SNS COLLEGE OF PHARMACY AND HEALTH SCIENCES

Affiliated To The Tamil Nadu Dr. MGR Medical University, Chennai
Approved by Pharmacy Council of India, New Delhi.
Coimbatore -641035

COURSE NAME : PHARMACOGNOSY (ER20-13T)

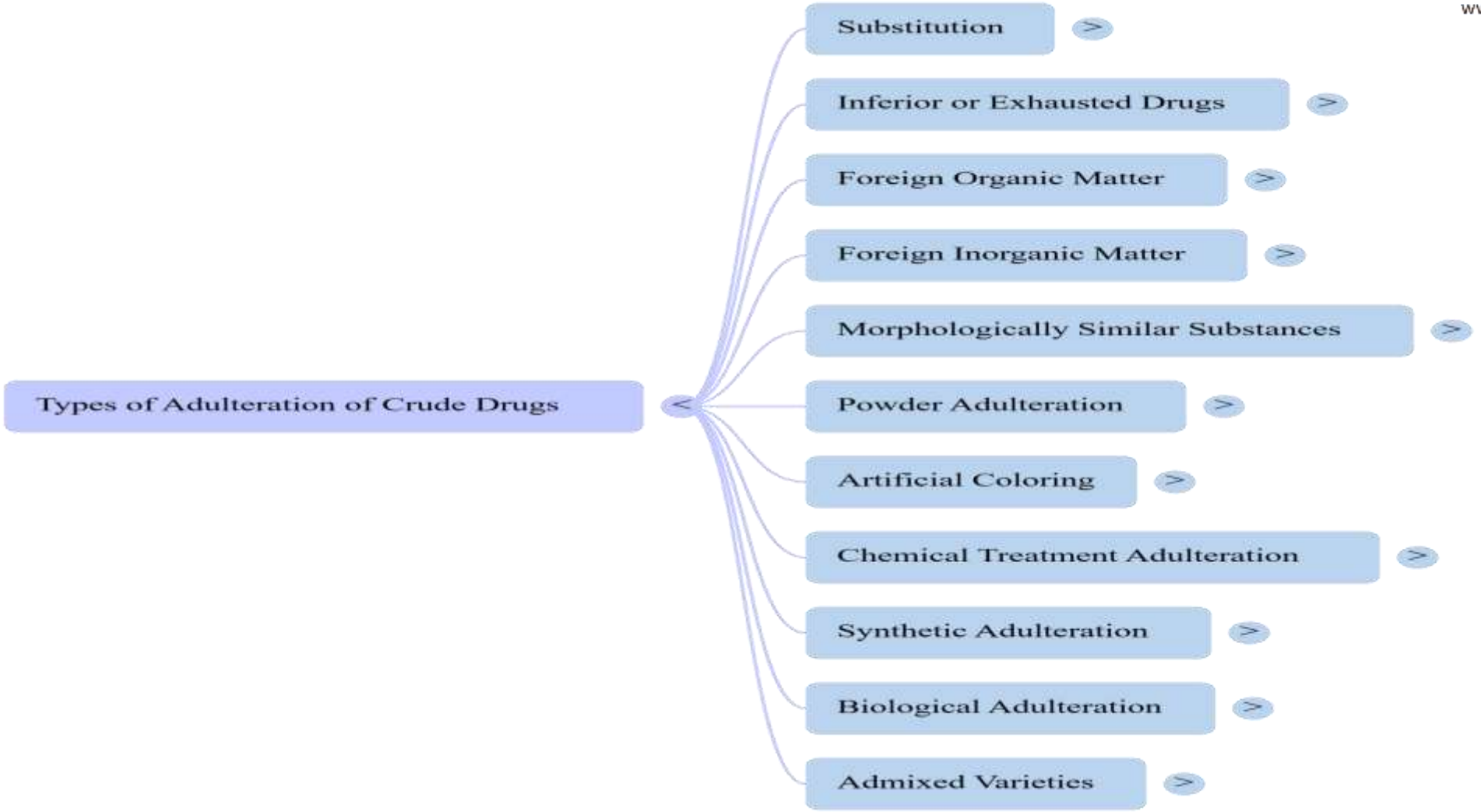
D.PHARM / I YEAR

TOPIC 6 : DIFFERENT METHODS OF ADULTERATION

DESIGN THINKING IN PHARMACOGNOSY

- **Empathize:** Understanding the Problem & Stakeholders
- **Define:** Clear Problem Statement for Each Type of Adulteration.
- **Ideate:** Generating Innovative Solutions for Each Method.
- **Prototype:** Creating Practical Tools or Methods.

