

## 2.8. METHODS IN PHARMACOGNOSY

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### 2.8.1. ASH INSOLUBLE IN HYDROCHLORIC ACID

Ash insoluble in hydrochloric acid is the residue obtained after extracting the sulphated or total ash with hydrochloric acid, calculated with reference to 100 g of drug.

To the crucible containing the residue from the determination of sulphated or total ash, add 15 ml of *water R* and 10 ml of *hydrochloric acid R*, cover with a watch-glass, boil the mixture gently for 10 min and allow to cool. Filter through an ashless filter, wash the residue with hot *water R* until the filtrate is neutral, dry, ignite to dull redness, allow to cool in a desiccator and weigh. Reheat until the difference between 2 consecutive weighings is not more than 1 mg.

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### 2.8.2. FOREIGN MATTER

Herbal drugs should be free from moulds, insects and other animal contamination.

Foreign matter is material consisting of any or all of the following:

- 1) *Foreign organs*: matter coming from the source plant but not defined as the drug,
- 2) *Foreign elements*: matter not coming from the source plant and either of vegetable or mineral origin.

#### DETERMINATION OF FOREIGN MATTER

Weigh 100 g to 500 g of the substance to be examined, or the minimum quantity prescribed in the monograph, and spread it out in a thin layer. Examine for foreign matter by inspection with the unaided eye or by use of a lens (6 ×). Separate foreign matter and weigh it and calculate the percentage present.

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### 2.8.3. STOMATA AND STOMATAL INDEX

#### STOMATA

There are several types of stomata (see Figure 2.8.3.-1), distinguished by the form and arrangement of the surrounding cells:

- (1) The *anomocytic* (irregular-celled) type: the stoma is surrounded by a varying number of cells in no way differing from those of the epidermis generally,
- (2) The *anisocytic* (unequal-celled) type: the stoma is usually surrounded by 3 subsidiary cells, of which one is markedly smaller than the others,
- (3) The *diacytic* (cross-celled) type: the stoma is accompanied by 2 subsidiary cells, whose common wall is at right angles to the guard cells,

- (4) The *paracytic* (parallel-celled) type: the stoma has on each side one or more subsidiary cells parallel to the long axis of the pore and guard cells.

#### STOMATAL INDEX

$$\text{Stomatal Index} = \frac{100 \times S}{E + S}$$

- S = the number of stomata in a given area of leaf,  
E = the number of epidermal cells (including trichomes) in the same area of leaf.

For each sample of leaf, make not fewer than 10 determinations and calculate the mean.

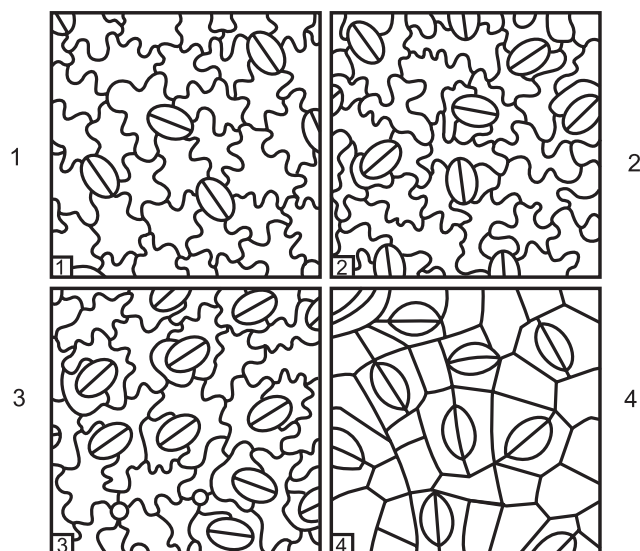


Figure 2.8.3.-1

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### 2.8.4. SWELLING INDEX

The swelling index is the volume in millilitres occupied by 1 gram of a drug, including any adhering mucilage, after it has swollen in an aqueous liquid for 4 h.

In a 25 ml ground-glass stoppered cylinder graduated over a height of  $125 \pm 5$  mm in 0.5 ml divisions, place 1.0 g of the drug, whole or of the degree of comminution prescribed in the monograph. Unless otherwise prescribed, moisten the drug with 1.0 ml of *alcohol R*, add 25 ml of *water R* and close the cylinder. Shake vigorously every 10 min for 1 h. Allow to stand for 3 h. At 90 min after the beginning of the test, release any large volumes of liquid retained in the layer of the drug and any particles of the drug floating at the surface of the liquid by rotating the cylinder about a vertical axis. Measure the volume occupied by the drug, including any adhering mucilage. Carry out 3 tests at the same time.

The swelling index is given by the mean of the 3 tests.

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### 2.8.5. WATER IN ESSENTIAL OILS

Mix 10 drops of the essential oil with 1 ml of *carbon disulphide R*. The solution remains clear on standing.