Osmometer for Measurement of Osmolality in Agriculture R&D

Application

Osmolality measurements using an osmometer are regularly carried out in R&D labs of agricultural processes. For example, cell culture media are usually adjusted for equilibrium of osmotic pressure to prevent any osmotic stress to cells. Soil samples are tested for hygroscopic evaluation. Water is checked for salinity and dissolved content to enable proper growth of plants.
Plant water potential can be calculated by determining osmolality of plant tissues.
Osmolality of milk replacers for calves is critical and adjusted to creates an ideal situation for the absorption and digestion of nutrients.
Fermentation industry measure osmolality of broth to ensure optimization of yield.

Why vapor pressure osmometer ?

For effective use in Life-science and Agriculture industry, the Vapro® Osmometer offers following unique advantages:

- *Vapor Pressure method*
  Thermodynamic limitations of vapor pressure osmometry are least restrictive for a sample type.
  The vapor pressure method determines osmolality at room temperature with the sample in natural equilibrium. This precludes cryoscopic aberrations due to high viscosity, suspended particles, cellular content or other conditions that can interfere with freezing point determinations, giving Vapro® a much broader range of error-free applications.

  For these reasons, vapor pressure osmometry is the method of choice for most sample types in biology and agriculture in which water is the prime solvent

- *Process Delay measurement mode*
  Upon introduction of sample in Vapro, start of measurement can be delayed so as to allow sample to reach vapor equilibrium. This is required for accurate analysis of complex cellular material like tree bark, leaf, root, etc.

- *Superb Accuracy*
  Unsurpassed by any other method, error is less than 1% in the clinical range.

- *Easy & Automated calibration*
  A push of a button automatically sets the calibration parameters.

- *Short measurement time of 90 seconds*
- *Low sample volume of only 10 µl*
  Ideal for expensive or hard to obtain samples, allowing multiple measurements from small sample volume.
- *Three-point calibration*
  Giving high accuracy as mandated by regulatory guidelines.
- *Self-cleaning process*
  Self-cleaning thermocouple reduces user-level maintenance and improves performance.
- *Comes with Vapro Lab Report software*
  For easy transfer of Calibration data, QC data and sample results to a linked PC for records and traceability.

The Vapro® system is being used in many renowned R&D units across the world, complying to stringent regulatory norms and accreditation guidelines.

Bibliography for further reading:

- Alternative methods of estimating the water potential at turgor loss point in Acer genotypes [Banks and Hirons Plant Methods (2019) 15:34]
  Jonathan M. Banks and Andrew D. Hirons : School of Agriculture, The University of Reading, UK. And Bartlett Tree Experts, Research Laboratory, UK.

- Measurement of Inner Bark and Leaf Osmolality
  Teemu Paljakka, Anna Lintunen : Faculty of Agriculture and Forestry, Institute for Forest Sciences, University of Helsinki, Finland

- Measurement of root and leaf osmotic potential using the vapor-pressure osmometer [Environmental and Experimental Botany Volume 53, Issue 1, February 2005]
  R.A.Balla, D.M.Oosterhuis : Department of Plant Sciences, University of Saskatchewan, Canada and Department of Crop, Soil and Environmental Sciences, University of Arkansas, USA

- Water Relations Analysis of Seed Germination Rates [Plant Physiol. (1990) 94]
  Kent J. Bradford : Department of Vegetable Crops, University of California, Davis, USA

- Rapid determination of comparative drought tolerance traits: using an osmometer to predict turgor loss point [Methods in Ecology and Evolution 2012, 3, 880–888]
  Megan K. Bartlett, Christine Scoffoni, Rico Ardy : Department of Ecology and Evolution, University of California Los Angeles, USA

- Extending the osmometer method for assessing drought tolerance in herbaceous species [Springer-Verlag GmbH Germany, part of Springer Nature 2019]
  Robert J. Griffin-Nolan · Troy W. Ocheltree : Department of Biology and Department of Forest and Rangeland, Colorado State University, USA