MINDMAP

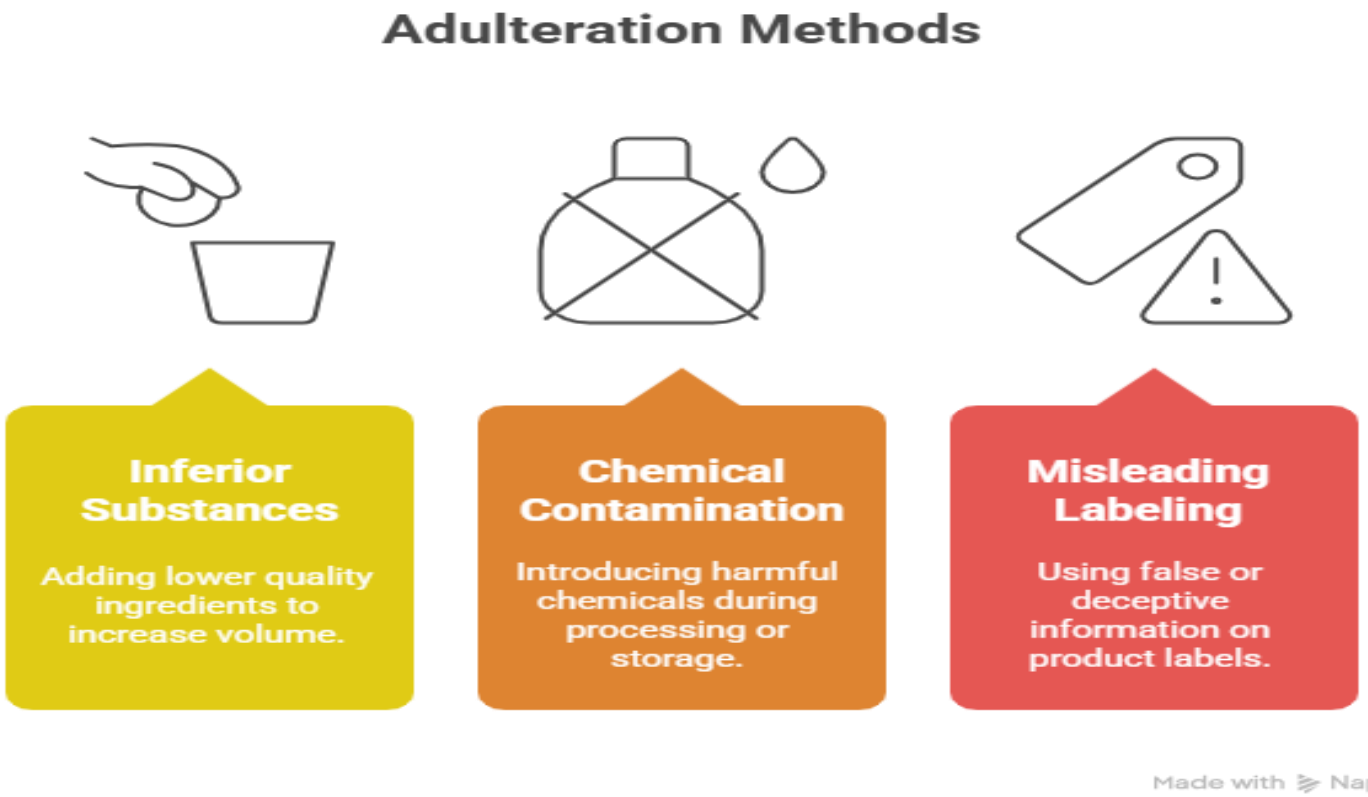

Types of Adulteration of Crude Drugs
Substitution
Inferior or Exhausted Drugs
Foreign Organic Matter
Foreign Inorganic Matter
Morphologically Similar Substances
Powder Adulteration
Artificial Coloring
Chemical Treatment Adulteration
Synthetic Adulteration
Biological Adulteration
Admixed Varieties

Empathize

INTRODUCTION

Empathize

DIFFERENT METHODS OF ADULTERATION



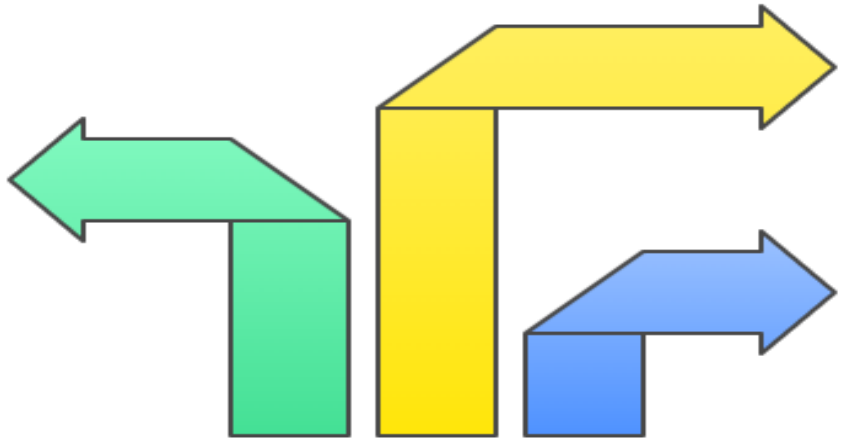
Empathize

SUBSTITUTION WITH INFERIOR COMMERCIAL VARIETIES

How to detect substitution with inferior varieties?

Chemical Analysis

Provides accurate identification of chemical compounds.



Microscopic Examination

Reveals cellular structures for differentiation.

Visual Inspection

May not be reliable due to resemblance in appearance.

Made with Napkin

Empathize

EXAMPLES

Adulteration Examples

Senna Pod Substitution

Substituting senna pods with *Cassia obovata*, which has lower anthraquinone content.

Clove Oil Replacement

Replacing clove oil with clove stem oil, which has a lower eugenol content.

