, as the results of industrial contamination or as the result of deliberate administration as to relieve the victim of his belongings. Accordingly, the poisonous metals have to be looked for and eliminated in all cases of suspected poisoning. Amongst the metallic poisons arsenic, antimony, mercury, copper, lead, zinc, bismuth and barium are to be eliminated in suspected poisoning cases. The recent chromatographic technique has several advantages over the old method used by chemists. The paper deals with the application of paper chromatographic technique for the detection of poisonous metals in the viscera, vomit, stomach washes and other miscellaneous exhibits received for the examination in the forensic laboratory.

The viscera is cut into small pieces and part of it is taken in a porcelain basin along with other exhibits and heated in a muffel furnace. The basin is taken out and the remaining residue is dissolved in dilute hydrochloric acid and concentrated to a small bulk. A drop of this solution is placed at the centre of a Whatman No. I filter paper. The solvent used for irrigating the chromatogram was a mixture of n-Butanol saturated with 1 n. HCl as used by the author[2]) previously. The wick was applied as the centre of the filter paper and the whole system was kept in a closed chamber at 20° C. After the development the paper was dried and sprayed with a solution of Diphenylcarbazide, which gave coloured bands for different metallic salts as given in the table 1.

Table 1

Metallic poisons	Colour of bands	Rf values
Lead	Grey	0.00
Copper	Green	0.10
Bismuth	Orange	0.63
Zinc	Red	0.71
Mercury	Greyish red	0.96

[1]) Present address: Horne-office Forensic Science-Laboratory, London.

[2]) TEWARI, S. N., Naturwissenschaften **41**, 229 (1954).

For the detection of arsenic and antimony another chromatogram is run (solvent mixture being acetylacetone saturated with water to which 0.5% HCl and 25% of acetone are added) which after drying is sprayed with a solution of dithizone in chloroform. The antimony forms a band Rf 0.53 and arsenic, Rf 0.18. Barium is detected by spraying the chromatogram with rhodizonic acid, Rf 0.45.

The chromatographic technique is the quickest of all the methods hitherto employed in the laboratories.

A more detailed account will form the subject matter for further communication.

Kanpur (India), 18/3A; The Mall.

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