D.PHARM • FIRST YEAR

Pharmacognosy

CHAPTER 3

Quality Control of Crude Drugs

ENGLISH CHAPTER NOTES



DIPLOMA IN PHARMACY

ADULTERATION OF NATURAL DRUGS

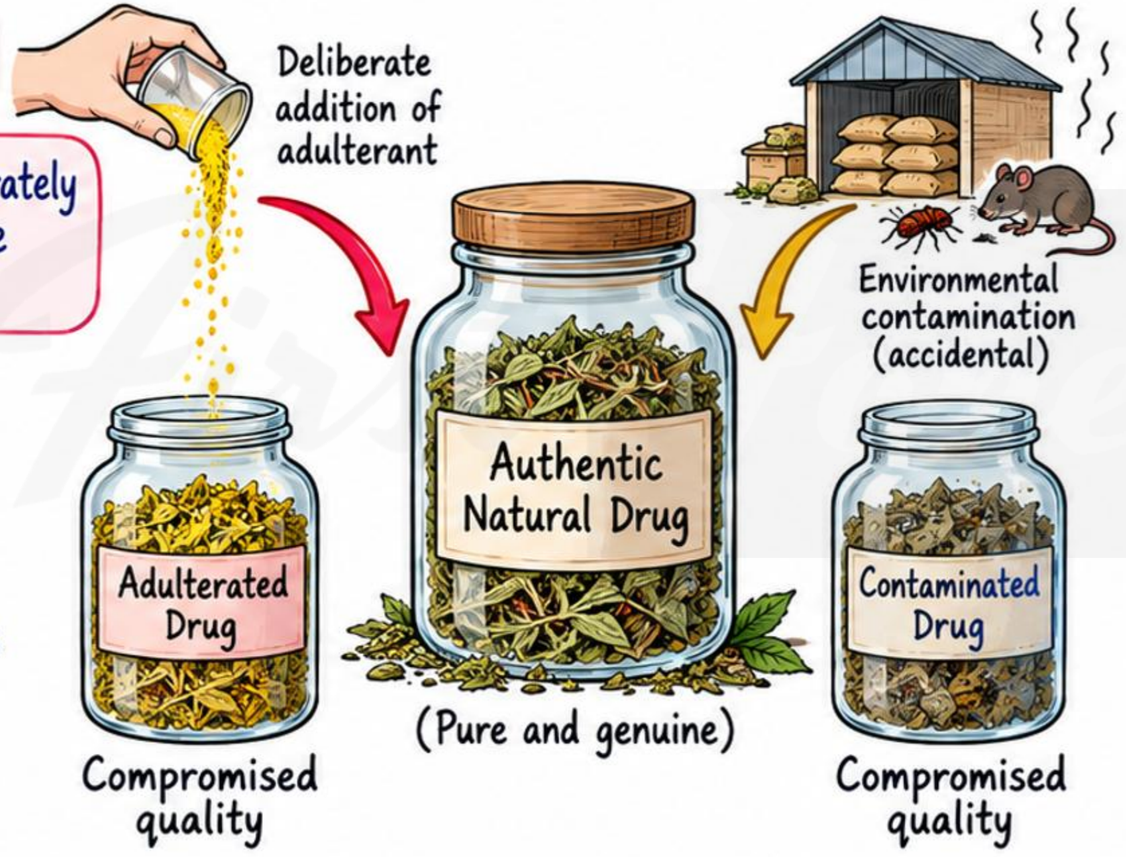
DEFINITION Adulteration is the intentional or unintentional addition, substitution or removal of material in a drug, causing loss of identity, purity, quality or safety.

DIRECT ADULTERATION

Harmful or inferior material is deliberately added to increase quantity, improve appearance or reduce cost.

Examples:

- Metanil yellow in turmeric
- Formalin in milk or fish
- Non-food-grade additive such as washing powder in ice cream
- Starch mixed into milk or ghee



INDIRECT ADULTERATION

Contamination occurs unintentionally during production, processing, transport, packaging or storage.

Examples:

- Pesticide or heavy-metal residues
- Arsenic or cadmium in water
- Rancidity of oil during poor storage
- Rodent or insect contamination

RESULT ➡ The drug may become ineffective, inconsistent or unsafe.

CAUSES AND PREVENTION OF ADULTERATION

MAJOR CAUSES

- Economic gain by using cheaper material
- Weak enforcement of quality standards
- Misidentification of plant or species
- Contamination from soil, water or air

ADULTERATION

COMMON EXAMPLES



Turmeric → Metanil yellow



Ginger → wheat flour or fillers



Honey → sugar or corn syrup



Animal-derived material → contamination if purification is poor

DETECTION AND PREVENTION

1. Follow official pharmacopoeial standards and legal requirements.
2. Verify identity and reputation of suppliers.
3. Apply Good Manufacturing Practices (GMP).
4. Use suitable organoleptic, microscopic, physical, chemical and biological tests.