Define

SUBSTITUTION WITH EXHAUSTED DRUGS

Adulteration Process of Crude Drugs

Active Constituents Removed

Active compounds are extracted, leaving inert material

Bulk and Weight Increased

The mixture increases the overall volume and mass

Exhausted Drugs Mixed

Inert material is combined with genuine drugs

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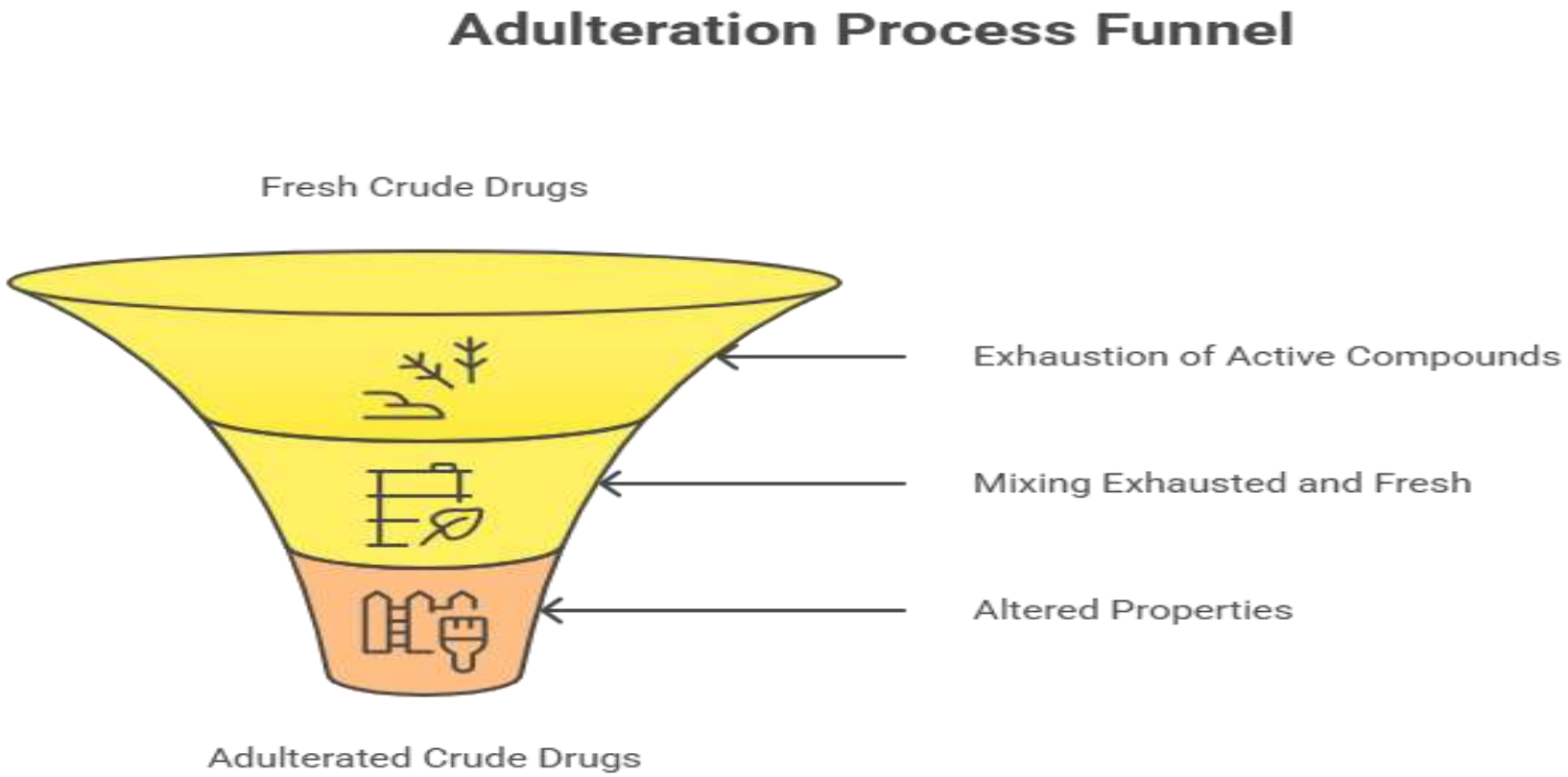
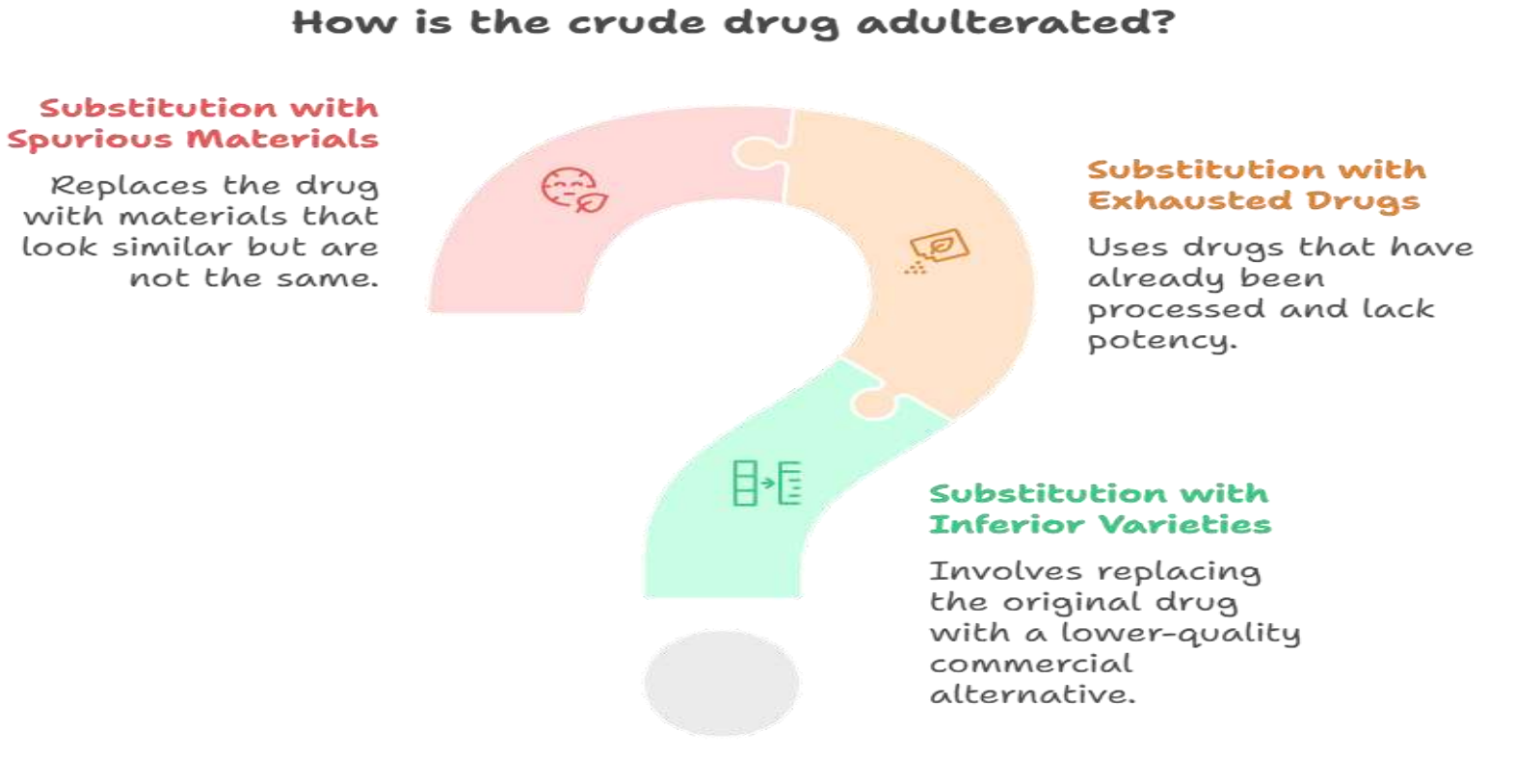
Define

