

Medical Botany

7: Preparation of drugs, quality control

- Preparation of drugs
- Herbal drugs (such as flowers, shells, roots, seeds, leaves) are collected, dried and stored at the most convenient time before they are used as medicines or for treatment.

- Collection
 - • Leaves, when the plant begins to bloom,
 - • Flowers flow completely before opening or in buds,
 - • The underground parts (such as root, tuber "rhizome"), after drying the top parts of the plant,
 - • After the shells have turned the plant leaves,
 - • Seeds and fruit are usually harvested after they have matured.

- Drying
 - Herbal drugs are stored after being dried by appropriate methods.
 - It is recommended to perform the drying process at 35°-50°C.
 - Drying can be done in the sun, in the shade, in the glazing, in the hot air stream.
 - During drying with various methods, the drugs lose moisture content by 70-90%.
- Unaffected by sunlight, the climate can be dried in direct sunlight at suitable locations; Drying can take several weeks with several hours.
- Drinking roots, jensiyan root, thistle, lance root, bonito, salep are prepared by drying the sun.

- • Shadow drying; It is dried in the open air where it is covered, open side by side, such as open arbor, porch.
- O It is often confused to speed up the installation and prevent mold.
- O A convenient and economical method for climate-friendly places.
- O Drugs like flowers, leaves easily dries easily in this way.

- • Drying on the screen is the most suitable method to shorten the drying time and reduce the enzymatic activity of the drug.
- O An aspirator assembly is connected to the glass to extract the moist air.

- • Drying by hot air current at places such as drying cabinet, drying chamber, drying tunnel is the best way to obtain a good quality of the drug.

- Storage
- Properly dried drugs should be stored protected from light, heat and moisture.
- • Drugs placed in appropriate containers (such as glass jars, cans, paper boxes, sachets, cloth bags);
- O Usually dry (relative humidity \leq 30%),
- O Darkness,
- O Cool ($<10^{\circ}\text{C}$),
- O Parasites (such as flies, mice, rats) are stored in places where entry / attack is prohibited.
- O Drugs can usually be kept for 1 year like this.

- Procurement of Active Ingredients / Parts
 - It can be applied either directly or through some processes (distillation, decoction, infusion, extraction, seeding) such as plants (such as sage, tea, almonds, lime, liquorice) and / or plant parts (flowers, bark, root, fruit, seed, (Such as fixed oils, volatile oils, latex, alcoholic-extract, aqueous-extract, dry-extract, powder, tincture, capsules).
- The purpose of preparing and using the plants in various forms is the herbal substance / product;
- It can be given to the patient,
 - O To increase the amount of active substance,
 - O To reduce substances that may be toxic / harmful.
- So, the goal of these transactions is; To increase the desired amount, to reduce undesirable effects.
- •

- • The effect may be diminished or lost by separating the effective / effective substances from some plants with other processes.
- • The use of active / effective substance which is separated purely from the pure can cause side effects which are not seen during the use of plant extract.

- • It is preferred to use plant extract (aqueous or alcoholic extract) or partially purified extract instead of using active substance and / or substances alone.
- • There are many examples in this subject; Two well-known examples concern Sarichantaron (*Hypericum perforatum*) and Gibberish (*Ginkgo biloba*).
- •

- • Sarichantaron has a large number of active substances (such as amentoflavone, hyperoside, kaempferol, quercitrin, and rutin), most notably the bianthroquinone derivatives hiperisin and hyperforin.
- When it is broken down in pure state;
- ☒ Hypericin is not very absorbable from the digestive tract,
- Hyperferrin is also rapidly inactivated by oxidation.
- O Oligomeric procyanidins (OPCs) in the plant regulate the absorption of these substances and prevent oxidative damage.
- O Therefore, it is recommended to use standardized dry extract (300 mg contains 0.4-0.9 mg of hypersis).
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- • Tryptophenoid ginkgolides (such as ginkgolides A, B, C) and bilobalides are effective ingredients in the conifer plant
- O Ingestion of ginkgolides in the digestive tract is significantly reduced (90-95%) when administered in pure form; The flavonoids found in the plant increase their absorption.
- O Standardized extract (EGb761, containing 24% flavonoid glycoside, 6% bilobalide and terpenoid lactone) is recommended.
- •
- • Vegetable materials from plants and / or plant parts are generally obtained by distillation and extraction methods.
- • Some of the plant materials (such as volatile substances, sap, oily extract) are prepared from fresh plant parts, most often from dry plant parts.

