

Getting Started with VisiSens™ -

Notes on pH Measurement in Rhizotrons

1. The foils for pH imaging require at least a 6-point calibration. The calibration is ideally performed in the experiment set-up. At least, the calibration set-up should be as similar as possible to the final measurement set-up (identical temperature, ambient light conditions, camera settings, distance to the sample, ionic strength,...). As an accessory you can make use of the CaliPlate. (<https://www.presens.de/products/detail/caliplate-for-sf-hp5r.html> or <https://www.presens.de/products/detail/caliplate-for-sf-lv1r.html>).
2. Please equilibrate the pH sensor foil prior to calibration or measurement in buffer or medium for at least 30 min., ideally 180 min.
3. Do not use tap or distilled water! Minimum ionic strength for the pH sensors is 50 mM, and minimum buffer capacity is 2 mM.
4. Store the sensors in the dark. Once the sensors have been placed in liquid for equilibration, and you would like to reuse them later, please store them in buffered medium.
5. Avoid any contact of the sensitive layer with glue or oily substances like hand cream.
6. Examples for suitable calibration buffers (please adjust the ionic strength to the ionic strength of your sample medium):

Buffer recipe for PBS buffer (usually used for calibration of **SF-HP5R**):

Preparation of 1 L Stock Solution					
	buffer capacity	total ionic strength	NaH ₂ PO ₄ * 1 H ₂ O	Na ₂ HPO ₄ * 2 H ₂ O	NaCl
Solution A	40 mM	140 mM	5.5 g		5.8 g
Solution B	40 mM	140 mM		7.1 g	1.2 g

Buffer recipe for citrate buffer (usually used for calibration of **SF-LV1R**):

Preparation of 1 L Stock Solution					
	buffer capacity	total ionic strength	Na ₃ C ₆ H ₅ O ₇ * 2 H ₂ O	C ₆ H ₈ O ₇	NaCl
Solution A	40 mM	140 mM	11.8 g		1.2 g
Solution B	40 mM	140 mM		7.7 g	8.2 g

Solution A and solution B are mixed respectively to create calibration buffers of different pH values but constant ionic strength.

- The pH sensor foils are designed for measurements in liquids. Drying out of the sensor foil will result in a false signal.
- For long-term measurements, we recommend to re-calibrate the foil once a week or to perform a control measurement after finishing the experiment.

USEFUL LINKS:

Webinar

O₂, pH & CO₂ in Plants, Roots & Soils <https://www.presens.de/support-services/videos/video/visisens-webinar-o2-ph-co2-in-plants-roots-and-soil-1049.html>

Related Publications

https://www.presens.de/fileadmin/user_upload/publications_abs/ABS_2013_Disentangling_who_is_who_during_rhizosphere_Temperton.pdf

https://www.presens.de/fileadmin/user_upload/publications_abs/ABS_2013_Quantitative_imaging_of_rhizosphere_pH_P._Hinsinger.pdf

https://www.presens.de/fileadmin/user_upload/publications_abs/ABS_2012_An_imaging_method_for_oxygen_Rolletschek.pdf