EXAMPLES

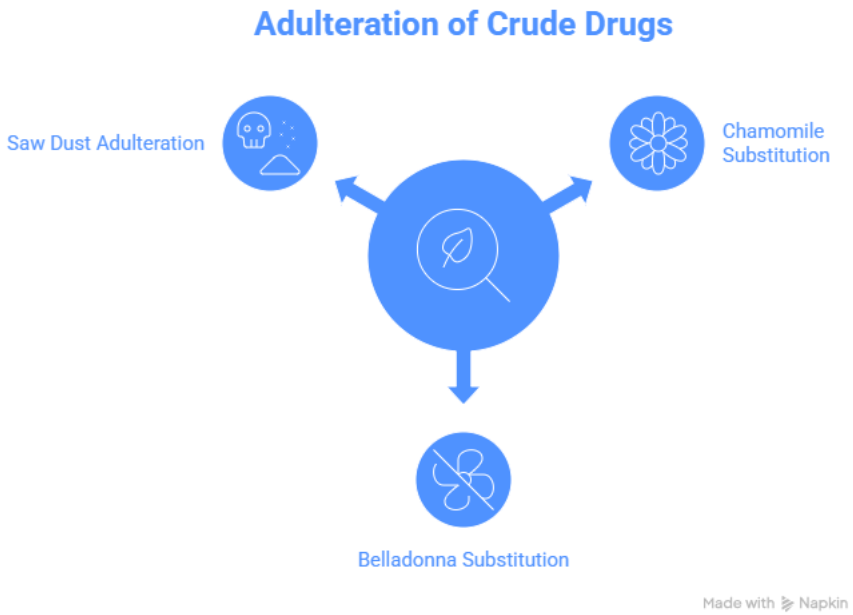


Ideate

SUBSTITUTION WITH SPURIOUS MATERIALS

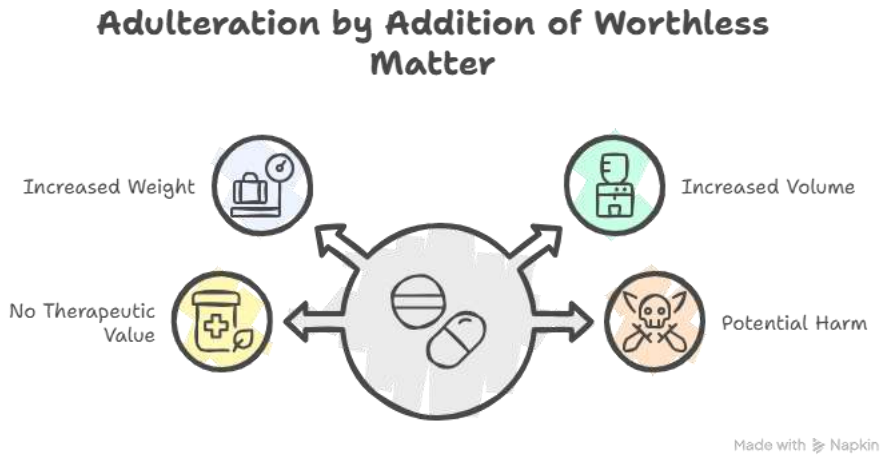


EXAMPLES

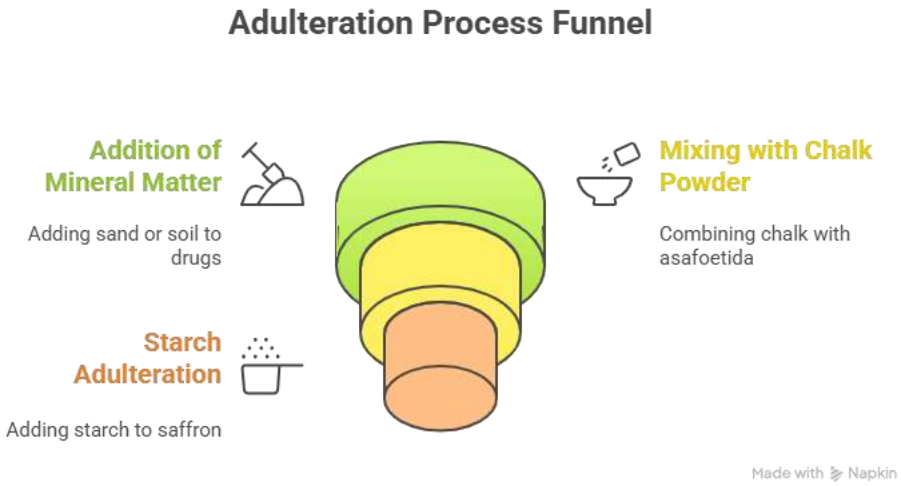

Adulteration of Crude Drugs
Saw Dust Adulteration
Chamomile Substitution
Belladonna Substitution
Made with Napkin