- Distillation operations
 - • Distillation of fresh or dry plant parts by dry and / or wet distillation (processes such as water, water vapor, water-water steam distillation), thus separating the active fractions.
 - • Materials that can be blown with normal and heat (such as essential oils, mustard oil) are obtained by these methods.
 - • After distillation, separation, filtration and drying (removal of water from the oil) are carried out.
- Distillation with water
 - • It is a process of heat treatment of volatile substances with water vapor first, followed by cooling and condensing by applying heat to plant parts (water, covering the plant part) which are put into the water.
 - • Essential oils are insoluble in water; Separated into two phases; Depending on its density, oil accumulates below or above the water.

- Distillation with water vapor
- • Drifting and separation of volatile substances with water vapor.
- • Most volatile substances are usually distilled under boiling point of distilled / pure water.
- • Water vapor from the steam generator is given to the bottom of the cabin where the steam is present.
- O The volatile substances in the water vapor drift together.
- • Water vapor and volatile substances are also liquefied when passing through the cooler.
- O Essential oils are collected on the water because it is usually lighter than water.
- O Heavy oils from the water fall off to the bottom.
- • In the absence of phase separation, extraction of distilled liquid with water-immiscible solvents (eg hexane, isooctane, petroleum ether) (liquid-liquid extraction) is required.

- Distillation with water-steam
 - Distillation process by passing steam from the boiler water in the lower section from the plant parts placed on the perforated tray.
 - Volatile substances drifting with water vapor are condensed when passing through the cooler and accumulate in the collection chamber.
- Dry distillation
 - It is a rarely used distillation type.
 - It is used to obtain tar from oleoresin containing trees (such as pine).
 - In a closed system, the wood fragments are heated from above and volatile and heat-assisted to flow down the melts.
 - Burning and disintegration occur in many items during the heating process.
 - When the obtained product is left to stand for a while, the oily part containing the essential oil, the water in the middle and the tar in the bottom are separated.

- Extraction methods
- • Extraction; Means to pull out the active substance (s) in the raw droplets.
- • Extraction;
- O By physical / mechanical operations (such as squeezing, drawing / busting, crushing) and
- O Wetting with solvents (water, ethyl alcohol, ethylacetate, methyl alcohol, water-alcohol, wetting, decoction, digestion, infusion, maceration, percolation).
- § Operation with solvents;
- O Solid-liquid,
- It is known as liquid-liquid extraction.

- • In the product obtained by solvent extraction,
 - O The amount of active substance is significantly concentrated,
 - O The influence has increased.

- Physical / mechanical extraction
 - • Extraction with a mechanical process or device (such as squeezing, scratching, scraping).
 - • The products obtained can be used directly or after many purification processes.

- Squeezing
 - It is a method used especially for obtaining fixed oils from oil seeds or beans (sunflower, corn, soy, olive).
 - It is also used to obtain volatile oil from the citrus peel and to obtain sap from fresh plant parts.
 - Tightening is done by inserting a hole in the hole or the tray on the tray.
- Drawing / bruising
 - It is based on the principle of collecting the epidemic (such as balsam, latex, resin) that the plant grows by cutting the plant material (body, root, poppy head) with a cutting tool such as a knife.
 - Poppy head opium,
 - Rubber / rubber latex,
 - Daily log of resin / balsam,
 - Turpentine from the tree of the red-
 - In this way.

- Solid-liquid extraction
 - In extracting active ingredients from plants and / or plant parts, extraction is a direct process as well as extraction processes such as dexion, digestion, infusion, maceration, consumption.
 - The products obtained (such as dicot, digeste, sorghum, extract / extract) can be used directly, as well as subjected to further purification / purification processes.

