



INNOVATIVE INTEGRATED TRAINING IN
**HEALING PLANTS
BUSINESS**

IO3 - The Total Business Plants Training Material

Module No. 5

“Medical use of therapeutic plants”

Unit 4

Biognosis

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Unit 4

Herbal preparations - Phytomedicines - Dosage & mode of administration

Summary

Here are presented: main pharmacological products prepared from medicinal plants according to the part of the plant use; their route for administration to human body according to their properties; how can be calculated the appropriate dosage and the duration of the treatment.

- **Learning outcome descriptors**

By the end of the course, the trainee should be able to demonstrate:

Knowledge, understanding and professional skills:

1. Explain different known ways of using drug, according to the part of the plant derived
2. Recognize different ways for herbal drug administration
3. Understands limitations in dosage and in medicinal use of herbs.

General and transferable skills:

1. Show good written and oral communication skills.
2. Demonstrate general computer literacy
3. Perform computer search to retrieve information from other sources
4. Show ability to use information retrieved for improving professional status
5. Plan tasks and work independently
6. Work in team with minimal guidance where appropriate.

Unit 4

Herbal preparations - Phytomedicines - Dosage & mode of administration

Plant drugs, also known as phytomedicines or phytopharmaceuticals, are plant-derived medicines that contain a chemical compound or more usually mixtures of chemical compounds that act individually or in combination on the human body to prevent disorders and to restore or maintain health. Phytomedicines are medicinal products whose pharmacologically active components contain only preparations that are made from medicinal herbs. (Gaedcke F, Steinhoff B. 2000)

The traditional ways of using medicinal plants are the forms of herbal teas, decoction, and alcoholic extracts etc. Very often these plant materials are used in a non-standardized

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manner. However, nowadays more and more emphasis is being put on the use of standardized materials.



Mixtures are products with medicinal properties and which contain 2 or more plants or herbs that can act individually, additively or even synergistically to restore or maintain health. In Traditional medicines, medicinal plants are typically used in mixtures. (The National Formulary)

Extracts are concentrated preparations of liquid, powdered or viscous forms that are ordinarily made from dried plant parts (the crude drug) by maceration or percolation. The extract ratio for herbs is typically 5:1 and the chemical compounds can then be extracted from plant material using water or organic solvents, such as alcohol (ethanol). The fluidextracts are liquid preparations that usually contain a 1:1 ratio of fluidextract to dried herb [w/w] or volume-to-weight [v/w]. Ethanol, water, or mixtures of ethanol and water are used as solvents. Solid or powdered extracts are preparations made by evaporation of the solvent used in the production process (raw extract). Essential oils are extracted by steam distillation or by solvent extraction. (European Pharmacopeia (2002))

Medicinal teas or infusions prepared by steeping herbs in boiling water. They are called Teas because of the similarity in preparations. A typical medicinal tea consists of several herbs. In European phytotherapy, the general rule considered as sound pharmaceutical practice, is to have no more than 4-7 herbs in a blended tea (Wichtl, 1989). In some cases the efficacy of a medicinal tea is obvious. Anthranoid-containing herbs have a definite laxative action, teas with aromatic bitters stimulate the appetite, and nothing is usually better for an upset stomach than fasting and Dictamnus tea or Sideritis tea. There are basically three ways to prepare tea: Decoction, Infusion and Cold maceration. (Schilcher H (1982))

a) Decoction: are preparations of hard woody parts of plants such as bark, roots, seeds and nuts. They are quite similar to the infusions and require more heat in preparing and transmitting their chemical compounds in the water. They are usually prepared by

boiling 1 to 2 coffee teaspoons of the hard part of the plant for 1-10 minutes. For the preparation of the beverage, is better not to put hot water on the herb, but instead to add cold water and heat the mixture to boil. After boiling the liquid should be left for 15 minutes to rest and then can be drained (except for plants containing astringents which drain immediately after boiling). The beverage is better to be drunk in a single dose, as in this way its active elements will be kept unchanged. For the procedure, is better not to use stainless steel utensils, but to use clay, enamel, glass or similar. Also, decoctions are prepared in proportion (part of the plant in gr/gr of water) 1:10 or 1:20 for internal use and 1:5 for external use.



