

**FORENSIC TOXICOLOGY LABORATORY
OFFICE OF CHIEF MEDICAL EXAMINER
CITY OF NEW YORK**

**CYANIDE
(COLOR TEST)**

PRINCIPLE

Cyanide inhibits cellular respiration by interfering with actions of important respiratory enzymes. This mechanism of action is the same whether cyanide is inhaled as the gas, hydrocyanic acid, or ingested as the potassium or sodium salt. Cyantesmo[®] test paper is used for the detection of hydrocyanic acid and cyanides in aqueous solutions (including blood and tissue homogenates). The pale green test paper turns blue in the presence of hydrocyanic acid.

SAFETY

The handling of all reagents, samples and equipment is performed within the guidelines which are detailed in the safety manual.

REAGENTS AND MATERIALS

All reagents must be ACS grade or better.

1. *Cyantesmo* test paper purchased from Macherey-Nagel.
2. 12 x 75 mm disposable borosilicate test tubes purchased from Kimble or Corning
3. Polyethylene stopper plugs for the above mentioned test tubes purchased from Fisher
4. Potassium cyanide (KCN) stock solution
Dissolve 100 mg of KCN in 50 mL of distilled water, add 20 mL of 0.5N sodium hydroxide (NaOH) Q.S. to 100 mL with distilled water.
5. High KCN positive control (0.4 mg/L)
Add 0.1 mL of KCN stock solution to 9.9 mL of a blood previously screened negative for cyanide.
6. Low KCN positive control (0.2 mg/L)
Prepare a 1:1 dilution of the high KCN control with the same cyanide negative blood.
7. Concentrated sulfuric acid (H₂SO₄)
8. 0.5N NaOH
Dilute 0.4 g NaOH in 20 mL of distilled water.
9. Certified negative blood
10. Distilled or deionized water

PROCEDURE

1. Label a set of test tubes, including a negative and a positive control.

NOTE: The following steps must be performed in a fume hood.

2. Transfer 1 mL of specimen and controls into pre-labeled test tubes.
3. Add 1 drop of concentrated H₂SO₄ to each tube, close **tightly** and mix gently on a Vortex mixer.
4. Open test tubes one at a time and insert a strip (5 - 7 cm in length) of *Cyantesmo* test paper. Close **tightly**, using the stopper to hold paper strips suspended above the liquid.
5. Examine *Cyantesmo* test paper color after approximately 30 minutes.

SENSITIVITY

0.2 mg/L HCN after 15 minutes reaction time.

INTERPRETATION

Cyantesmo[®] test paper color changes from pale green to dark blue according to the concentration of hydrocyanic acid. The most reactive zone is above the liquid level, especially at low concentrations.

ACCEPTANCE CRITERIA

1. Only specimens which have been analyzed with successful controls can be reported.
2. The negative control must not react with the test paper.
3. The positive control must change the test paper color from pale green to blue.

REPORTING

1. Samples which do not cause a color reaction with the Cyantesmo[®] test paper will be reported as "cyanide not detected".
2. Samples which cause a color reacted with the Cyantesmo[®] test paper will be reported as "cyanide detected".

NOTES

1. Due to high toxicity of hydrocyanic acid this test **must be performed under a fumehood.**
2. Cyantesmo[®] test paper reacts very sensitively to cyanide solutions weakly acidified with sulphuric acid and does not react with alkaline solutions. Strongly acidic solutions destroy the Cyantesmo[®] reagent.

REFERENCE

Cyantesmo[®] insert, Macherey-Nagel, Dueren, Germany.

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