chapter 2
Solutions

Overview

Upon completion of this chapter, you should be able to:

- prepare a solution from first principles
- select an appropriate container in which to package a solution
- prepare an appropriate label for a solution
- understand the differing calculations used in the preparation of solutions, including:
  - Basic strength calculations
  - Tailored strength calculations
  - Percentage calculations
  - Parts calculations
  - Millimolar calculations.

Introduction and overview of solutions

Solutions are traditionally one of the oldest dosage forms used in the treatment of patients and afford rapid and high absorption of soluble medicinal products. Therefore, the compounding of solutions retains an important place in therapeutics today. Owing to the simplicity and therefore speed of preparation of an ad hoc formulation, they are of particular use for individuals who have difficulty in swallowing solid dosage forms (for example, paediatric, geriatric, intensive care and psychiatric patients), where compliance needs to be checked on administration (for example, in prisons or psychiatric pharmacy) and in cases where precise, individualised dosages are required.

Generally, water is chosen as the vehicle in which medicaments are dissolved, since it is non-toxic, non-irritant, tasteless, relatively cheap and many drugs are water-soluble. Problems may be encountered where active drugs are not particularly water-soluble or suffer from hydrolysis in aqueous solution. In these cases it is often possible to formulate a vehicle containing water mixed with a variety of other solvents.

Definition

Essentially a solution is a homogeneous liquid preparation that contains one or more dissolved medicaments. Since, by definition, active ingredients are dissolved within the vehicle, uniform doses by volume may be obtained without any need to shake the formulation. This is an advantage over some other formulation types, e.g. suspensions (see Chapter 3).

British Pharmacopoeia (BP) definition (oral solutions)

Oral solutions are oral liquids containing one or more active ingredients dissolved in a suitable vehicle.