out of the mouth. Some of the analgesic preparations like aspirin gargles may be swallowed afterwards.

Gargles should be dispensed in white fluted bottles.

Gels

Generally gels are the aqueous colloidal suspensions of the hydrated forms of insoluble inorganic drugs. Examples are aluminium hydroxide gel, aluminium phosphate gel, milk of magnesia etc. They are generally used as antacid.

Glycerins

They are also known as glycerites. Glycerins are the viscous preparations in which the drug is dissolved in glycerin with or without heating. They are generally used as antiseptic or anti-inflammatory preparations. Examples are ichthammol glycerin, phenol glycerin, tannic acid glycerin etc.

Granules

Granules are the solid dosage form of medicament in which the powdered drug or drugs are mixed with sweetening, flavouring and colouring agents. A suitable granulating agent is added to moisten the powder and mixed thoroughly. The wet mass is passed through a suitable sieve and granules dried at a temperature of 60°C. They are supplied in glass containers and the patient is asked to add sufficient freshly boiled and cooled water to constitute a liquid preparation.

Effervescent Granules

These are specially prepared solid dosage form of medicament, meant for internal use. They usually contain citric acid, tartaric acid, sodium bicarbonate and medicament, a sweetening agent such as saccharin or sucrose may be incorporated.

When these granules are added to water, the acids react with sodium bicarbonate to librate carbon dioxide and the preparation is taken while effervescing or immediately afterwards. These preparations act as antacid.

2. Certain drugs are no more effective when administered in long acting forms.
3. They are comparatively costlier than the drugs in conventional dosage forms.

Principles Involved in the Development of Sustained Action Dosage Forms

When the drug is administered into the body, it is absorbed into the blood stream from the site of absorption, distributed, metabolised and eliminated out of the body in the original form or in the metabolised form. The amount of drug present in the circulation at any given time depends upon the rate of absorption, rate of biotransformation and rate of elimination of the drug. Thus the action of a drug can be prolonged by :

1. Decreasing the rate of absorption.
2. Decreasing the rate of biotransformation.
3. Decreasing the rate of excretion.

Out of the above mentioned factors, for the development of sustained action dosage forms it is not possible to either decrease the rate of biotransformation or the rate of elimination of drugs because both the factors involve the simultaneous administration of enzymes and other substances which interfere with the normal metabolic functions, therefore, cannot be administered. Thus the only factor which can be manipulated is to decrease the rate of absorption of drugs.

Design of Sustained Action Dosage Forms

It is the principle of sustained action dosage forms that the initial dose must be released immediately to the system to produce rapid action and the subsequent doses are released gradually and continuously at a specified time to maintain an effective blood concentration to produce the desired therapeutic effect for a specified period of time. Therefore the products so designed should conform to these requirements. Following are a few types of sustained action dosage forms generally used for the administration of drugs.

Classification

The drug compendia are classified as :
(i) Official compendia
(ii) Non-official compendia.

(i) Official compendia :

Official compendia are the compilations of drugs and other related substances which are recognised as legal standards of purity, quality and strength by a government agency of respective countries of their origin. Official compendias include British Pharmacopoeia, British Pharmaceutical Codex, Indian Pharmacopoeia, United States Pharmacopoeia, National Formulary, The State Pharmacopoeia of USSR and Pharmacopoeias of other countries.

(ii) Non-official compendia :

The books other than official drug compendia which are used as secondary reference sources for drugs and other related substances are known as non-official drug compendia. These include Merck Index, Remington's Pharmaceutical Sciences, The United States Dispensatory etc.

Official Drug Compendias

1. National Formulary of India

For the compilation of National formulary of India a committee known as national formulary committee was constituted in November 1956 who was assigned the work to compile this formulary. The opinions of medical associations, hospitals, teaching institutions and leading manufacturers in the country were invited and finalised by the committee. it was printed in India by the manager, Government of India Press, Simla in 1960.

2. Pharmacopoeia of India (The Indian Pharmacopoeia)

In 1946 the Government of India published the Indian Pharmacopoeial list which served as a supplement to British

$$180 \text{ gr} = 64.8 \times 180 = 11664 \text{ mg}$$
$$\therefore 3 \text{ dhrachm} = 11664 \text{ mg}$$

6. Convert 550 mg into grains

$$1 \text{ mg} = \frac{1}{64.8} \text{ gr}$$
$$550 \text{ mg} = \frac{1}{64.8} \times 550 = 8.48 \text{gr}$$

7. Convert $\frac{1}{100}$gr into metric weights

$$1 \text{ gr} = 64.8 \text{ mg}$$
$$\frac{1}{100} \text{ gr} = 64.8 \times \frac{1}{100} = .648 \text{ mg}$$

8. Convert $\frac{1}{6}$ gr into mgs

$$1 \text{ gr} = 64.8 \text{ mg}$$
$$\frac{1}{6} \text{ gr} = 64.8 \times \frac{1}{6} = 10.8 \text{ mg}$$

9. Convert 30 m into ml

$$16.23 \text{ m} = 1 \text{ ml}$$
$$1 \text{ m} = \frac{1}{16.23} \text{ ml}$$
$$30 \text{ m} = \frac{1}{16.23} \times 30 = 1.848 \text{ ml}$$

10. Convert 2 pt into ml

$$1 \text{ pt} = 20 \text{ fl.oz}$$
$$2 \text{ pt} = 20 \times 2 = 40 \text{ fl.oz}$$
$$1 \text{ fl.oz} = 29.57 \text{ ml}$$
$$40 \text{ fl.oz} = 29.57 \times 40 = 1182.8 \text{ ml}$$
$$\therefore 2 \text{ pt} = 1182.8 \text{ ml}$$

3.2 Calculations based on Imperial systems :

For preparing 1% w/v solns any of the following formulas which are identical in strength can be used :

Contents