

Checklist

Measuring pH in Foods



1. Calibration

- Remove the protective/storage cap from the electrode.
- If the pH bulb is dehydrated, place in storage solution for at least 3-4 hours.
- If the pH electrode is a refillable design, then remove the fill hole screw cap.
- Fill two beakers with enough pH buffer solution 7.01 to cover the pH electrode junction (approximately 75 mL in a 100 ml beaker).
- One of the beakers will be used to rinse the pH electrode and the other for the actual calibration.
- Repeat for any other pH buffer (i.e. pH 4.01) that is used.

Perform a two point calibration

- Rinse the pH electrode with deionized (DI) water.
- Rinse the pH electrode in the pH 7.01 rinse beaker.
- Place the electrode in the pH 7.01 calibration beaker & stir.
- Wait for the reading to stabilize & confirm the calibration.
- Repeat this procedure for the second point with pH 4.01 buffer.

2. Measure

a. Procedure for liquid samples

- Do not start taking measurements unless the pH electrode has been properly hydrated and calibrated.
- Fill two beakers with enough sample to cover the pH electrode junction (approximately 75 mL in a 100 ml beaker). Use one of the beakers to rinse the pH electrode and the second for the actual measurement.

- Rinse the probe with deionized water
- Place the electrode in the rinse sample beaker.
- Place the sample beaker to be measured on a magnetic stirrer and drop a clean magnetic stir bar into it.
- If available, place the pH electrode into the electrode holder and lower it until the junction is fully immersed.
- Wait for the reading to stabilize before recording the measurement.

b. Procedure for semi-solid and solid samples

Direct Measurement with Application Specific pH Electrodes

- Do not start taking measurements unless the pH electrode has been properly hydrated and calibrated.
- If a solid, use a knife or auger to make a hole for the pH electrode.
- Insert the tip of the probe into the hole. Ensure that the electrode junction is covered by placing the electrode at least 2cm (0.75") into the sample.
- Wait until the pH reading is stable before recording.

Slurry Method for pH Measurement

- The slurry method involves taking a sample mixed with deionized/distilled water to make a solution that can be tested.
- 21CFR114.9 (Council for Federal Regulation) recommends 10-20 ml of distilled water should be added to each 100 grams of product. The mixture is homogenized and the resultant slurry tested.
- The testing procedure would then be the same as a liquid sample.
- Once you are finished measuring your samples, slide the pH electrode from the electrode holder and rinse it with water until all food residues are removed.

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3. Cleaning a pH electrode

- Fill a 100ml beaker with approximately 75 mL cleaning solution.
- Place the pH electrode into the cleaning solution, making sure the junction is covered.
- Soak for 10 to 15 minutes.
- Rinse the electrode with DI water.
- Soak in storage solution for at least two hours before next use.

4. Storing a pH electrode

- Fill the storage cap of the pH electrode to the half point with storage solution and place the storage cap on the electrode.
- Make sure there is enough storage solution in the cap to cover the tip of the pH electrode.
- For refillable pH electrodes, check to see if the probe needs to be refilled. The fill solution should be less than a half-inch below the fill.

Know if the probe needs to be cleaned:

Knowing the offset (mV value in pH 7.01 buffer) is a great way to know if the probe needs to be cleaned. A new pH electrode will have an offset of +/- 15 mV. A large change is an indication that the probe is coated and requires maintenance. A meter with GLP option will display the offset.

Slope and Offset:

Calibration parameters to monitor include slope and offset. When a pH probe is placed in a solution, a voltage is generated. The offset of a probe is the mV reading in pH 7 buffer. The slope of a probe is based on the mV difference between two buffer solutions. A probe should always have a slope minimum of 85%, ideally greater than 90% slope and any probe with an offset outside +/- 30 mV should be cleaned and conditioned prior to use. These parameters provide information on the probe's overall condition.

