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The equivalence of oxytetracycline tablets B.P.

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The inequivalence of bioavailability of oxytetracycline hydrochloride from capsules has been known for several years (Brice & Hammer, 1969; Blair, Barnes & others 1971). The B.P. tablet contains the dihydrate and a recent study has shown that the dissolution at pH 2.0 varies between products obtained from different manufacturers and between batches from one source (Groves, 1973).

We have carried out bioavailability studies on formulations giving equivalent dissolution profiles at pH 2.0 and these have shown markedly different serum levels in volunteers.

A more critical examination of the conditions of the dissolution test suggests that the pH of the dissolution medium is an important parameter. The percentage of drug released from a tablet in a given time was found to be directly related to the pH-solubility profile which exhibits a minimum at pH 5 (Merck Index, 1968). Dissolution tests at this pH highlight differences in serum levels from different formulations (for example see Table 1).

	Peak serum level ($\mu\text{g ml}^{-1}$)	Dissolution— T_{50} (min)	
		pH 2	pH 5
Formulation A	1.44	14.9	32.3
Formulation B	0.71	13.2	>100

Samples of oxytetracycline dihydrate B.P. from various sources varied in particle size between 7.8 and 170 μm . This variation was found to give rise to difference in bioavailability and dissolution of the formulated tablet. For example the percentage dissolved in 40 min at pH 5.1 was 55.8% using 170 μm material by comparison with 73.1% using 59 μm material.

The age of the tablets affected bioavailability and dissolution e.g. tablets from one source stored for 3 months at 20-25° showed a reduction in the percentage dissolved in 40 min at pH 5.1 from 68.9% to 40.3%. This is contrary to the findings of Groves, 1973.

The conditions of storage also affected dissolution and bioavailability the effect being more pronounced as the storage temperature rises. Samples of tablets from various commercial sources have been examined and found to exhibit differences in dissolution properties. Results as wide apart as 16-73% dissolved in 40 min at pH 5.1 were observed.

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