

PHYSICAL EVALUATION

Physical standards such as specific gravity, density, optical rotation, refractive index, melting point, viscosity and solubility in different solvents help in the evaluation. A few of them are described below.

(1) Moisture content: The percentage of active chemical constituents in crude drugs is mentioned on air-dried basis. Hence, the moisture content of a drug should be determined and also be controlled to make the solution of definite strength. The moisture content of a drug should be minimized in order to prevent decomposition of crude drug either due to chemical change or due to microbial contamination.

The moisture content is determined by heating a drug 105 °C in an oven to a constant weight. For the drug containing volatile active constituents, the toluene distillation method is followed.

Table 5: Crude drug with limits of moisture content

Drugs	Moisture content (% w/w) not more than
Aloes	10
Digitalis	5
Ergot	8
Acacia	15
Starch	15

(1) Viscosity: Viscosity of a liquid is constant at a given temperature and is an index of its composition. Hence, it can be used as a means of standardising liquid drugs. The following are the suitable examples:

1. Liquid paraffin: Kinematic viscosity not less than 64 centistokes. (Kinematic viscosity is a measure of a fluid's internal resistance to flow under gravitational forces).
2. Pyroxylin : Kinematic viscosity, 1100 - 2450 centistokes.

(iii) Melting point:

- It is one of the parameters to judge the purity of crude drugs. In case of pure chemicals or phytochemicals, melting points are very sharp and constant.
- Since crude drugs from animal or plant origin contain mixed chemicals, they are described with certain range of melting point.
- The purity of the following crude drugs can be ascertained by determining their melting points in the range shown against each of them (Table 6).

Table 6: Melting point of drugs

Drugs	Melting point (°C)
Colophony	75-85
Kokum butter	39-42
Cocoa butter	30-33
Bees wax	62-65
Anhydrous wool fat	34-40
Hard paraffin	50-57

(iv) Optical rotation:

- Certain substances are found to have the property of rotating the plane of polarised light in pure state or in the solution. Thus, they are described to be optically active and this property is known as optical rotation.
- Plane of polarised light may be rotated towards right (dextrorotatory) or left (laevorotatory). Normally, the optical rotation is determined at 25 °C using sodium lamp as the source of light. Following is the list of few drugs of pharmacognostic origin with their optical rotation.
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Drugs	Angle of rotation
Caraway	+ 70 ° to + 80 °
Castor oil	Not less than +3.5 °
Clove oil	0 ° to -1.5 °
Honey	+3 ° to -15 °

Eucalyptus oil	-5 ° to + 10 °
Chinopodium oil	-3 ° to -8 °

(v) Refractive Index:

- When a ray of light passes from one medium to another of different density, it is bent from original path. Thus, the ratio of the velocity of light in vacuum to its velocity in the substance is termed as refractive index of the second medium.
- Depending upon purity, it is a constant for a liquid and can be considered as one of the criteria for its standardisation.
- Refractive index of a compound varies with the wavelength of the incident light, temperature and pressure.
- Refractive indices of the following compounds are sodium light and at a temperature of 25°C (Table 8).

Table 8: Refractive indices of some phytoconstituents

Drugs	Refractive index
Arachis oil	1.4678 to 1.4698
Caraway oil	1.4838 to 1.4858
Castor oil	1.4758 to 1.4798
Clove oil	1.5300 to 1.5310