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# PHYSICAL EVALUATION OF CRUDE DRUG

# DRUG EVALUATION

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Evaluation of crude drug ensures its identification and determination of its quality and purity.

## NEED OF DRUG EVALUATION

The evaluation of crude drug is necessary because

Biochemical variation in crude drug

Deterioration due to treatment and storage

# PHYSICAL EVALUATION

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These are rarely constant for crude drug , but may help in evaluation with reference to

- MOISTURE CONTENT
- SPECIFIC GRAVITY
- DENSITY
- OPTIC ROTATION
- REFRACTIVE INDEX
- MELTING POINT
- VISCOSITY

# MOISTURE CONTENT

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Moisture content is responsible for the decomposition of crude drug due to chemical change or microbial attack. It is necessary to determine and control the moisture content of crude drug .

It is determined by heating the drug at 105°C in an oven to a constant weight.

## EXAMPLE

Moisture content of **Digitalis** is 5% w/w.

# VISCOSITY

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Resistance of the fluid to flow . Viscosity of a liquid is constant at given temperature . Hence it is used as a means of standardizing liquid drugs.

## EXAMPLE

**PYROXYLIN** kinematic viscosity is 1100-2450 centistokes .

**LIQUID PARAFFIN** kinematic viscosity is 64 centistokes at 37.8°C.

# MELTING POINT

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It is one of the parameter to judge the purity of crude drug. In case of pure chemical or phytochemicals , melting point are very sharp and constant . Since the crude drug from animals and plants origin contain the mixed chemicals .

Purity of crude drug can be determined by their melting points.

## EXAMPLE

❖ COLOPHONY

75-85°C

❖ BEES WAX	62-65°C
WOOL FAT	34-44°C
COCOA BUTTER	30-33°C

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# ULTRAVIOLET LIGHT

Certain drugs fluoresce when the cut surface or the powder is exposed to ultraviolet radiation , And it is useful in the identification of those drugs .

## EXAMPLE

Indian and Chinese Rhubarb are very difficult to distinguish and is very difficult form , but examination in ultraviolet light gives such marked differences in florescence that the varieties can be easily distinguish from each other .

# SOLUBILITY

The number of ml of solvent required to dissolve 1g of drug .

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The presence of adulteration in a drug could be indicated by solubility studies.

- Balsam of peru is soluble in chloral hydrate solution.
- Colophony is freely soluble in light petroleum.
- Asafoetida is soluble in carbon disulphide.
- Alkaloidal bases are soluble in chloroform.



# SPECIFIC GRAVITY

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It is also referred to as “RELATIVE DENSITY” .It is the ratio of the mass of a liquid or solid to the mass of an equal volume of distilled water at 4°C.

Its measure gives the idea of the floatability of drug.

IF specific gravity is greater than 1 the substance sinks.

If specific gravity is less than 1 the substance floats.

## EXAMPLE

Cotton seed oil	0.88-0.93
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Coconut oil      0.925

Castor oil        0.95

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## ASH VALUE

The residue remaining after incineration is the ash content of the drug (inorganic salts of carbonates , phosphates , silicates of sodium , potassium, calcium and magnesium ) is known as ash content.

Ash value is the criterion to judge the identity and purity of crude drug.

**Useful for detecting low grade products, exhausted drug and drugs from earthy matter .**

# TYPES OF ASH VALUE

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- Total ash value
- Acid insoluble ash value
- Sulphated ash value
- Water soluble ash value

## ➤ TOTAL ASH VALUE

It is used for detecting crude drug that are mixed with minerals like sand , soil , calcium oxalate m chalk powder or drugs with different organic contents to

improve appearance . EXAMPLE **GINGER** .

TEMP. should be less than 450 because at high temp. alkali chlorides maybe lost

## DETERMINATION

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Weigh accurately about 3gms of the powdered drug in silica crucible . Incinerate the heat until free from carbon and cool .Keep it in desiccator . Weigh the ash and calculate the percentage of the total ash with reference to the air dried sample.

## ACID INSOLUBLE ASH VALUE

It is used for the determination of earthy matter present on roots , rhizomes and also on leaves . Crude drug contains calcium oxalate crystals , the amount may varies depending on the environmental conditions.

# DETERMINATION

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Boil the total ash obtained as above for five minutes with 25ml of dilute HCL.

Filter and collect the insoluble matter on the ash less filter paper . Wash the filter paper with hot water , ignite it in tared crucible , cool and kept in desiccator. Weigh the residue and calculate the acid insoluble ash of the drug.

## SULPHATED ASH VALUE

It is used for the detection of low grade products.

# WATER SOLUBLE ASH VALUE

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It is used to detect either material exhausted by water or not (tea leaves , ginger rhizomes)

# EXTRACTIVE VALUE

The extract obtained by exhausting crude drugs with different solvents are approximate measures of their chemical constituents . Various solvents are used according to the type of the constituents to be analyzed .

## SIGNIFICANCE

- Useful for the evaluation especially when the constituents of the drugs can not be readily estimated by any other means .

- It also helps to indicate the nature of chemical constituents present in the drug.
  - Also helps in the identification of adulteration of drug .
  - Solubility of drug is also detected .
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## TYPES OF EXTRACTIVE VALUE

- Water soluble extractive value
- **Alcohol soluble extractive value**
- **Ether soluble extractive value**

# WATER SOLUBLE EXTRACTIVE VALUE

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It is applied for the drugs which contain water soluble constituents such as tannins , sugar , plant acids and mucilage.

- **ALCOHOL SOLUBLE EXTRACTIVE VALUE**

It is applied for drugs which contain alcohol soluble constituents such as tannins, resins and alkaloids .



# ETHER SOLUBLE EXTRACTIVE VALUE

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It is applied for the extraction of volatile oils , fixed oils and resins .

- Volatile ether soluble extractive value
- Non volatile ether soluble extractive value

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