

DRY TESTS FOR URINE ANALYSIS

1- Test for Glucose :

* Principle:

The Benedict reaction is based on the reduction of bivalent blue copper-citrate ions to monovalent red cuprous oxide by glucose in boiling water. False positive reactions may be caused by other reducing substances, such as ascorbic acid.

* Reagent: R1 and R2

Method for testing

- Place a pea-sized quantity of powder **R1** in a test-tube and moisten with 3 drops of urine.
- Add one pellet of dry sodium or potassium hydroxide **R2** and mix. Continue shaking through the spontaneous boiling of the mixture, which is caused by the strong exothermic reaction.

* Result:

- Olive-brown precipitates turning rapidly dark brown: 20g/L of glucose or more.
- Orange precipitate turning brown after starting: 10g/L of glucose.
- Persistent orange precipitate: 5g/L of glucose
- Slight orange precipitate with blue supernatant: about 2g/L of glucose .
- Unchanged blue solution : < 2g/L of glucose

2- Test for Ketone Bodies :

* Principle:

Nitroprusside yields a violet colored complex with enolizable keto-groups such as acetoacetic acid and acetone which are the ketone bodies excreted during metabolic acidosis.

* Reagent: R3

Method for testing

Moisten a pea-sized quantity of powder **R3** with one drop of fresh urine.

* Result:

Violet color within one minute:

50mg/L acetoacetic acid or 500mg/L acetone or more.

Orange color:

Phenylpyruvic acid (excreted in phenylketonuria).

3- Combined Test for Urinary Protein and Urobilinogen:

* Principle:

A Piece of filter paper impregnated with sulfosalicylic acid and 4-dimethylamino-benzaldehyde (4-DMAB = Ehrlich reagent) is placed in the urine to be tested. Sulfosalicylic acid denatures the proteins, leading to turbidity or some precipitation, while 4-DMAB yields a cherry-red color with urobilinogen.

* Reagent: R4

Method for testing

One piece of each reagent paper **R4** is placed into about 1 ml of urine. The reaction may be performed in micro test-tube.

* Result:

Place the tube or tile first on a white paper to observe the color reaction, and afterwards on a black paper to observe turbidity.

4- Test for Nitrite Detection :

* Principle:

Detection of urinary nitrite indicates urinary tract infections caused by nitrate reducing bacteria provided adequate precautions are taken, e.g. allowing sufficient reaction time and rapid analysis after collection of urine. The reaction powder suggested by Jaeggy and Lanz is based upon the classical Griess reaction.

* Reagent: R5

Method for testing

Moisten a pea-sized quantity of powder with one drop of fresh urine.

* Result:

Nitrite in concentrations as low as 1mg/L yields a carmine red colour highly specific for the presence of nitrate-reducing bacteria. The test is positive in over 80% of urinary tract infections, although a negative test dose not rule out bacteriuria.

References:

1. Hawk PB, Osler BL and Summerson WH. Practical Physiological Chemistry. 12th ed., Philadelphia, Toronto, The Blakiston Company, 1947, p. 774
2. Hawk PB, Osler BL and Summerson WH. Practical Physiological Chemistry. 12th ed., Philadelphia, Toronto, The Blakiston Company, 1947, p. 767-768 and 1227
3. Lynch, MJ, Raphael SS, Mellor LD; Spare PD et al. Medical Laboratory Technology, Philadelphia and London, WB Saunders Company, 1963, p. 89.
4. Hallman L. Klinische Chemie and Mikroskopie, 11th ed. Stuttgart, New York, George Thieme Verlag, 1980, p. 113.

**DRY TESTS FOR URINE
ANALYSIS**

+15 to +25°C 200 Tests
In vitro diagnostic use

CAT. No.

UA 24 11

REAGENTS

R1 Reducing agent
R2 NaOH pellet
R3 Sodium nitroprusside
R4 Sulphosalicylic-DMAB
R5 α – Naphthylamine –
sulphanilic acid.

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