

## Dissolution testing

### Dissolution

Dissolution means dissolving. It is a vital first step when medicinal drugs are taken in the form of tablets and capsules.

Rate of dissolution is an important property of a medicine as it indicates how quickly the drug in a formulation is released in the body and made available for absorption.

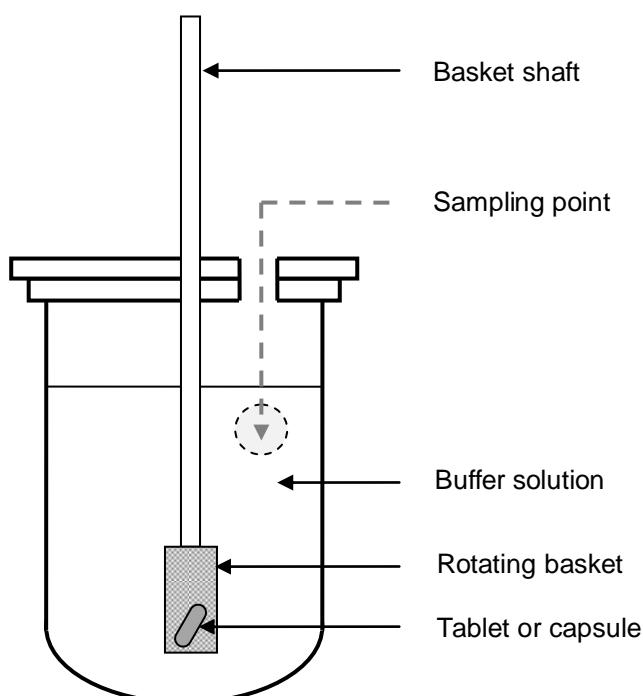
There are two main methods

- the rotating basket;
- the paddle.



**Figure 1** A bank of eight vessels for measuring rate of dissolution using the paddle method. The paddles can be replaced by mesh baskets, allowing the apparatus to be used for the rotating basket method.

### The rotating basket method<sup>1</sup>



**Figure 2** Experimental set up for determining rate of dissolution using the rotating basket method.

The tablet or capsule is placed in a stainless steel cylindrical mesh basket. The basket is placed in a vessel kept at a constant temperature.

The basket is rotated at a constant speed (between 25 and 150 revolutions per minute).

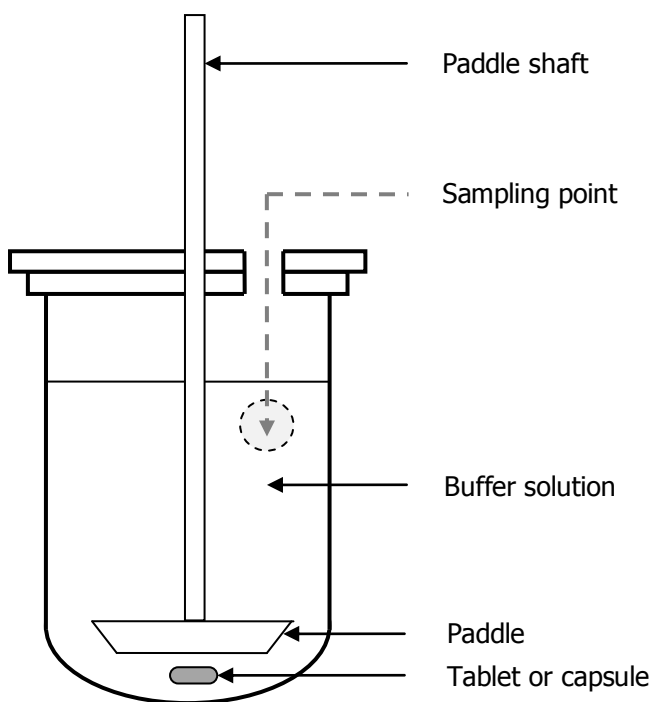
Samples are withdrawn for analysis from the same position each time.



**Figure 3** A stainless steel cylindrical mesh basket.

<sup>1</sup> [http://www.tabletdissolution.com/education/baskets\\_and\\_shafts/index.php](http://www.tabletdissolution.com/education/baskets_and_shafts/index.php)

## The paddle method<sup>2</sup>



**Figure 4** Experimental set up for determining rate of dissolution using the paddle method.

The apparatus for the paddle method (figure 4) is similar to that for the rotating basket method (see figure 2).

The design of the paddle and the speed at which it rotates are important. The paddle must rotate smoothly with no wobbling and no vortex should form when the paddle is turning.



**Figure 5** A typical paddle.

The tablet or capsule is allowed to sink to the bottom of the vessel before the paddle starts rotating.

The apparatus may seem a little crude for making such an important measurement. However, it is a precisely defined, closed-tolerance instrument.

## Dissolution media

Buffer solutions are chosen to represent the pH values of fluids found in the gastrointestinal tract. They are usually maintained at 37 °C (body temperature).

Sometimes simulated gastric fluid or simulated intestinal fluid is used.

## Finding out

Design and set up an apparatus based on the paddle method, using equipment in your school or college.

Carry out some trial runs to decide an appropriate stirring rate that ensures thorough mixing and avoids the formation of a vortex.

How might samples be taken and what techniques might be used to analyse them?

<sup>2</sup> <http://www.tabletdissolution.com/education/paddles/index.php>