**TITLE:** Eye pH Test

**Purpose:** This procedure provides instructions to perform eye pH testing. Nitrazine pH paper 4.0-9.0 is used as a semi-quantitative screening test to rapidly determine the pH of eye secretions after a chemical exposure within the range of pH 4.0-9.0.

**Principle:** NitrazinepH paper identifies changes in the pH of the eye and is used in conjunction with patient symptoms, reported exposure, and physical examination. An eye pH of <7.0 or >7.0 is associated with patients that have had acidic or alkaline chemical exposure. The paper is impregnated with an indicator dye Phenaphthazine. The dye gives a broad range of colors from reddish orange (4.0) through dark green (9.0). A neutral pH test will show a yellow color corresponding to a pH of 7.0.

**Specimen:**

All body fluids should be handled as if capable of transmitting infectious diseases. Use universal precautions when in contact with such materials. Refer to Laboratory Infection Control

Policy.

**Patient preparation**:

None

**Specimen Requirement**:

Lacrimal fluid of the eye

**Specimen Handling Conditions**:

Nitrazine paper is brought into contact with the lacrimal fluid of the eye. The Nitrazine paper changes color based on pH of the fluid.

**Patient Identification**

• Patient is identified by asking them to state their name and date of birth and verifying this information using their identification band.

• If a patient without known identity is tested, the results are kept with the chart and identifying information is recorded once information is obtained.

**Interferences:**

* Salt solutions and enzymes may cause deviations in results
* Expired pH paper or QC material
* Exposure to direct light
* Exposure to heat or cold
* Exposure to moisture

*Do not use nitrazine paper if it is discolored. Discard and open new pH Nitrazine paper roll/dispenser.*

**Reagents and Supplies**

* Nitrazine pH paper -stable until manufacturer’s expiration date printed on container.
* Color chart (included with pH paper roll)
* pH calibrating buffer solutions (pH 4.0 and pH 7.0)- stable at room temperature (15-30℃), until the manufacturer’s expiration date.
* Plastic pipettes
* QC result log

**Quality Control**

* Quality control is performed weekly by testing personnel.
* The Nitrazine paper, QC log and buffer solutions are stored in the ED POC Lab, at room temperature.
* Wearing clean gloves, tear off two pieces of Nitrazine pH paper to the desired length.
* Use a plastic pipette to draw up the 4.0 buffer solution then add a drop to the strip of Nitrazine paper. Repeat this process for the 7.0 buffer using a new plastic. Do not touch the tip of the pipette to the pH Nitrazine paper.
* Immediately match the strip color with the closest color on the dispenser color chart.
* Discard any unused buffered solution that might remain in the pipette. Do not return unused buffered solution to the bottle.
* Record the date, lot number and expiration dates of the pH buffer solutions and Nitrazine paper on the pH Nitrazine QC log sheet.
* Verify that all of the QC buffer results are within acceptable range by comparing the results with the control range on the pH Nitrazine QC Log sheet.
* Place a check in the QC Pass/ Fail box on the QC Log sheet to note whether QC passed or failed.
* Discard the used pH paper into an appropriate waste container.
* **QC Corrective Action**:
  + Document all QC failures and repeat QC testing on QC log sheet
  + Check to make sure that the pH Nitrazine paper and pH buffers have not expired.
  + Check that all materials have been stored at room temperature
  + If the buffers do not read 4.0 and 7.0 repeat the test.
  + If the buffers read 4.0 and 7.0 the pH Nitrazine paper may be used for testing.
  + If the buffers still do not read 4.0 and 7.0, a new reel of pH Nitrazine paper must be opened and tested.
  + If the new reel reads 4.0 and 7.0, discard the old reel, and proceed with patient testing.
  + If the buffers again do not read 4.0 and 7.0, obtain new buffers.
* DO NOT PERFORM ANY PATIENT TESTING until the quality control issues are resolved and the expected results are obtained and recorded.
* Contact Point of Care office for assistance (ext. 4643 or 4645).

**Patient Test Procedure**

1. Tear off pieces of pH Nitrazine paper to the desired length (approximately 1-2 inches).
2. Touch the Nitrazine paper to the lacrimal secretion or the conjunctival fornix (the area between the eyelid and the globe) inside the lower lid.
3. Immediately read pH.
4. Record result in LIS.
5. Irrigation of the eye should be performed until normal pH of the eye is achieved or with at least 1 to 2 liters of normal saline or lactated Ringer’s solution, depending on exposure. Non-sterile water can also be used.
6. After 30 minutes of irrigation, the eye should be closed for approximately 5 minutes.
7. Then the eye pH should be tested again.
8. Record result in LIS.
9. If eye pH of 7.0 is achieved and maintained for at least 30 minutes, no further irrigation is needed.
10. If eye pH of 7.0 is not yet achieved, repeat steps 5-8 until neutral eye pH of 7.0 is achieved.

**Reportable range:**

pH range: 4.0 – 9.0.

**Reference Values:**

pH of 7.0 is consistent with normal lacrimal secretions.

**Interpretation/Reporting: pH range 4.0-9.0**

Acidic lacrimal secretion detection**:**

* pH of lacrimal secretion: <7.0

Alkaline lacrimal secretion detection:

* pH of lacrimal secretion : >7.0

**Reading of pH paper: pH Nitrazine color & pH Nitrazine Value**

Dark Orange 4.0

Orange 5.0

Yellow-Orange 6.0

Yellow- Green 7.0

Green 8.0

Dark Green 9.0

**Limitations of Procedure:**

* Discoloration of pH Nitrazine paper may occur if not protected from direct light, heat/cold, or moisture.
* Do not use pH Nitrazine paper if it is discolored. Discard and open new pH Nitrazine paper roll/dispenser.
* Do not touch the pH Nitrazine paper with bare fingers.
* Use only the Color Chart included with each specific package of pH Nitrazine paper. If the chart is missing, discard the roll and open/date a new roll of pH Nitrazine paper.

The results of this test are interpreted in conjunction with other clinical information.

References:

CAP today- captodayonline.com/Archives/0509/0509\_qa.html

Johns Hopkins Hospital POCT Program, pH Testing Hydrion Paper, 2005

Frankford Hospital, Jefferson Health System, Philadelphia/Langhorne, PA, pH of Lacrimal fluid of the eye, Dept of Pathology & Laboratory Medicine, Department Manual Proc 945.8004

Occular Emergencies, Prabhat K. Pokhrel, MD,MS,PhD., Sanza a Loftus, MD, American Family Physician. 2007

Sep 15;76(6):829-836

Treating Acute Chemical Injuries of the Cornea, Houman D. Hemmati, MD, PhD nad Kathryn A. Colby, MD, PhD, EyeNet Magazine. October 2012

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