MEDIA PREPARATION (DEAERATION - THE PRINCIPLES)

The effects of air bubbles and other dissolved gases in the media used to conduct dissolution tests are legion and can be significant.

A Design of Experiment (DOE) study reported by USP in 2007 (Joseph Eaton *et al*. Perturbation Study of Dissolution Apparatus Variables - A Design of Experiment Approach. Dissolution Technologies. February 2007 Volume 14 Issue 1) found that of the 9 variables and 36 two-factor variables studied, three variables stood out as being statistically significant as far as mean percent dissolved was concerned: **level of deaeration, vessel type** and **rotation speed,** with the level of deaeration contributing to **52.3%** of the total reported effects.

The major influence of gas or air in dissolution work seems to be physical. Air bubbles may collect on the dosage form, the basket containing the dosage form or the sampling probe or their filters used to draw off samples for analysis. Their presence in spectrophotometer flow cells or on fibre optic probes may lead to incorrect absorbance readings. They may also accumulate on the membranes employed in the vertical diffusion cells used in transdermal and percutaneous absorption tests.

THE REGULATIONS

The Pharmacopoeias recognise that "dissolved gases in the dissolution medium may affect dissolution test results and recommends that gases be removed before the test is performed".

They advocate the following procedure as one method of deaeration:

"Heat the medium, while stirring gently, to about 41 degrees C, immediately filter under vacuum using a filter having a porosity of 0.45 microns or less, with vigorous stirring and continue stirring under vacuum for about 5 minutes".

This **"filtering, warming and stirring under vacuum"** approach is echoed by the FDA (Terry W. Moore. Dissolution Testing: A Fast, Efficient Procedure for Degassing Dissolution Medium' Dissolution Technologies. May 1996).

The Pharmacopeias also state "Place the **stated volume of the the Dissolution Medium (+/- 1%)** in the vessel of the specified apparatus given in the individual monograph, assemble the apparatus, equilibriate the Dissolution Medium to 37 +/- 0.5 degrees C, and remove the thermometer".

The temperature of the medium is critical to volumetric precision. The volume of the dissolution medium at the stated temperature of 25 degrees C is different for that at 37 degrees C, at which point the volume would be greater because the medium expands as the temperature rises.

It is for this reason that USP suggests that a more accurate and temperature independent measure of the media volume is gravimetric i.e., by **weight**.

USER REQUIREMENTS

In addition to conformity to the compendial and regulatory requirements, there are a number of user requirements which must be taken into account:

Simple, easy-to-use operation
- Proven time savings in comparison with manual methods
- Compact (space saving)
- Accurate and reproducible
- Capable of validation

"Dissomate" Media Station			
Warms	✓	Weighs	✓
Deaerates	✓	Dispenses	✓

"Dissomate" with Dissolution Tester