Department of Pharmaceutics
University of Singapore,
Singapore 3.

A. G. MITCHELL*
LUCY S. C. WAN
S. G. BJAASTAD

* Present address.

Department of Pharmacy
University of Sydney,
Australia.

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The solubility of benzaldehyde in water as determined by refractive index measurements

SIR,—Mitchell Wan & Bjaastad (1964) have recently determined the solubility of benzaldehyde in water at 25° and found a value of 6·55 mg/ml, a figure considerably higher than the previous literature values which range from 3·0 to 3·5 mg/ml. As a result of this finding we have determined the solubility of benzaldehyde in water by measurement of the refractive index of a range of benzaldehyde dispersions.

The sample used was redistilled Analar benzaldehyde that had been stored, refrigerated, in glass ampoules under nitrogen in the dark. Varying concentrations of benzaldehyde were dispersed in freshly boiled and cooled distilled water; the air above the dispersions was then displaced with nitrogen and the sealed flasks shaken overnight in a water-bath at 25° ($\pm$0·5°). The dispersions were then left for a further 2–4 hr without shaking to allow sufficient separation of a clear supernatent in those dispersions containing benzaldehyde in excess of its aqueous solubility. This technique was used in preference to centrifuging, where the control of temperature was found to be inadequate, even with a temperature-controlled centrifuge. The refractive index of each benzaldehyde solution, in terms of instrument scale reading, was determined against water in the reference cell using a Hilger-Rayleigh interference refractometer (Model M154) maintained at 25° by circulating water from a thermostat bath. 1 cm cells were used throughout and the supernatent aqueous solutions of benzaldehyde, pipetted from the dispersions kept in the water-bath, were allowed to equilibrate in the instrument for 20 min. Duplicate readings, accurate to one scale division, were taken for each of the ten dispersions prepared. The whole procedure was then repeated using a second sample of benzaldehyde.

The solubility of benzaldehyde, taken as the intercept of the two straight lines shown in Fig. 1, is 6·9 to 7·0 mg/ml, as compared with the value of 6·55 mg/ml found by Mitchell using a gravimetric method confirmed by gas chromatography.

The refractive index method described herein has the advantage that it is independent of any coefficients or factors, involves no manipulative techniques

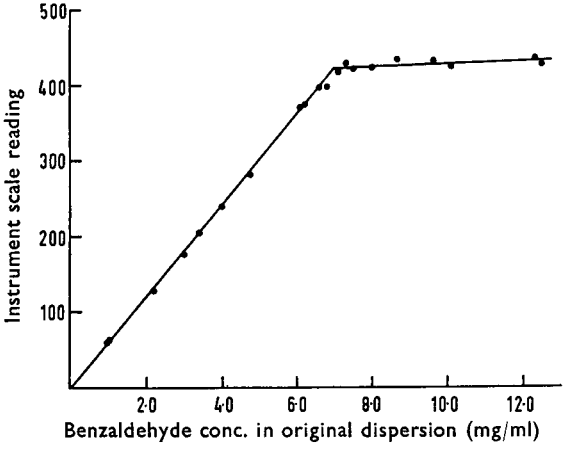

FIG. 1. Variation in refractive index, in terms of instrument scale reading, of aqueous solutions containing increasing concentrations of benzaldehyde at 25°.

such as filtration, ignition or dilution which may introduce errors and is capable of rigid temperature control, an obvious necessity in solubility determinations. As such it appears to be an ideal method for measuring the solubility of benzaldehyde in water and is also applicable to many other materials.

School of Pharmacy,
Chelsea College of Science
and Technology,
Manresa Road, London, S.W.3.
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J. E. CARLESS
J. SWARBRICK

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Some newer anti-inflammatory agents

SIR,—Lightbody & Reid (1960) demonstrated the hypoglycaemic effect of *o*-cresotinic acid. The hypoglycaemic effects of some newer salicylic acid congeners were reported by Luthera & Tayal (1962). Since salicylates possess potent anti-inflammatory activity, the anti-inflammatory effects of these newer salicylic acid congeners, 2,4-diacetoxybenzoic acid, *m*-cresotinic acid and 5-ethyl-2-hydroxybenzoic acid, on formaldehyde-induced arthritis (Brownlee, 1950) was compared with that of hydrocortisone.

Albino rats weighing between 100–110 g were divided into five groups of six animals each. The anteroposterior diameters of the ankle joints were measured daily for 10 consecutive days and 0·1 ml of 2% formaldehyde solution (v/v) was injected in each foot subcutaneously under the plantar aponeurosis on first and third days. One group of animals served as control. Other groups were treated with daily intraperitoneal injections of 2,4-diacetoxybenzoic acid, *m*-cresotinic acid, 5-ethyl-2-hydroxybenzoic acid (2·0 mg/100 g body weight) and hydrocortisone (0·5 mg/100 g body weight) respectively. The results are shown in Table 1.