

Aim of the experiment

Systematic extraction, isolation, purification and identification of metallic poison by various analytical techniques.

Requirements

- a) **Test sample:** Food curry (divided in five parts) spiked with salts of Arsenic, Mercury, Bismuth, Copper and Antimony, respectively.
- b) **Materials:** Copper strips (5 pieces), nails (10), beakers, watch glass, tweezers, filter paper sheet.
- c) **Instruments:** Hot plate
- d) **Chemicals:** Hydrochloric acid, Mercury chloride, Bismuth nitrate, Antimony sulphate and Copper sulphate.

Theory

- a. Heavy metals are chemical elements with a specific gravity that is at least five times the specific gravity of water.
- b. The test performed is known as Reinsch test and was discovered by Hugo Reinsch in 1841.
- c. This test is an initial indication to detect the presence of one or more of the heavy metals often by toxicologists where poisoning by such metals is suspected.
- d. The method is based on the chemical reactivity of the elements relying on the fact that copper will be displaced by elements below it in the electrochemical series. Discoloration of copper strip owing to deposition of heavy metals indicate the positive result.

Procedure:

Extraction and Detection of heavy metals:

- a) Add 50 ml of 4N HCL (digestion of sample) to the matrix in each beaker.
- b) One copper strip and two nails, both pre-treated with HCL and further washed with distilled water is added to each test beaker.
- c) Keep the beaker(s) on hot plate to heat for 20-30 minutes (or till digestion is completed) at 110 degrees Celsius.
- d) During heating 4N HCL can be added if loss of volume is observed.
- e) Allow the beaker(s) to cool. Further, copper strip(s) and nails is taken out with the help of tweezers, placed on filter paper.

- f) Observation can be carried out for colour deposition on the copper strip(s) and nails.
- g) The deposition is scrapped and put on glass slide for observing crystals shapes on under microscope.

Observation:

Test sample	Deposition on		Microscopic Observation	Inference
	Nail	Copper Strip		
S1	Deep black		Octahedral Crystals	Indicates presence of Arsenic
S2	Silver		Silver Globules	Indicates presence of Mercury
S3	Greyish black		No crystals formed	Indicates presence of Bismuth
S4	Bluish Black		Needle shaped crystals	Indicates presence of Antimony
S5	Copper	No Deposition	No crystals formed	Indicates presence of Copper

Conclusion:

On the basis of observation, it can be concluded that the test sample contains _____ respectively.