KEY IDEA

Prevention begins with correct identity, controlled sourcing, clean handling and documented testing.

EVALUATION OF CRUDE DRUGS

SIGNIFICANCE

- Quick, low-cost preliminary check of identity.
- Detects obvious adulteration or deterioration.

3. Physical

2. Microscopic

4. Chemical

1. Organoleptic

5. Biological

LIMITATIONS

- Subjective and experience-dependent.
- Cannot detect subtle or chemically similar adulterants.

ORGANOLEPTIC EVALUATION

Uses the sense organs to inspect a crude drug.

Sight

colour, shape and size

Example: yellow-orange turmeric rhizome



Smell

odour

Example: pungent-spicy clove



Taste

taste

Example: bitter quinine bark



Touch

texture

Example: brittle senna leaves



MICROSCOPIC EVALUATION

DEFINITION

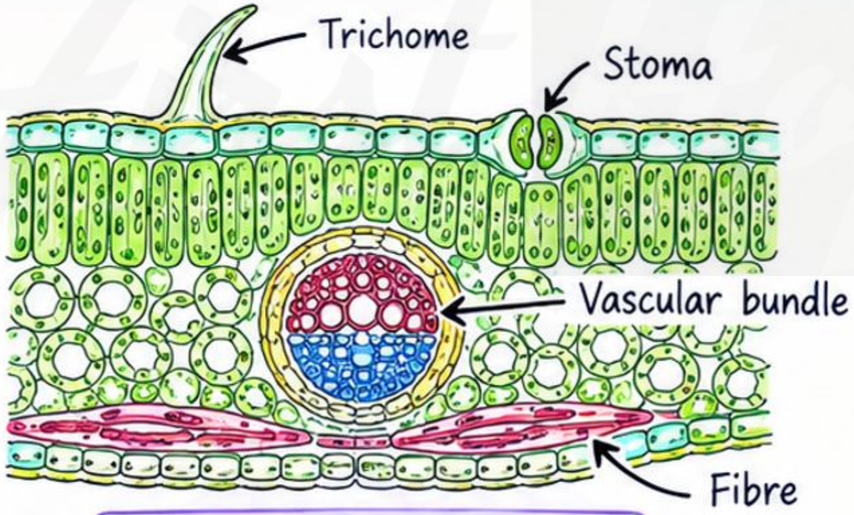
Microscopic evaluation examines whole or powdered crude drugs for diagnostic histological and cellular features.

PROCEDURE

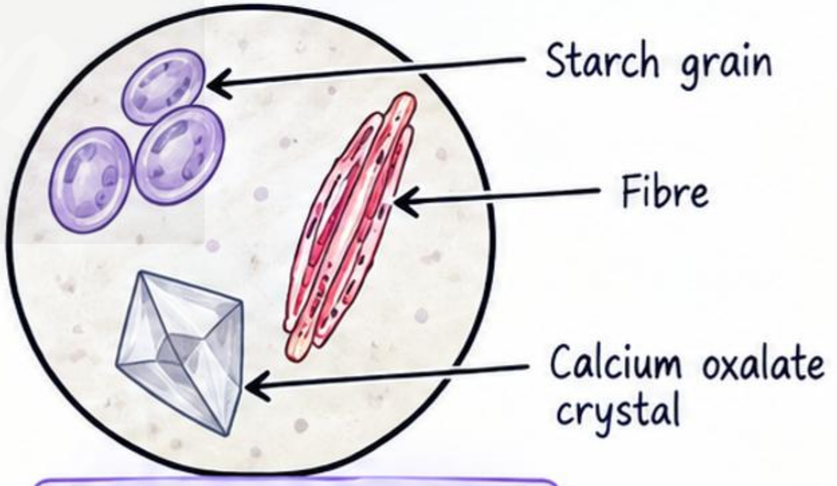
1. Prepare a thin transverse or longitudinal section.
2. Clear or stain the sample, for example with chloral hydrate or phloroglucinol + HCl.
3. Observe the prepared material under a microscope.
4. Compare diagnostic tissues, cells and inclusions with an authentic standard.

FEATURES EXAMINED

- Trichomes and stomata
- Fibres, vessels, glands and vascular bundles
- Starch grains, pigments and calcium oxalate crystals



T.S. of a leaf (enlarged view)



Powder view (enlarged view)

SIGNIFICANCE

Confirms identity and detects foreign tissues, insects or other matter.

LIMITATION

Needs skill in plant anatomy; chemically similar material may still require chemical testing.

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