Taking a Page from the Past-"pH"

Simple is Best?

Hydrangeas come in many colors; white, blue, pink and so forth. Did you know that the color of a hydrangea is related to the pH of the soil? Usually if the soil is acidic, with a pH from 4.5 to 5, the color will be blue. If the soil is less acidic, the color will be redder. Although this color order is the opposite of litmus paper, a hydrangea is "litmus paper which blooms in early summer," so to speak.

The method of measuring chemical properties according to color originated with the measurement method according to coloration phenomenon using iron gall in vinegar (the so-called "colorimetric method"), which was commonly used in the A.D. 60's (the Nero era). Litmus paper was developed based on this principle, using a reagent which changes its color depending on the pH, instead of gall, to evaluate the acidity or alkalinity.

The measurement principle of this method is to compare the color change of sample and standard meterial by adding an appropriate regent. Up to the present, various pH reagents have been found. Izaak Maurits Kolthoff (1894-1993) who was called the "father of 20th century analytic chemistry" contrived a "universal indicator", which shows the different color by one pH unit within the range of pH4 through pH11, by mixing several reactive indicators, each possessing its own respective coloring range.

The pH level of a sample can be determined by comparing its color to the color change samples, which show each pH color when using the universal indicator. The filter paper saturated with the universal indicator is called pH test paper and reagent manufacturers sell it with the color printing of color change examples.

Although pH test paper is not used as much now because of its low accuracy (about one decimal place) and the rapid development of instrumental analysis technology, it is being reconsidered as a convenient and inexpensive method of pH measurement.

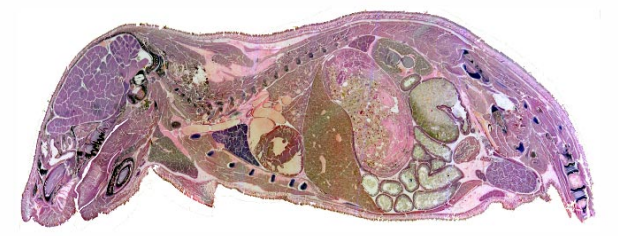
New Tools Create New Worlds!

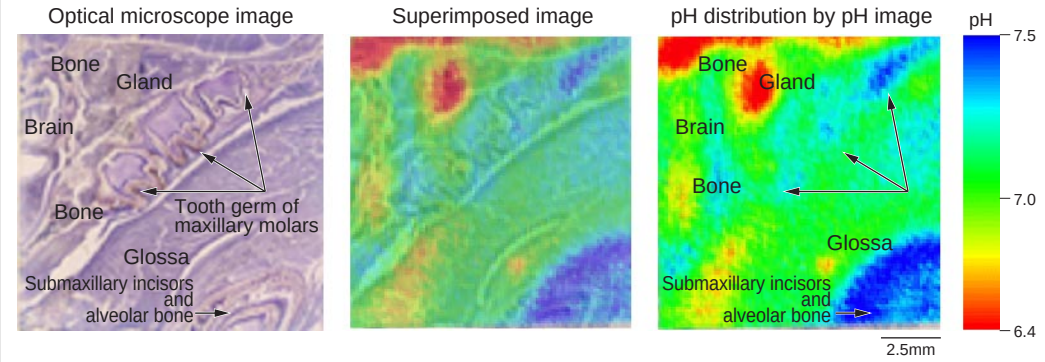
HORIBA has developed its pH imaging microscope (SCHEM) through a convergence of accumulated understanding of pH measurement, and the latest MEMS (Micro Electro Mechanical Systems).

“What can be revealed by imaging pH distribution?” “What can we use it for?” “How can it be expanded in the future?” These questions continuously arise.

We certainly feel that “New tools create new worlds!” is a true statement.

[Observing cross section of a rat]





Yukiko Nakano, et al. “Trial of pH mapping of animal samples with pH imaging microscope using semiconductor silicon sensor,” BUNSEKI KAGAKU Vol.51, No.6, pp.473-476 (2002)