b) Infusion (hot tea or beverage): The infusion is prepared by using boiling water but without boiling the herb. This means that boiling water is poured in a cup with the pharmaceutical preparation and the mixture is left covered for 15-20 minutes to rest. In this way, the active substances from delicate medicinal plant parts (usually flowers, leaves) will not evaporate or neutralize with extensive boiling. The ratio of herbal preparation and boiling water is usually 1:10 or 1:20, but for formulations with a strong effect it can rise up to 40. Usually 1 - 2 coffee teaspoons of crumbled herb are used for a glass or a cup of boiling water. More specifically 1 ounce or 25 grams of dried herbs, or 2 ounces or 50 grams of fresh aromatic herbs, should be added to 1 pint or 600 ml of boiled water. The hot beverage should be drunk immediately, but also can be stored in the refrigerator for up to 24 hours. In a chronic disease, a cup of medicinal tea should be consumed three times a day, since in an acute phase the herbal tea can be consumed 6 times a day. (Leimbeck R (1987))

c) Maceration: refers to a preparation made by adding cold water to the required amount of the drug, which is allowed to soak at room temperature for 6–8 h before it is strained.



The meaning of the term tea gradually broadened in the English language, first referring to the dried tea leaf, then to the beverage brewed from it, and soon it was applied to all herbs from which potable infusions can be made.

A basic distinction is drawn between:

- Non-medicinal teas that are consumed for pleasure, such as black tea and its blends.
- Medicinal teas that are used either as single teas or, more commonly, as tea mixtures.

Dosage of teas

Prepared tea (irrespective to the way of preparation) should be consumed within 24 hours of preparation; otherwise the solution could be a suitable environment for the growth of various microorganisms that will poison the tea with their toxins. Tea with unpleasant odor, blur and color change should not be drunk. The infusion after preparation should be stored in glass or enamel containers and not metallic, because the tea can react with the metal releasing harmful substances. As a rule, the infusion is stored in dark and fresh places, at room temperature or in the refrigerator. (Hiller K (1995).

The teas of medicinal plants are drained and sweetened preferably with honey, it is advised to be used warm, usually 3 glasses a day, morning fasting (before eating), noon after eating and the evening before sleep, but the following exceptions should be noted:

- Diuretic tea is taken at breakfast time; 1 liter should be consumed in one sitting if possible.
- Appetite-stimulant teas are taken about 30 min before meals.
- Teas that are used as a laxative or for sleep aid should be taken at night.
- Peppermint and chamomile teas for an upset stomach should be taken at the patient's usual meal times or as needed.

- Diaphoretic teas such as Linden blossom tea and elderflower tea has no effect in the morning, but when taken in the afternoon as the body temperature is rising, it promptly induces profuse sweating. (Wichtl M (Hrsg) (1989)

Tincture: Tinctures are obtained by immersing an herb in an alcoholic solution for a period of 3 weeks. During this time, the active ingredients of the herb are dissolved in the alcoholic solution resulting in the tincture being formed, as alcohols are able to extract mainly the alkaloid and falconoid components of the herbs. For the preparation the most commonly used alcohol is ethanol solution (40 - 70%) such as vodka, jean or white rum. The crushed plant is placed in a glass container and covered with alcohol (1:5, 1:10 or 1:20), and left in a warm place for 21 days. Then the liquid is pressed, drained and stored in firmly closed glass containers, in dark places, as are designed for longer shelf life and storage. The tinctures of poisonous plants and those with strong action are kept separate from other formulations. Tinctures are used internally as drops diluted in water.

Also, tincture can be pouring directly into the mouth for immediate absorption, or can be drunk with a small amount of water or juice. If the alcohol, smell is not preferable the appropriate dose of the tincture can be dissolved in about half a glass of warm water and the alcohol will evaporate in just a little while. Generally tinctures are much more effective than infusions and infusions.



