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Nature 436, 789 (2005)

Organic chemistry: Dotty solutions

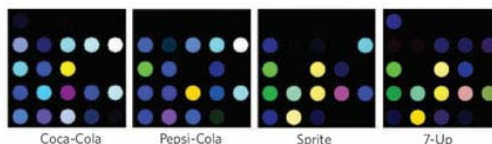
Richard Webb

What are you drinking? One answer to this frequently asked question might be found by a sensor that uses an array of chemically sensitive dyes to identify organic compounds dissolved in water.

The innovative array developed by Chen Zhang and Kenneth S. Suslick (see *J. Am. Chem. Soc.* doi: 10.1021/ja052606z; 2005) uses 36 dots of dyes that change colour in response to pH, molecular polarity and Lewis basicity (how readily a molecule donates an electron pair). These properties are strongly influenced by water, making it tricky to identify trace molecules in solution. So Zhang and Suslick dampen the effects of water by using hydrophobic dyes on a hydrophobic membrane.

The combination of colour changes in the dye dots when they are dunked in solution forms a 'fingerprint' of the compounds present. The authors confirm this using a variety of common organic molecules at concentrations as low as one micromol per litre. And, although a breakdown of components is not possible with the array, complex mixtures of organic molecules do excite a unique response — as the authors show by testing a number of similar aqueous solutions found in their refrigerators (see images).

Zhang and Suslick concede that the recognition of flavours is still some way off. That would require the incorporation into the array of hydrophobic dyes that are sensitive to salt or sugar, for instance. For now, answers to questions of taste, at least, will remain on the tip of the human tongue.

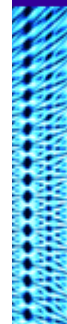





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