- Decomposition (Hot Extraction)
 - Plant parts (usually hard parts of plants such as roots, hulls, crusts)
 - O Cold water is poured.
 - It is kept in the water bath (20-100°C) for 10-60 minutes with frequent mixing.
 - O Wait for a while (max 10 min) from here.
 - O Filters hot.
 - ☒ The Kondurango decoction is cooled and then squeezed through the cheesecloth.
 - • The resulting liquid is called decoke.
 - • If there is no record, the decoctions are prepared as 2% (weight: 2 gdrog / 100 ml water on a volume basis).
 - It is also recommended to prepare it according to the amount of 1 teaspoon plant / 1 glass of water (150-200 ml).
 - • Freshly prepared as required.
 - • It can be kept on ice for 2-3 days.

- Digression
- • Plant parts
- It is poured into the solvent at 35-40 ° C.
- He is kept in temasta for 12-24 hours.
- It is filtered.
- O The resulting liquid is called digeste.
- • Volatile materials are used as solvent.
- • Digsoff operation is carried out with a glass ball fitted with a vertical cooler.

- Infusion (Brewing, Medical tea, Tea)
 - • Plant parts (leaves, flowers, etc.)
 - O Boiling water is poured.
 - O In the closed door and water bath, keep mixing for 5-15 minutes.
 - O Cooled closed (usually 15-30 min expected).
 - O Then, filter or filter from the filter and use.
 - • After boiling hot / boiling water on roots, shells, etc., boiling is done; Hold 10-60 min of temasta.
 - • It is generally recommended to drink on an empty stomach and sip.
 - • Sweeteners (honey, sugar, etc.) can also be added.
 - • It is a suitable process for drug (containing lime, thyme, mint, chamomile, cinnamon, etc.) containing odorous / volatile substances and drugs (such as digital leaf, rye spur) containing decomposing substance during boiling.
 - • If there is no record, the infusions are prepared as 2% (2 g plant / 100 ml water).
 - O It is generally advisable to prepare 1 teaspoonful of plant (varying between 1-10 g according to the plant part and cement) by adding 1 glass of water (150-200 ml).
 - O People are given 1 cup 2-3 times a day.
 - • Infusions are freshly prepared.
 - • It can be kept on ice for 2-3 days.
 - O Long-standing incubation creates a favorable environment for reproduction of bacteria or fungi.

- Maceration (Wetting, Cold extraction)
 - • Shaking the plant parts;
 - O Temstas are kept in solvents (usually water) at normal temperature (15-20°C) for a period of time (30 minutes to 24 hours, sometimes extended to 5-10 days).
 - O Soluble parts are removed by filtration.
 - O The resulting liquid is called the mask.
 - • The contact time with liquid is different; Some droglard is like the following.
 - O Hatched rootstocks, flax seeds: Usually 30 minutes.
 - O Contains aromatic material: 2-6 hours.
 - O Contains bitter substances: 6-12 hours.
 - O Contains resinous substance: 12-24 hours.
 - • Especially when cold water insoluble materials are not desired (tannin in mulberry leaf, vitoxins in mistletoe leaf) is a preferred process.
 - • The filtrate can be both cold and heated.
 - • Raw drug / solvent ratio weight: usually 1:10 by volume.

- Extraction
- • Use one of the solvent extraction methods such as water, ether, ethyl alcohol, ethylacetate, methyl alcohol, alcohol-water (such as 25:75, 45:55, 80:20, ...), especially the vegetable droplets containing the active substances and / Wetting and consumption); Is a dry and / or viscous-fluid form of drug obtained by evaporating the solvent to a certain volume or product to dryness.
- • Water / moisture content varies between <5-25%; Water / moisture content;
- O Dry extracts <5%,
- O 10-20% in solid extracts,
- O Fluid / soft extracts are 20-25%.

- • According to the solvent;
 - O Water-extract,
 - O Alcoholic-extract (tincture) is known by such names.

- • The extract obtained according to the solvent used (product);
 - O Soluble in water and / or
 - O Contains soluble substances in the alcohol (such as ethyl alcohol, methyl alcohol).