Syrups: is a viscous solution of 66% pure sugar in water (e.g. plain syrup) or other liquids (such as wine, etc.). It is offered as a beverage or as a medicine depending on other flavoring or therapeutic substances that contains. Medicinal syrups contain extracts or infusions of the medicinal plants, which are added to the basic syrup prepared with raw sugar or honey, as it has softening properties. The unpleasant taste of some herbs is covered by the sweet taste, making the use easier for children and persons who mind the bitter and intense flavors. Furthermore the sugar content of syrups is essential for extending their shelf life. Microorganisms cannot proliferate in saturated sugar solutions, because highly concentrated

solutions deprive the microbes of the water necessary for their development. (Hartling Ch. (1983)



Juice: Fresh juice is prepared by freshly harvested plant parts, which are macerated in water and pressed. For this purpose, fresh plants and fresh fruit are compressed in a mixer machine and then squeezed to juice. The juice is stored in dark glass containers in the refrigerator for one day to settle down and then should be filtered. The product can be pasteurized to extend their shelf life. Some common sources of plant juices are birch leaves, nettle, watercress, St. John's worth, garlic, dandelion, lemon balm, radish, and horsetail. Juices are taken at a fixed dose.

Powder: The powder is prepared by grinding thoroughly the dried plant matter or the combination of medicinal plants. For this purpose, the dried plants are crushed and then pulverized by using a mortar, or chopping machine. The final product sold in sachets, is used for the preparation of beverages and there is no need for filtering. It is also possible the powder to be taken directly on the tongue or to be mixed with food such as soup or yogurt.

Poultice-Compass (compress). It's a moist mixture that is applied directly to the body, where is necessary. For the preparation, fresh or dried herbs are used as a poultice. When fresh leaves, stems or roots, are used should be breached or crushed before. If dried herbs are used, a little hot water can be added to the herbs, which are either finely chopped or powdered. For the therapeutic procedure first on the crushed plants powder, are added a few drops of boiling water and then stir until pasta is formed. Then, the mixture is spread on gauze and placed externally on the painful part wrapped with fine net gauze. The pouch is hold in place with a bandage and kept warm.

Ointment: Ointments are semi-solid preparations aimed at external application. They usually contain medicinal substances in a suitable carrier substance (watery or oily solvents). Ointment is a viscous substance that often spreads to a surface. Ointments are mixtures that are used for therapeutic purposes, for massage to relieve muscle pain, to stimulate the muscles and body joints. They are prepared by warming or simply mixing vegetable oils with herbs and alcohol tinctures. The easiest way to make an ointment is to use petroleum jelly or natural beeswax and mix it with appropriate herbs or herbal tinctures or essential oils.

Ointments can be easily absorbed by the skin and transferred to the affected area of the body, the therapeutic ingredients they contain. They are used externally and kept in a fresh and dark place.

Medicinal Oils (Pharmaceutical Plant Infusions in Oil): are fatty oils or liquid waxes containing solutions or extracts of medicinal plants. They are prepared when the herb is left with oil (usually olive or sunflower oil), for a few days in the sun. Then the active ingredients of medicinal plants are extracted in the oil. Medicinal oils are used both internally and externally usually as massage oils, especially in aromatherapy. Examples of medicinal oils prepared by extraction of plant material are St. John's worth oil and garlic oil maceration. (Bauer KH, Fromming KH, Fiihrer C (1989))



Medicinal essences: is a solution of a volatile substance in alcohol or in mixture of water and alcohol. They are prepared either by dissolving the volatile oil in alcohol, or by distillation. Medicinal spirits are produced by mixing aromatic herbs with alcohols, and allowed to stand until the volatile components of the plant have dissolved out of the herbal tissue. Finally, the active ingredients are recovered by distillation. A known medicinal essence for example is peppermint Spirit made by peppermint oil.

Capsules: are usually small soft or hard drug containers normally made from gelatin. They can contain medicinal products or extracts in a predetermined dose, protected from air, light and moisture. Hard gelatin capsules consist of a two cylindrical shells, which are fitted together when the drug is inserted. Soft gelatin capsules present a gelatin shell, spherical, oval, or oblong, in shape, enclosing semisolid or liquid contents that must be free of water (e. g., oily herbal extracts). Enteric-coated capsules or tablets that release the drug substance after entering the bowel protect the drug substance from deactivation or decomposition by gastric juices. They should never be taken during or after meals, but approximately 1 hour before meals.

