Quadrant II – Transcript and Related Materials

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Module Name: Processing of Crude Drugs (Part - 2)

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NOTES

Steps in the Preparation and Processing of Crude Drugs

Crude drugs need to undergo suitable preparation for being marketed. The following steps are used in the preparation and processing of crude drugs:

- Collection and Harvesting of Crude Drugs
- Drying
- Garbling (process of removal of dirt and foreign organic materials from the drug. After garbling, the crude drugs are graded according to the size, age and medicinal properties, and then packed. The crude drugs should not be packed unless they are dried completely).
- Packing (prior to marketing to meet the standard pharmacopoeial requirements to ensure the quality and safety of essential medicines).
- Storage in a special place. It forms a stockpile of dried medicinal material.

Packing of Crude Drugs

In order to send the prepared crude drug to the commercial market it must be put in some convenient containers or packages.

- The principle aim of packaging should be to provide ample protection to the drug as well as to give economy of space.
- The choice or type of package to be used depends on the nature (morphological and chemical) of the crude drug, its ultimate use and effects of climatic conditions during transportation and storage.
- Drugs, which are traded in nearby markets and which do not involve transportation or much handling or storage, may be packaged loosely in temporary ordinary packages.
- But the drugs that undergo transportation, much handling and storage should be packed in waterproof and strong containers or packages in a very compact way.

Type of Package

- The choice or the type of package to be used depends on the nature of the crude drug.
- Leaf or herb material should be baled (pressed) with power balers into a solid compact mass and covered by suitable strong waterproof covers (e.g. *Senna* sp., *Vinca* sp., *Datura stramonium* and *Atropa belladonna*).
- Extracts, gums and resins should be shipped in barrels, tin lined boxes and tin cans or metallic containers (e.g. Colophony and Tolu balsam are packed in kerosene tins, Asafoetida is stored in well closed containers to prevent loss of volatile oil).
- Crude drugs like stem, root, bark, wood, seeds which do not need special attention are packed in gunny bags, while in some cases bags are coated with

polythene internally. The weight of certain drugs in lots is also kept constant (e.g. Indian Opium).

Mostly new gunny bags are used to pack the graded medicinal plant parts. Gunny bags used to keep agricultural chemicals or fertilizers should not be used.

- Drugs which are very sensitive to moisture need special attention. The moisture, not only increases the bulk of the drug, but also causes impairment in the quality of crude drug. The excessive moisture facilitates enzymatic reactions resulting in decomposition of active constituents. They should be packed into moisture proof cans. Desiccating agents (chemicals which absorb excessive moisture from the drug) are also incorporated in the containers Form or shape of the drug also plays very important role in preserving the crude drugs (e.g. Squill, Digitalis, Colophony, Cinnamon bark, Gentian).

  Squill becomes flexible, when stored in powdered form it becomes hygroscopic and forms rubbery mass on prolonged exposure to air; while Digitalis looses its potency due to decomposition of glycosides, if brought in contact with excess of moisture during storage. Colophony needs to be packed in big masses (entire form) to control auto-oxidation because if stored in powdered form, it gets oxidized. Cinnamon bark, which is available in the form of quills, is packed one inside the other quill, so as to facilitate transport and to prevent volatilization of oil from the drug. Gentian becomes susceptible to the microbial growth.
- Cowhides and skins of other animals, waterproof or waxed papers, leather bags or even wooden and hardboard boxes may be used as packaging materials for crude drugs (e.g. *Aloe* sp. are packed in goat skin).

  The outfit of the packages should be convenient for easy handling in transportation and stacking in storehouses.

- After packing, the package should be labelled properly to indicate the plant part, date of packing and other details of the drug inside.

  A label affixed to the packaging should clearly indicate the scientific name of the medicinal plant, the plant part, the place of origin (cultivation or collection site), the cultivation or collection date and the names of the grower/collector and the processor, and quantitative information. The label should also contain information indicating quality approval and comply with other national and/or regional labelling requirements. The label should bear a number that clearly identifies the production batch. Additional information about the production and quality parameters of the medicinal plant materials may be added in a separate certificate, which is clearly linked to the package carrying the same batch number. Records should be kept of batch packaging, and should include the product name, place of origin, batch number, weight, assignment number and date.

Storage of Crude Drugs

1. Storage facilities for medicinal material (dried medicinal plants/herbal drugs/essential oils) should be dry, well ventilated and protected from light to prevent destruction of active chemical constituents, and when necessary be supplied with air-conditioning and humidity control equipment as well as facilities to protect against pests.

   Different types of insects, nematodes, worms, moulds and mites infest the crude drugs during storage. They can be prevented by drying the drug thoroughly before storage and also by giving a treatment of fumigants only when necessary. The common fumigants used for storage of crude drugs are methyl bromide, carbon disulphide and hydrocyanic acid. At times, drugs are given special treatment such as liming of the ginger and coating of nutmeg.

When freezing or saturated steam is used for pest control, the humidity of the materials should be checked after treatment.

2. Medicinal material should be stored in a building with concrete floors, on wooden pallets keeping a sufficient distance from the wall; measures should be taken to prevent the occurrence of pest infestation, mould formation, rotting or loss of oil; and inspections should be carried out at regular intervals.
3. Continuous in-process quality control measures should be implemented to eliminate sub-standard materials, contaminants and foreign matter prior to and during the final stages of packaging.
4. Processed medicinal plant materials should be packaged in clean, dry boxes, sacks, bags or other containers in accordance with standard operating procedures and national and/or regional regulations of the producer and the end-user countries.
5. Materials used for packaging should be non-polluting, clean, dry and in undamaged condition and should conform to the quality requirements for the medicinal plant materials concerned.

   Reusable packaging material such as jute sacks and mesh bags should be well cleaned (disinfected) and thoroughly dried prior to reuse, so as to avoid contamination by previous contents.

   Small quantities of crude drugs could be readily stored in air tight, moisture proof and light proof container such as tin, cans, covered metal tins or amber glass containers.

   Wooden boxes and paper bags should not be used for storage of crude drugs because the drug will deteriorate by moisture and also attacked by insects, rats and mice. So, few drops of chloroform and carbon tetrachloride are very useful for preventing insect attack.

6. Temperature is also very important factor in preservation of the drugs, as it accelerates several chemical reactions leading to decomposition of the active constituents. Most of the crude drugs are stored at 20-25°C in closed containers. Fresh medicinal plant materials should be stored at appropriate low temperatures, ideally at 2-8°C; frozen products should be stored at less than -20°C. The costly phytopharmaceuticals are required to be preserved at refrigerated temperature in well closed containers.

SUMMARY

- Preservation of crude drugs needs sound knowledge of their physical and chemical properties. A good quality of the drugs can be maintained, if they are preserved properly.
- For commercial marketing, the prepared crude drugs must be put in convenient containers or packages.
- The choice or the type of package to be used depends on the nature of the crude drug, the extent of handling it may undergo and its final disposition.
- Factors such as form or shape of the drug, moisture, light and temperature play a very important role in preservation of crude drugs.