- • Extract after extraction;
 - O Filtering,
 - O Solvent's evaporation,
 - O Drying,
 - O If necessary, processes such as crystallization are performed.
-
- • Impact is usually 2-4 times the main substance.
 - O The effect of fluid / soft extract can reach up to 10 times.
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- • While aqueous extracts are not stable (microorganisms can easily produce), alcoholic extracts are resistant to 2-3 years.

- Consumption (Percolation)
- • In the device called consumer (percolator), it is an extraction process which is made of glass, enamel or iron with a cap on its bottom, with a pore on its bottom and a conical shape with six taps.
- O First, the drug is soaked with solvent for a certain period of time.
- O The solvent is then continuously consumed at a certain rate (10-15 drops / min in ≤ 1 kg droplets in TK-1948).
- O Vacuum or pressure is sometimes applied during the passage of the solvent.
- • By consumption, the extract / product is obtained in a certain amount (such as 0.1, 1, 5, 10 L).
- O 10 g of belladonna plant to make a 100 ml belladonna tincture (product) is consumed with dilute ethyl alcohol (10% tincture) until a total volume of 100 ml is obtained.
- • It is recommended to consume more fluid extracts and tinctures.

- Medicinal plant drug forms
- Aromatic water (Fragrant water)
- • Water soluble solutions of volatile / odorous substances.
- • When the volatile oil is removed from the distillation of the volatile substances, the residual aqueous medium (oil-in-water) is also known as aromatic water.
- • Water-soluble terpenic materials (usually with oxygen) are found in the structure.
- • Good quality aromatic water should be in clear form, not in suspension or emulsion volatile oil; Turbidity indicates that it carries aromatic oil.
- • Sage water,
- • Rosemary juice,
- • Rose water,
- • Thyme water,
- • Lime juice,
- • Melissa water,
- • Mint juice,
- • Taflan water,
- • Cinnamon juice
- Are the main examples.

- Mixtures of plant and / or plant parts (Enva, Species)
- • Parts of various plant parts (such as flowers, leaves, branches, bark) that are broken up or not yet broken down are blends of each other or other materials.
- • From the parts of the plant that will enter the composition of the lane;
- O Leaves, flowers, herbs such as rough,
- O Parts such as shell, wood, root, lump are medium-grained,
- O Parts such as seeds, fruits, seeds are thinly disintegrated.
- • Enva is usually used as tea, infusion and decoction.
- • People are known as illicit drugs.

- Dry plant (Dried plant)
- • Plant masses prepared by collecting plant parts (flowers, leaves, etc.), drying with various methods and sometimes dusting.
- • The plant / plant part must be protected from excessive light and heat and should not be exposed to them for a long time after being dried.
- • After the plant is completely dry / dried, it is stored in tightly closed cups.
- • Dry plants should be stored at ≤ 11 ° C, the spawning limit of insects.
- • Dry-powdered plant, dry-plant mass, coarse powder and capsules can be prepared and marketed.
- • Dried plant can be fed directly to animal feed; Herb tea, dextrose, and the like.

- Fluid extract (Liquid extract, Fluid extract, Fluid extract)
- • It is the process of separating active parts of plants with alcohol (usually 25-100%) or water: alcohol mixture (20:80, 40:60) by wetting (maceration) and / or consumption (percolation) method.
- • Fluid extracts usually represent 1 g of dry weight of air dried in 1 ml of air.
- This is expressed as 1: 1 by weight (g): volume (ml) basis.
- • Because of the high content of alcohol, fluid extract is also known as 100% tincture.
- • Fluid extract is generally 10 times more effective or stronger than tincture.

- Dry extract / extract (powdered extract)
- • Plant part;
- O Water (infusion, decoction) is soaked.
- O Soluble parts are separated.
- O Concentrate under vacuum / dry.
- O Prepared plant extract is granulated or powdered.
- ☐ Usually contains <5% water,> 95% solids.
- O Since the solvent is water, the substances present in the plant and dissolved in organic solvents (such as alcohol, ether) are not obtained with this method.
- • Dry extracts are usually prepared and found at a 4: 1 or 5: 1 strength; so,
- O 1 g (or k) extract (finished product) 4 g or 5 g (or k) dry plant and / or plant effect
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- Extra water (Usare)
- • Fruit or plant (quince, raspberry, strawberry, mulberry, etc.) is the core.
- O Fresh plant parts are prepared by processes such as crushing, crushing and squeezing.
- • It usually contains water-soluble parts; Colorful and beautiful fragrance.
- • Some plants (such as Echinacea-Kirpiotu) are generally poorly affected except for their juices.
- • After opening the mouth, it may be kept for a week, provided it is stored in the ice-cup.
- O The remaining part should then be discarded.

