Thermo SCIENTIFIC

Electrode Log # 46

Parameter
pH in Salad Dressing

Introduction
Control of salad dressing pH in the range of 3.5 – 3.7 will prevent growth of bacteria and contribute to its taste (flavor). This measurement can be made using a ROSS Ultra Triode which will measure both the temperature and pH of the sample with a single probe. The probe's unbreakable epoxy body meets sanitary requirements for direct contact with food.

Reference
AOAC Official Method 921.11 Food Dressing. AOAC "Official Methods of Analysis" 16th Edition, Revision 5 (1999).

Result Statistics
See page 2

Recommended Equipment
Orion Star or Star Plus Benchtop Meter (Cat. No. 1115000 or 1119000, or 1112000, or 1117000); ROSS Ultra Triode (Orion 8157BNUWP); Optional: NIST calibrated thermometer; printer (Orion 1010006); Stirrer (Orion 096019); Star Navigator Software (Orion 1010007) or Star Plus Navigator Software (Orion 1010017).

Required Solutions
pH 4.01, 7.00 and 10.01 Buffers (Orion 910104, 910107 and 910110); Filling Solution (Orion 810007); deionized water (DI); ROSS storage solution (810001).

Solutions Preparation
None Required

Meter Setup
Connect both plugs of the triode to the Star Meter. Set measurement mode to pH. In Setup mode of Star Meter, set resolution to 0.01, Buffer Set to USA and read type to Continuous. If all steps were followed correctly the meter display will show a number with two decimal places in the top line and "pH" to the right of the top line. The temperature will also be displayed in the top left of the screen. This should read the actual sample temperature rather than reference temperature (25.0°C).

Electrode Setup
See the electrode manual for preparation of the electrode.

Electrode Performance Check
Check slope at least daily according to the electrode manual. Drift may be checked by comparing a 1-minute to 2-minute reading. Results should agree with desired criteria. See troubleshooting section of manual if slope and/or drift are not acceptable.

Electrode Storage, Soaking, and Rinsing
To ensure a quick response and free-flowing junction, the sensing element and reference junction must not dry out. See electrode manual for 1) short-term storage (up to one week), and 2) long-term storage (more than one week). Between measurements, store electrode in pH 4.01 or 7.00 buffer. Rinse the electrode with DI water and blot dry with lint free tissue before measuring the next sample

Sample Preservation
Refrigerate sample if not using immediately.

Sample Preparation
Before removing any portion of sample for analysis, mix it with spatula until homogeneous. Repeat mixing before each subsequent portion is removed for analysis. See the Reference section for detail on emulsified dressings preparation.

Calibration
Calibrate the probe's thermistor against a NIST calibrated thermometer if desired. Perform a three point calibration using pH 4.01, 7.00 and 10.01 buffers. The meter automatically recognizes the buffers and displays the temperature-corrected pH value for each calibration point. The electrode slope should be between 92 and 102% of the Nernst value (59.16 mV/pH unit at 25°C). Read a fresh portion of pH 7.00 buffer to verify calibration. Reading will be temperature-adjusted, see table on page 2 for expected values. If readings are not acceptable and/or slope is not within range, see troubleshooting section of manual.

Analysis
Rinse electrode with DI water and blot dry. Collect about 40 mL of sample aliquot in a beaker. Place probe and stirrer (optional) in sample. Turn on the stirrer. The pH value and temperature will be displayed. Continue measurement for 2 minutes or until pH and temperature are stable, then press the MEASURE key to print and log the result. Turn off the stirrer.

Quality Control (QC)
Recommended QC procedures include: calibration and calibration verification, sample duplicates, slope, and drift.

Thermo SCIENTIFIC

Electrode Log # 46

pH of Creamy Caesar Dressing at elevated temperature after 2-minutes readings

	pH	Temperature (°C)
Sample 1	3.71	33.3
Sample 2	3.64	33.8
Sample 3	3.66	32.5
Sample 4	3.65	33.9
Sample 5	3.65	34.1
Mean	3.66	33.5
Standard Deviation	0.03	0.64
Expected pH	3.5 – 3.7	

Temperature Corrected Values for pH 7.00 buffer

°C	0	10	20	30	40	50	60	70	80	90
pH	7.11	7.06	7.01	6.98	6.97	6.97	6.97	6.99	7.03	7.08

For a more detailed table (including buffers 4.01 and 10.01), see
http://www.thermo.com/com/cda/resources/resources_detail/1,2166,13217,00.html