Prototype

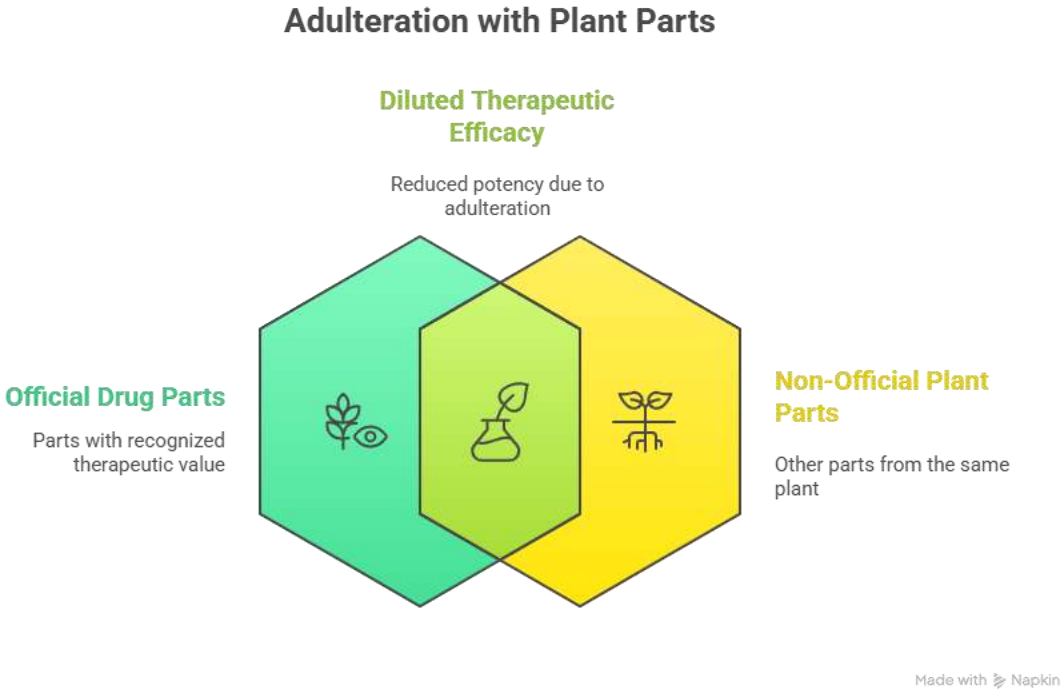
ADULTERATION BY ADDITION OF WORTHLESS MATTER



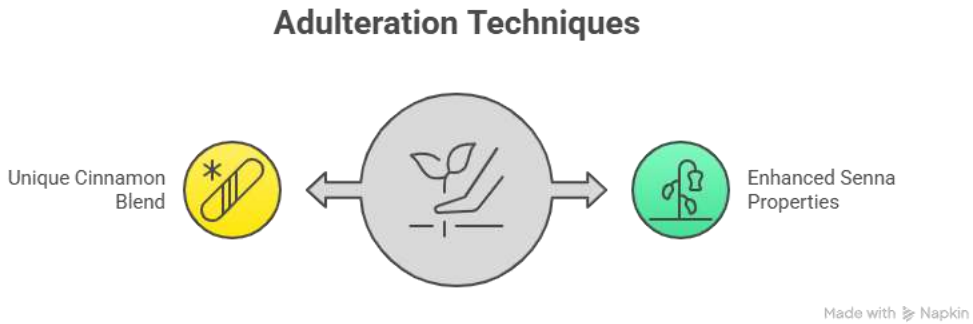
ADULTERATION PROCESS FUNNEL



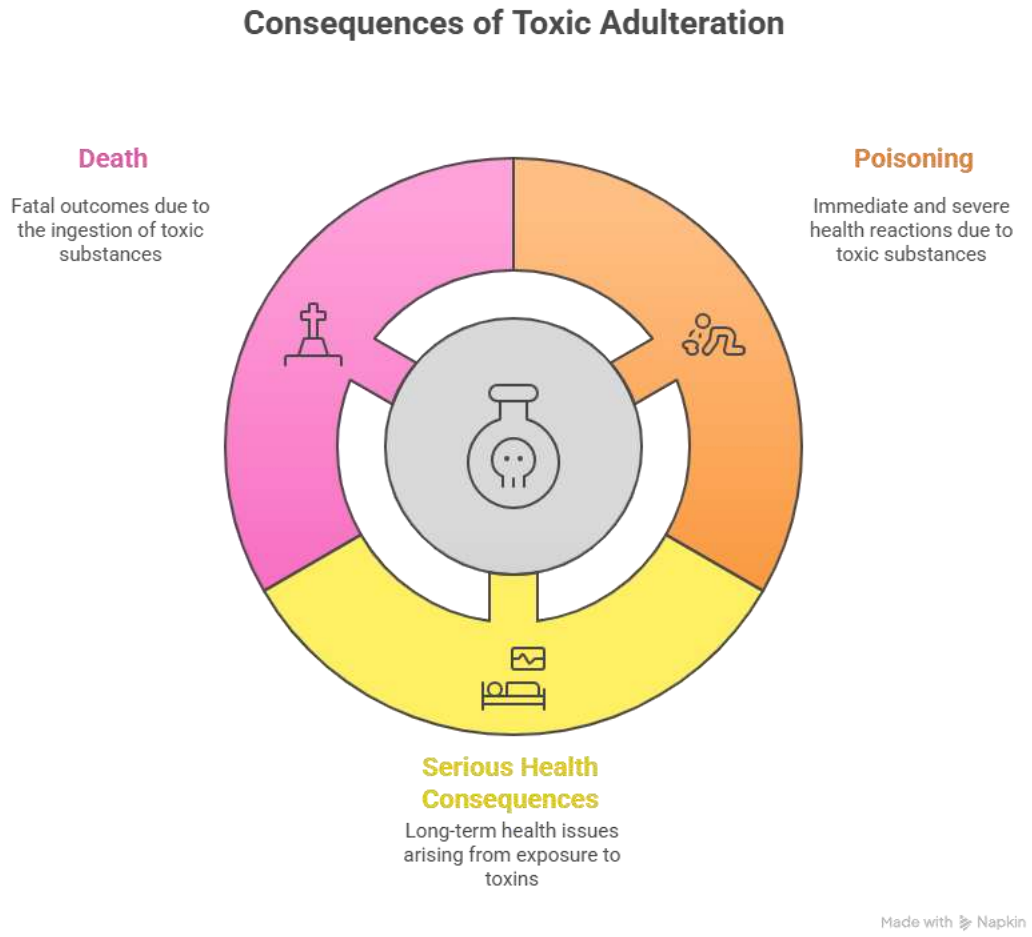
PRESENCE OF VEGETABLE MATTER



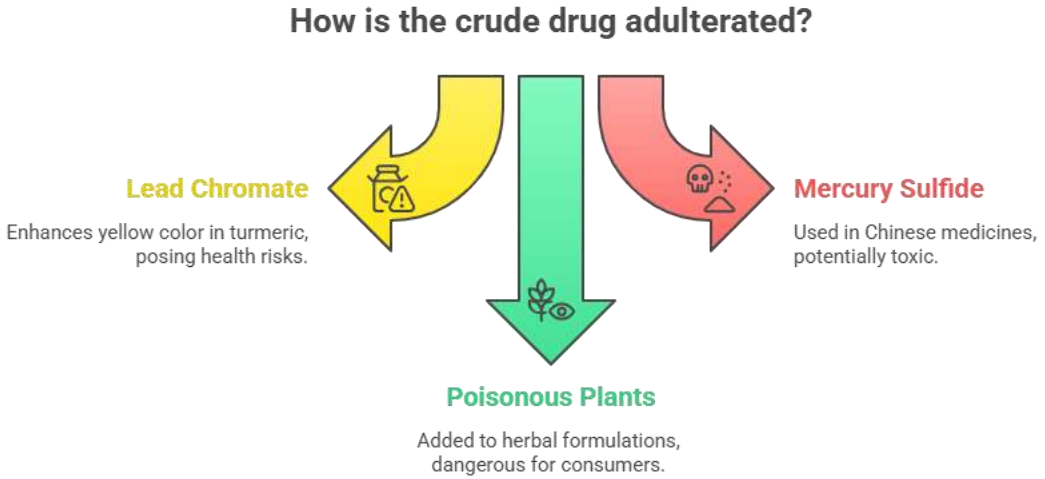