- Saddle (Emulsion)

- • It is a form of medicine in the form of milk containing oil, resin, gum, wax, etc., which are insoluble in water, uniformly.

- • Used internally and externally.

- • It is prepared by dispersing a liquid (or droplet) in the other liquid.

- O The droplet or particle scattered in the inside varies within wide limits such as 0.01-10 μm .

- ☐ Usually it is $> 0.1 \mu\text{m}$.

- Tincture (Teinture)
- • Separation of soluble parts of plants by using solvents such as alcohol, aqueous-alcohol, ether, alcohol-ether by means of wetting (maceration) and / or consumption (percolation) methods.
- • It is usually colored liquid medicine.
- • Tincture is essentially a solvent soluble solvent such as alcohol, aqueous-alcohol.
- • The ratio of raw materials in tinctures ranges from 2-10% (ie 2-10 g of drug / 100 ml of solvent).
- O Weight: generally 1 g of plant by volume basis is prepared to give 5 ml of alcohol (1: 5).
- O Plants with strong / more active substances (such as grenadilla) are usually prepared with a 1:10 account.
- • It has been proposed by Wynn and Fougère (2007) that tinctures in safe vegetable preparations are usually prepared in a strong / dense (1: 2-1: 3 by volume basis).
- O 1: 4, 1: 5, 1:10 as weak tinctures.
- • A vegetable tincture is usually prepared as follows:
- O 1 g of droplets in a flask add 10-50 ml of solvent (usually ethyl alcohol).
- O Frequent shaking in the dark and at room temperature for 10 days; Then drained.
- • Tinctures are stored in tightly sealed dark bottles and cool places.
- • It is generally durable.
- O They are stored and used for 2-3 years following their preparation.
- • Glycerin can be added to increase the solubility and durability of the active ingredients in tinctures in which the solvent is water-alcohol.

- Medical oil (Olea medicata)
- • It is a form of medicine used externally.
- • Usually kept at room temperature for a period of time (usually 1-2 weeks) with 10 g of drug and 100 g / ml of oil (such as sunflower oil, poppy oil, olive oil); Then drained from the gauze.
- • The solid materials are first milled (such as a coffee grinder), then placed in a bowl, and then oil is added.
- • The mixture is usually kept in the sunshine and mixed occasionally or kept in a water bath or sand bath for 5-10 hours, then mixed for some time and kept for the prescribed period.
- • Constant oil contains oil soluble substances such as resin.
- • It is unstable; It is recommended to prepare in small quantities.
- • It can be used directly, as cream, lotion, ointment.
- • These are the specimens prepared in this way, such as corn oil, chamomile oil, ointment oil, sedge oil.

- Fragrant oil (Olea aromatica)
- • Plant parts containing odorous substances are kept in oil (usually olive oil, peanut oil, sesame oil) for a certain period of time (usually 1-3 days) at room temperature.
- • This work is eventually filtered out.
- • Used externally.

- Essential oil (Aromatic oil, Essence)
 - • They are obtained from fragrant aromatic plants or by distillation methods from plant droplands (such as water, water vapor, water-water vapor).
- O distillation with water vapor for dry plant parts,
- O The distillation method with water is selected for fresh plant parts.
- • Special smell, taste, color and appearance, volatile liquid at room temperature, sometimes oily-mixture; Monoterpenoids, phenylpropanoids, and partially sesquiterpenoids.
- • Essential oils are found in special secretion organisms such as secretory follicles, secretory ducts of plants.
- • They are usually colorless; Carnation and cinnamon red, daisy oil blue-ink.
- • Essential oils;
 - O Spice (smell, taste corrector),
 - O Cosmetics / perfumery (most),
 - O Antiseptics for respiratory tract (Eucalyptus volatile oil) and urinary tract (Juniper volatile oil)
 - O Fungicide (thyme essential oil),
 - O Antelmintik (Kenopod volatile oil),
 - O Gas extractor (Anise volatile oil, Fennel volatile oil),
 - O Stomach is used as a relaxing-vomiting cutter (Mint volatile oil).
- • Extensive information has been given about essential oils (6b).