Tablets: are made by compression of powdered active material and suitable inert excipient, and other additives, improving color, or flavor. There are two types of tablets—uncoated and coated tablets. The uncoated ones can contain disintegrators to ensure that the tablet rapidly dissolves when placed in water. Coated tablets are compressed tablets covered with a coating of sugar, dyes, fat, wax, and/or protein, protecting the medicinal core, against external influences such as light, moisture, and mechanical stresses. When used the medication release can be controlled or delayed (enteric-coated tablets, controlled-release tablets). (Hefendehl FW (1984))

Lozenges: (pastilles) are designed to release the active ingredients slowly into the oral cavity while sucked or chewed. For the purpose the medicament is absorbed on a base, which is composed of sucrose (usually more than 90 %), acacia (about 7 %), gelatin, and water (e.g. *Echinacea lozenges*). They can have the appearance of a tablet (round, oblong, etc.) but differ from tablets in that they are not made by compression but are cut from pliable mass of varying composition.

Suppositories: are tablet-like products usually oblong to oval in shape that is designated to insert into the rectum, vagina or urethra and melt there. Herbal products are rarely used in this form but aromatherapy suppositories, are produced from essential oils.

Modes of administration

- **Oral:** decoctions, infusions, tinctures, syrups and tablets are taken orally and sometimes sublingually.
- **Nasal (Smoking, snuffing or steaming):** Essential oils suspended in hot liquids or powdered materials may be snuffed so that the active compounds are absorbed through the mucosa.
- **Skin:** Lotions, oils, ointments or creams containing extracts of medicinal plants are applied directly to the skin, where the active compound is absorbed.
- **Rectal:** The liquid preparations can be administered as enemas and the solid as suppositories. The active compounds are absorbed by the mucous membrane of the rectum.
- **Bathing:** Herbs or herbal extracts may be added to bath water.
- **Sub-cutaneous or intramuscular injections:** Some phytomedicines (often pure chemical entities derived from medicinal plants) are injected into the bloodstream.



DOSOMETRIC GUIDE FOR THE PREPARATION OF PHYTOMEDICINES

For the preparation of phytomedicines in domestic conditions the following ratios are given:

- One pinch (as much as the three fingers get dust) contains 0.5 - 1 g crushed preparation.
 - One teaspoon full, filled with crushed preparation contains 1.5-2g of medicinal plants.
 - A spoon full, filled with crushed preparation contains about 5 g of combination of medicinal plants.
 - A spoon full filled, contains about 4 g of flowers or leaves.
 - A spoon full filled contains about 8g of roots or wood.
 - A spoon full filled contains about 7,5 g of seeds or stalks.
- **Dosage proportions for liquid tea are:**
 - One teaspoon full contains 5 g of tea (liquid).
 - A spoon full filled contains 15 g of tea (liquid).
 - A cup of coffee full contains 50 g of tea (liquid).
 - A cup of tea full contains 100 g of tea (liquid).
 - A full glass of water contains 150-200 g of tea (liquid).

- **Dosage proportions for the preparation of infusions and beverages:**

The most common ratios are:

- 1-3 teaspoons or 1 spoon full filled with a medicinal preparation for a glass of water, or
- 6 teaspoons full filled with crushed preparation in 1 lit of water.

Typical doses of liquid tea therapy are:

- Adults take about 3 glasses of tea per day (morning before eating, lunch after eating and evening before bedtime).
- Children aged 6-14 take ½ of the adult dose.
- Children aged 2 to 6 take 1/4 of the adult dose.
- Children aged 0-2 years receive 1/8 of the adult doses.

Duration of the treatment with herbal medicinal products.

Usually the therapeutic effect of medicinal plants is slow, so treatment should be continued for 2 to 4 weeks. When prolonged use is required, then it is recommended after 1.5-2 months, the treatment to be stopped for 1-2 weeks, and restarted. The action of medicinal plants is always effective and without any side effects, which is mainly due to the synergy of the medicinal substances they contain. Often the failure of herbal therapy is due to the omission of the above rule.

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