ADULTERATION WITH PLANT PARTS



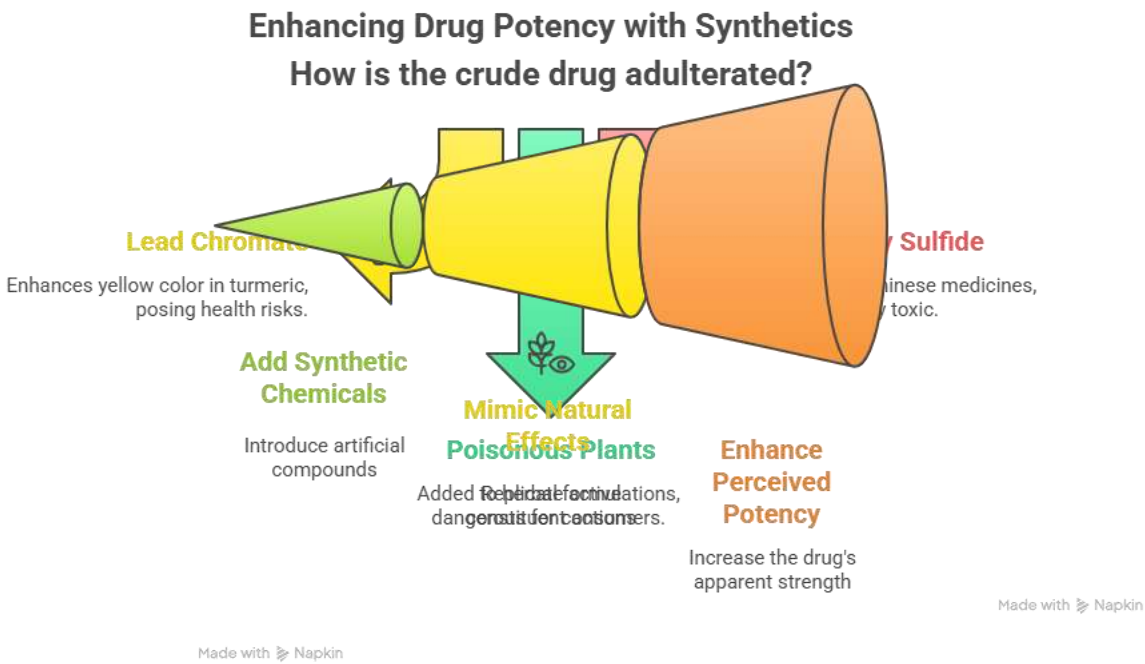
ADULTERATION WITH TOXIC SUBSTANCES



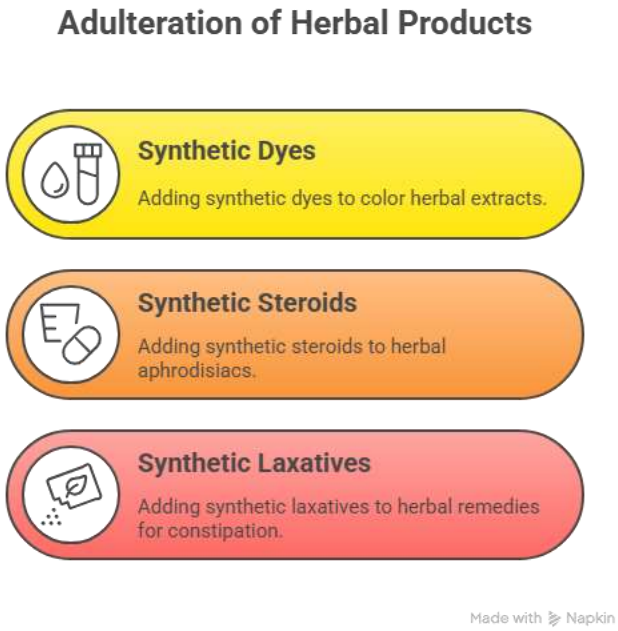
HOW IS THE CRUDE DRUG ADULTERATED



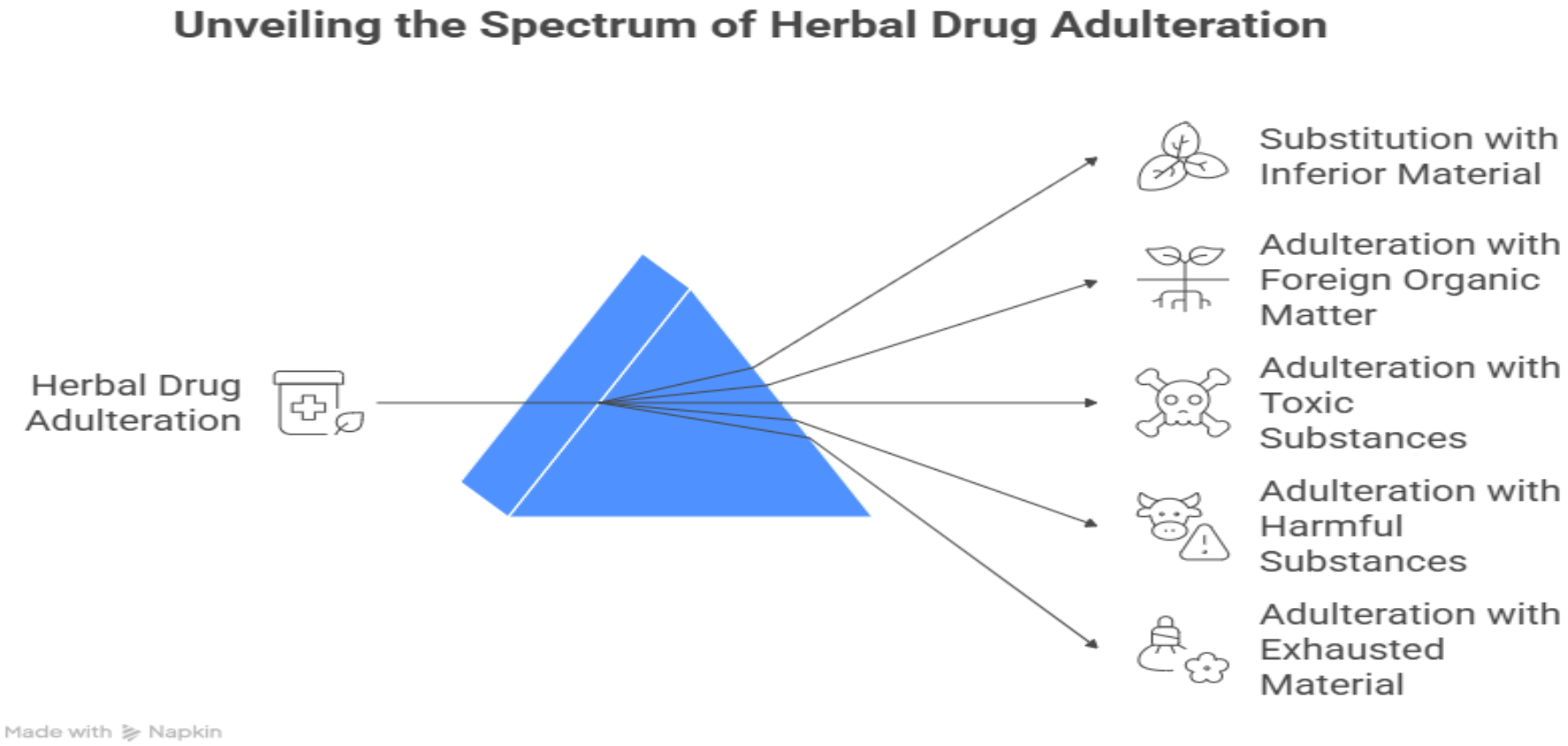
ENHANCING DRUG POTENCY WITH SYNTHETICS



ADULTERATION OF HERBAL PRODUCTS



SUMMARY


Unveiling the Spectrum of Herbal Drug Adulteration
Herbal Drug Adulteration
Substitution with Inferior Material
Adulteration with Foreign Organic Matter
Adulteration with Toxic Substances
Adulteration with Harmful Substances
Adulteration with Exhausted Material
Made with Napkin