- Powder
- • Preparing vegetable materials by milling or air crushing; The particles are not connected to each other.
- • They are divided into 3 groups according to particle size.
- O Coarse dust (dust passing through a hole with a diameter of 0.75 mm)
- O Medium-fine powder (dust passing through a hole diameter of 0.35 mm)
- O Fine dust (dust passing through a hole with a diameter of 0.15 mm)
- • Dusts are mixed in a glass of water and then mixed after drinking.

- Some medical applications
- Footbath
 - Warm-warm aquatic plants or herbal substances (such as infusions, essential oils) placed in a container.
 - Immerse to the foot.
 - It is kept for a certain period of time (5-20 minutes).
 - At the end of this work, the foot is removed from the bath water and dried with a towel, except for the use of mustard oil for the bath.
 - When the mustard oil is used, the feet are washed with warm water.
 - After the footbath, warm warm socks are worn and rested for 30 minutes.
 - It is recommended that the footbath be made before going to bed.

- Body bag
- • The water in the bath / tub is heated to a certain temperature (36-38 ° C); (Such as cloth, paper, wire sieve, etc.) that allow mutual passage of water and vegetable materials.
- • If volatile / aromatic substances are to be used, emulsifying substances such as milk, cream, honey are also added to the bath water.
- • It is suggested to accelerate circulation on the head and body surface by gently rubbing the body and hair by making movements in the body.
- O The bath usually lasts 10-20 min; Followed by a rest for at least 30 minutes.
- • Be careful not to let the body cool and chill after the bath.
- • Bathroom;
- O In cases of colds and colds,
- O Where it is necessary to accelerate circulation,
- O In anxiety and sleep disorders,
- O In joint-muscle pain,
- O In fatal skin disorders
- Is useful.

- Fumigation
 - means to volatilize (such as volatile oils) by flying with heat and to smell.
 - There are two forms of age and dry incense.
 - A few drops (2-5 drops) of volatile oil are added to hot water (or heated brick, stone, etc.) placed in a container.
 - Container; The animal is placed in the cage, fan, bath, etc., at least 5 minutes (5-15 minutes) is smelled for the duration.

- Winding bezieer, Compress, Lapa, Hot water / cloth application
- • It is frequently used for application of vegetable dressing, compresses, porridge, hot water or warm cloth. When applying compresses, mushrooms and hot water / warm cloth, they are brought into direct contact with the diseased / inflamed area in places such as skin, joints.
- • In these applications, mainly locally;
- O Prevention of fire /
- O Acceleration of circulation,
- O Encourage tissue / wound repair
- Is intended.

- • Bandage; The affected area is applied in several coats; Put the plant / herbal substance / product in the inner layer of the horny; It is wrapped around the cloth several times.
- • Strip / sheath containing vegetable material; Placed directly on the affected part of the body, then wrapped with another cloth, then wrapped with a second cloth.
- O In this place either a hot towel / cloth is covered or a container containing hot water is placed underneath; A protective cloth is placed between the skin and the hot water container to prevent burning or irritability.
- It is kept in 20-30 min for wrapping cloth or warm cloth.
- Following removal of these, the patient is rested for 15-20 minutes.
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- Dosage
- • The term; Means the dose, dose interval and duration of use of a substance.
- • It is extremely difficult to adjust the dosage of plant materials.
- • In most cases, some determinations / dose notifications have been made about how many times a day and how much to use for some form of medication (such as infusion, decoction, tincture).
- • The following dosages / dosages are given in relation to the herbal substances or medicinal forms used in the clinic.

