Evaluation of Crude Drugs

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Drug Evaluation

Drug evaluation means-

• Confirmation of its identity.
• Determination of its purity.
• Determination of its quality.
• Determination of nature of adulteration.
Need/Reasons for drug evaluation

Evaluation of crude drug is essential to check:

- Substitution/Adulteration.
- Biochemical variation.
- Deterioration.
Methods for evaluation

- Morphological/Organoleptic Evaluation.
- Microscopic Evaluation.
- Chemical Evaluation.
- Physical Evaluation.
- Biological Evaluation.
A] Morphological/Organooleptic Evaluation

It's a qualitative evaluation and drugs are evaluated by means of sensory features like colour, odour, taste, shape, size, texture, net content, volume.
B] Microscopic Evaluation

• This method enables detailed microscopic examination of organized crude drugs in their entire and powdered forms.
• Transverse sections (T.S.) are prepared for histological studies.
• Microscopic characters of plant part like cell wall, cell content, starch grains, lignin, Calcium oxalate crystals, fibres, vessels and trichomes can be studied.
• Micrometry.
• Microchemical tests:

<table>
<thead>
<tr>
<th>S. N.</th>
<th>Cellular Constituent</th>
<th>Chemical used to Evaluate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lignified tissue</td>
<td>Phloroglucinol + Conc. HCl (1:1)</td>
</tr>
<tr>
<td>2</td>
<td>Mucilage</td>
<td>Ruthenium Red</td>
</tr>
<tr>
<td>3</td>
<td>Starch grains</td>
<td>Dilute Iodine solution</td>
</tr>
<tr>
<td>4</td>
<td>Fixed oil/ Vol. oil</td>
<td>Sudan Red</td>
</tr>
<tr>
<td>5</td>
<td>Aleuron grains</td>
<td>Alcoholic picric acid</td>
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</tbody>
</table>
Quantitative microscopy

Leaf constants-
- Stomatal no.
- Stomatal index
- Palisade ratio
- Vein islet no.
- Vein termination no.

Lycopodium spore method.
C] Physical Evaluation

• Physical characteristics of crude drugs are evaluated like-

• Moisture content
• Viscosity
• Melting point
• Solubility
• Optical Rotation
• Refractive Index
• Ash values
• Extractive values
• Swelling index
• Volatile oil content
• Foreign organic matter
D] Chemical Evaluation

• The estimation of active constituents by chemical process is termed as chemical evaluation.

• Chemical evaluation is done by following two methods-
  i) Chemical tests-Qualitative and Quantitative test (Preliminary phytochemical screening).
  ii) Chemical assay-Estimation of particular group of constituents, (Titrimetry/ Gravimetry).
E) Biological Evaluation

• It confirms the therapeutic activity of raw material and finished products.
• When potency of drug is estimated by measuring its effect on living organisms like bacteria, animal tissue/entire animal it is termed as Bioassay.
Following methods are used for biological evaluation-

1. Antipyretic activity
2. Anti-inflammatory activity
3. Hypoglycemic activity
4. Antiulcer activity
5. Analgesic activity
6. Analgesic activity
7. Microbiological assay
8. Cardiac activity
9. Anthelmintic activity
THANK YOU