CLASS ASSESMENTS

1. A batch of powdered turmeric (*Curcuma longa*) is suspected of being adulterated. Microscopic analysis reveals the presence of starch granules that are significantly larger and more irregular in shape than those typically found in turmeric. Chemical analysis indicates a lower curcuminoid content than the pharmacopoeial standard.

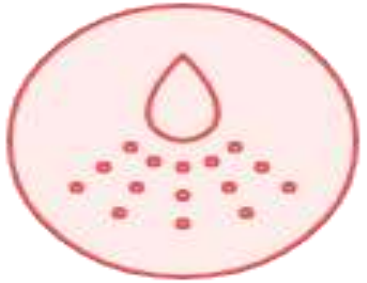
CLASS ASSESSMENTS

How to ensure the quality of turmeric powder?

Authentic Turmeric

Contains characteristic starch granules and curcuminoid content

VS



Adulterated Turmeric

Contains irregular starch granules and lower curcuminoid content

CLASS ASSESSMENTS

2) Identify the most likely type of adulteration present in this turmeric sample. Explain your reasoning based on the microscopic and chemical analysis findings.

CLASS ASSESSMENTS

How to enhance understanding of materials?

Microscopic and Chemical Analysis

Reveals intricate details and underlying properties

VS

Advanced Techniques

Uncovers hidden properties and enhances knowledge

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CLASS ASSESSMENTS

3) The most likely type of adulteration is *substitution* or *addition* with starch from another source, such as cornstarch or tapioca starch. The larger and irregular starch granules, compared to the smaller, oval granules of turmeric, indicate the presence of a foreign starch. The lower curcuminoid content further supports this conclusion, as the added starch dilutes the active compounds.

CLASS ASSESSMENTS

How to identify turmeric adulteration?

Foreign Starch

Larger, irregular granules; lower curcuminoid content

VS

Pure Turmeric

Smaller, oval granules; higher curcuminoid content

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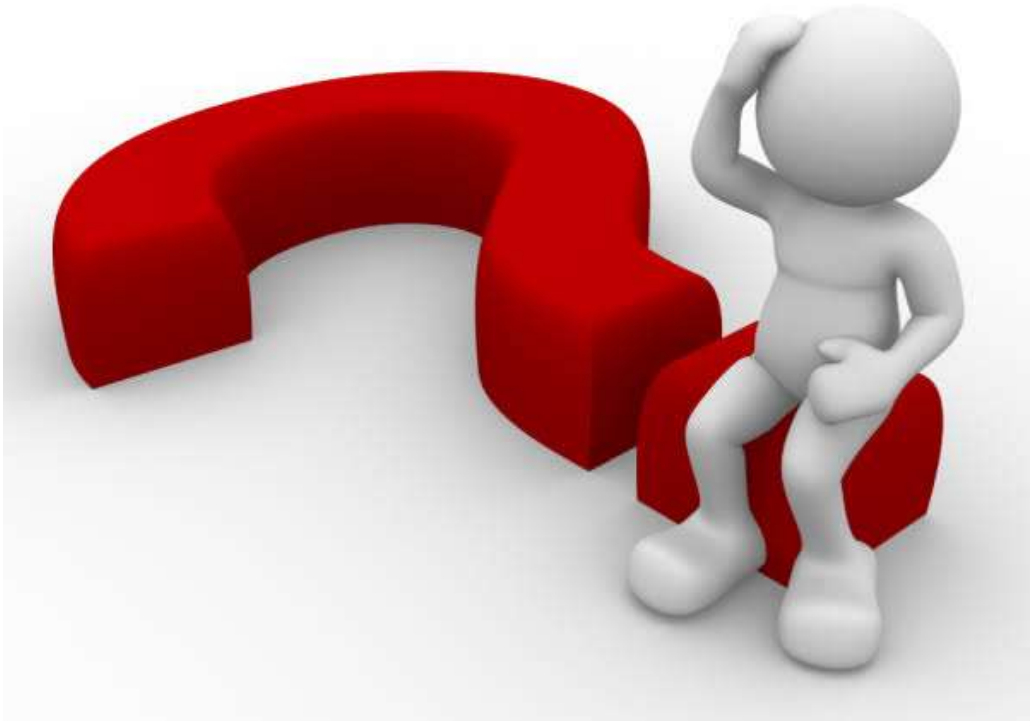

REFERENCES

1. Here are **books with author names** related to adulteration in pharmacognosy:
2. **Trease and Evans Pharmacognosy** – *W.C. Evans*
3. **Pharmacognosy** – *Varro E. Tyler, Lynn R. Brady, James E. Robbers*
4. **Quality Control and Standardization of Herbal Drugs** – *Pulok K. Mukherjee*
5. **Textbook of Pharmacognosy** – *C.K. Kokate*
6. **Pharmacognosy and Phytochemistry** – *Sharma & Agarwal*
7. **Pharmacognosy** – *Chopra, Nayar & Chopra*
8. **Modern Herbal Toxicology & Drug Quality Evaluation** – *Shibnath Ghosal*


Thank
you!