FORENSIC SCIENCE

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Tests for ammonium ions:

a) Nessler Reagent Test :

- Take one drop of test sample or extract, add one drop of conc.
- NaOH solution (5gms in 5 ml water)3 on a watch glass or in a small test tube.
- Take out a micro drop from this and kept on a filter paper and add to it one drop of Nessler reagent.
- Appearance of a yellow or orange red stain or ring indicates the positive test for the presence of ammonium ions.

Preparation of Nessler reagent :

Solution 1: Dissolve 10 gms of KI in 10 ml of water.

Solution 2: Dissolve 6 gms of mercury (II) chloride in 100 ml of water.

Solution 3: Dissolve 45 gms of NaOH in water and dilute to 80 ml.

Now add solution 2 to solution 1 drop wise until a slight permanent ppt. is formed then add solution 3,

mix and dilute with water to 200 ml.

Keep it for overnight and decant the clear solution.

The solution may be used for one month.

b) take an appropriate amount of the suspected sample ,

add to it few drop of NaOH solution in a test tube and heat it.

Smell of ammonia is observed.

This can be confirmed by bringing a glass rod dipped in HCl acid on the mouth of the test tube. White fumes are produced.

Test for Chloride:

a) Silver Nitrate Test: Take the appropriate portion of the exhibit in a beaker add distilled water, shake well and filter it. Take few ml. of the filtrate in a test tube and add 1 drop of nitric acid followed by few drops of 0.2 M silver nitrate solution. A white curdy precipitate is obtained which is soluble in excess of ammonium but insoluble in water and dilute nitric acid.

b) Test With Sulphuric Acid

Test for Sulphate :

a) **Barium chloride Test**: Take the appropriate portion of the exhibit in a beaker add distilled water, shake well and filter it.
Take few ml. of the filtrate in a test tube and add few drops of dilute hydrochloric acid followed by 0.25 M barium chloride solution.
White precipitate, which is insoluble in water, indicates the presence of sulphate.

b) Rhodizonate Test: take a drop of barium chloride solution (0.25M – 61.1 g barium chloride dihydrate diluted in 1 litre of water) on a filter paper and add a drop of fresh solution of sodium rhodizonate (5%). Reddish brown colour spot appears. Now add a drop of acid or alkaline test solution. Disappearance of colour spot indicates the positive test for the presence of Sulphate.

Test for Sodium ions:

Color Test:

Uranyl Zinc Acetate Test : Take a portion of exhibit solution and make it neutralized with acetic acid. Add few drops of uranyl zinc acetate reagent, shake/ stir with glass rod. Formation of yellow precipitate or cloudiness indicates positive test for the presence of sodium.

Preparation of uranyl zinc acetate : Take 10 gms of uranyl acetate in 55ml of water, 30 gms of zinc acetate, and 9 ml of acetic acid. Heat to dissolve and dilute with water to make up to 100 ml. Allow to stand for 24 hours, and filter.

Alternate method for the preparation of uranyl zinc acetate reagent :

Solution A: Take 10 grams uranyl acetate in 6 gms of 30% acetic acid. If necessary warm it, dilute with distilled water to 50ml .

Solution B: 30 grams zinc acetate is stirred with 3gms 30% acetic acid and dilute it with distilled water to 50 ml. Mix the above two solutions A and B. Warm if required. Add a trace of sodium chloride, keep it for 24 hours and filtered. Filtrate is used as above reagent.

Alternate Methods for Sodium Flame test :

Take appropriate portion of the exhibit as such or its water (distilled) extract evaporate to dryness, moisten with a few drops of conc. Hydrochloric acid to make past.

Take a small portion of paste with the platinum wire and introduce into the non-luminous flame of a semi-micro burner. A persistence golden yellow flame indicates the presence of sodium.

Alternate Method of Flame Test

Take a platinum or nichrom wire and wet it with conc. Hydrochloric acid and heat it in the non-luminous flame of the burner until the yellow colour of the flame disappears.

Dip the wire into test exhibit solution as such or its distilled water extract (or powder if exhibit is solid) and heat it in the non-luminous flame of the burner. Observe the color of the flame as above.

A persistence golden yellow flame indicates the presence of sodium.

Test for Potassium ions:

i) Dipicrylamine Reagent Test: Prepare a drop reaction paper by soaking the filter paper in sodium dipicrylaminate reagent (0.2 g dipicrylamine in 2 ml of 2N sodium carbonate and 15 ml water) and dried in a blast of heated air.

Place a drop of neutral test solution on the drop reaction paper, dry it in a current of hot air.

Keep the paper in 0.1N nitric acid. Formation of red fleck or ring at site of the spot indicates the positive test for the presence of Potassium.

ii) Flame Test: Potassium gives violet color when it is tested by flame test as described in the testing of sodium.