

# QUALITY CONTROL OF CRUDE DRUGS



## Adulteration and its types

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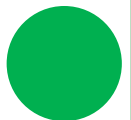
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# ADULTERATION

- Adulteration is a practice of **substituting original crude drugs** partially or fully with other similar looking substances but the later is either free from or inferior in chemical and therapeutic properties.
- A adulteration may also be defined as **mixing or substituting the original drug material** with other **spurious, inferior, defective, spoiled,** useless other parts of same or different plant or harmful substances or drug which do not confirm with the official standards.



# WHAT ARE THE REASONS FOR ADULTERATION?

- Enhancement of profits - intentional
- Scarcity / lack of authentic drugs- *Hypericum perforatum* (St John's wort)
- High price of drugs: **Saffron** (*Crocus sativus*)- Rs. 2000 / 5 g
- Lack of knowledge about authentic source
- Similarity in morphology, *Mucuna pruriens* with *M. utilis*
- Similarity in colour- *Ratanjot*
- Careless collections



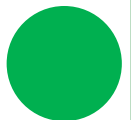
Injecting colouring material

# TYPES OF ADULTERATION

- **Substitution with INFERIOR commercial varieties**

Due to *morphological resemblance to the authentic drugs*, different inferior commercial varieties are used as adulterant which may or may not have any chemical or therapeutic potential as that original natural drug

- **Indian Senna** (*Cassia angustifolia*) is adulterated by Arabian Senna, dog Senna (*Cassia obovata*) and avaram (*Cassia auriculata*).
- **Ginger** (*Zingiber officinale*) is adulterated by Japanese ginger (*Zingiber mioga*).
- *Capsicum minimum* is replaced by *C. annuum*.



- **Substitution by SUPERFICIALLY SIMILAR but cheaper natural substances**

These inferior drugs do not have any relation to genuine drugs, they are superficially similar to genuine drugs, may or may not have any therapeutic or chemical component as desired.

- Leaves of species - *Ailanthus* (Tree of heaven) are substituted for **Belladonna, Senna, Mint** etc.;
- **Saffron** is admixed with dried flowers of *Carthamus tinctorious* (Safflower).



Saffron



*Carthamus tinctorious* (Safflower)



- **Substitution by EXHAUSTED DRUGS**

Here the same plant material is mixed which is having no active medicinal components as they have already been extracted out. This practice is most common in case of volatile oil containing materials like **Clove**, **Fennel** etc., where the dried exhausted material resembles the same like original drug.

- Sometimes when coloring matters have been extracted or removed during exhaustion, the residue is re-colored with artificial dyes as is done with **Saffron** and **Rose** petals.



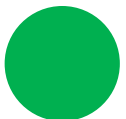
**High quality clove**



**Low quality clove**



**Fennel**



- **Adulteration by ARTIFICIALLY MANUFACTURED substitutes**

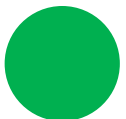
To provide the general form and appearance of various drugs, some materials are artificially manufactured and are used as substitute of the original one, e.g. **artificial invert sugar** for **honey**; **paraffin wax** after yellow coloration substituted for **bees wax**.



**Honey**



**Invert sugar syrup**





- **Adulteration by addition of WORTHLESS heavy materials**

Several times, the wastes from the market are collected and admixed with the authentic drugs.

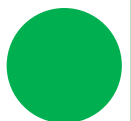
- A large mass of stone mixed with **Liquorice root** (*G. glabra*), pieces of limestone are found in **asafoetida** and lead shot has occurred in pieces of **opium** etc.



**Asafoetida**



**Limestone**



**THANK YOU**

