

Solomon M E. Control of humidity with potassium hydroxide, sulphuric acid, or other solutions. *Bull. Entomol. Res.* 42:543-54, 1951.
[Dept. Scientific & Industrial Res., Pest Infestation Laboratory, Slough, England]

Experimental biologists often need simple means of controlling atmospheric humidity in closed systems. This paper described methods of preparing and using alkali or acid solutions of graded densities, or saturated salt solutions, to give known humidities. Relevant data were tabulated, and pit-falls indicated. [The SCI® indicates that this paper has been cited in over 170 publications since 1961.]

Maurice Solomon
5 Karen Close
Backwell, Bristol BS19 3JE
England

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"In the 1940s, at the Pest Infestation Laboratory in Slough, near London, England, I began a long-term study of the ecology of acarid mites that infest stored grain and other dry food materials. A conspicuous feature of the survival and performance of these mites was their intolerance of humidities below about 60 percent relative humidity (RH) and their rapid multiplication at high humidities. Therefore I needed to control the humidity in the micro-cages in which the mites were held. Of course, temperature was also involved, but this was relatively easy to regulate, whereas dealing with RH in small containers was difficult. At that time, many of us looked to the paper by Buxton and Mellanby in the *Bulletin of Entomological Research*¹ for the procedures for controlling humidity with graded solutions or with saturated salt solutions. On searching physicochemical publications, I decided to take advantage of further data available there. I also had another reason for doing

this. Seeking a convenient method for measuring humidity in small spaces in laboratory, warehouse, and field, I tested the possibility of using the colour changes of paper impregnated with the chloride or other salts of cobalt, finally settling for cobalt thiocyanate. This proved far superior to cobalt chloride paper, so methods of preparation and use were published, and the impregnated paper and permanent colour standards were produced commercially;² but some authors, e.g., Winston and Bates,³ seem to have missed this news. For the calibration of colour standards I needed solutions that would give predetermined humidities with maximum precision.

"So I went to original sources, new and old, in the physicochemical literature, and compiled new tables of relationships between concentration and humidity. As for saturated solutions, data on these had been brought together by O'Brien in 1948;⁴ I added some later figures and notes on pit-falls and precautions. But the main theme of the paper was the preparation and use of graded solutions of potassium hydroxide and of sulphuric acid.

"Of publications since 1951, the best-known paper on humidity control for biologists is that by Winston and Bates,³ dealing mainly with saturated salt solutions. In the physicochemical literature, among the most relevant items since 1951 are Wexler and Wildhack⁵ and Young.⁶

"I can suggest several related reasons for the frequent citation of my paper: accounts of useful techniques normally have a wide appeal; there has been a continuing need to control humidity in small containers and in materials like grain and flour; and this paper gathered the requisite data, set out conveniently and in adequate detail, and described how to prepare and use the solutions."

1. Buxton P A & Mellanby K. The measurement and control of humidity. *Bull. Entomol. Res.* 25:171-5, 1934.
2. Solomon M E. Estimation of humidity with cobalt thiocyanate papers and permanent colour standards. *Bull. Entomol. Res.* 48:489-506, 1957.
3. Winston P W & Bates D H. Saturated solutions for the control of humidity in biological research. *Ecology* 41:232-7, 1960.
4. O'Brien F E M. The control of humidity by saturated salt solutions. *J. Sci. Instrum.* 25:73-6, 1948.
5. Wexler A & Wildhack W A, eds. *Humidity and moisture: measurement and control in science and industry. Vol. 3. Fundamentals and standards.* New York: Reinhold, 1965.
6. Young J F. Humidity control in the laboratory using salt solutions. A review. *J. Appl. Chem.* 17:241-5, 1967.