- • The duration of treatment in vegetable materials is usually around 4 weeks; Are used in chronic illnesses for longer periods (many weeks to months) and in small doses.
- O Herbal substances are usually given 2-3 times a day (8-12 hours call).
- O They are used in high doses and more frequently (4-6 times a day) in acute / severe conditions.
- [?] Doses are adjusted accordingly.
- • Either a total daily dose is reported, divided by the dose interval,
- • Or, the dose to be given every interval is reported.
- O In acute situations, if the symptoms do not improve within a few days, the substance or formula used should be observed.
- O Dose adjustment (quantity and frequency) is performed as the patient's condition improves.
- O Use of herbal substances should be supported by diet, environment, movement, etc.

- • Vegetable materials are generally prepared and used in dry form (dry plant) or in dosage forms such as powder, extract, fluid extract, sap, infusion, decoction, tincture.
- • Plant can be given as dry plant; Dry plants are generally overfed with other desired dosage forms (such as extracts); This is in fact due to the fact that the dry plant contains less active substances / more easily than other forms.
- O Dry plant is usually used 2-3 times per day in 3-10 g quantities in humans; The application can be repeated up to 6 times.
- O In small animals, it is used in 2-3-3 divided doses of 25-300 mg / kg per day.
- • Various plant parts or shapes can be converted to dry plant weight equivalent (equivalent amount). Organ;
- O 1: 1 fluid extract, 1 g soluble dry plant part in 1 ml solvent,
- O 1: 2 fluid extract 50% of this (i.e. 0.5 g extract in 1 ml)
- O 1: 5 fluid extract refers to 20% of this (i.e., 0.2 g extract at 1 ml).
- O Accordingly, 1 g of dry plant equivalent is as follows.
- ☒ 5 ml of 1: 5 liquid extract
- ☒ 3 ml of 1: 3 liquid extract
- ☒ 1: 2 liquid extract 2 ml
- 1 ml of 1: 1 liquid extract
- ☒ 200 mg of 5: 1 powder

- • Tinctures are often prepared intensely / strongly (weight: 1: 2-1: 3 by volume).
- O Tinctures are generally used in animals at doses of 0.05-0.25 ml / kg.
- O As an example, suppose Tent is prepared in 1: 3 ethylalcohol; 3 ml of this corresponds to the effect of 1 g plant / plant.
- ☐ Assume that 5 ml (total of 15 ml) is given 3 times a day from this tincture.
- ☐ According to this, a total of 5 g of plant (dissolved extract in ethyl alcohol, alcoholic extract) is given per day.
- ☐ Therefore, prescription should be made according to the amount of tincture or plant to be used based on the duration of treatment.
- O When people are taken as a unit, tinctures are given 3-5 ml 2-3 times a day; The application can be repeated up to 6 times.

- • Similar to the above, the amount of substance to be used in a treatment period (such as 1 to 4 weeks) in a patient is generally calculated and prepared by moving from day to day.
- O The knife should be used as a drug tincture (1:10) of an animal (such as a dog) weighing 10 kg,
- O If the daily dose will be 0.5-2 ml of tincture (the physician may accept it on average 1 ml)
- He / she prepares (or prescribes) and uses 14 doses of tincture (average 15 ml) for a 2 week treatment period.

- Prescription sample
- For the dog (10 kg c.a.)
- Rp
- Atropa belladonna tincture (10%) 15 ml
- S. For oral administration, 1 ml

- Substances / substances prepared in the form of infusion / decoction / maceration;
- How many grams per day to use,
- O how much of this will be prepared with water (ml in volume, L or glasses)
- O How many cups of tea (tea, water is specified as glass) is expressed.
- ☐ Generally 1 teaspoon is prepared with 1 cup water (150-200 ml) for plant.
- • Drink 2-3 glasses a day.
- ☐ Daily 5-30 g plant / 1 glass of water for animals is prepared.
- ☐ Drink 1 / 2-1 / 4 cup / 10 kg / day divided into 2-3.

- Sometimes, the infusion / decoction / maceration is expressed as a percentage (such as 1-5%); How many cups it will drink and / or how much it will be used.
- • Dosage is sometimes expressed as drop quantity.
- O Usually 20-30 drops are 1 ml.
- ☐ 0.1 ml: 2-3 drops.
- ☐ 0.2 ml: 4-6 drops.
- ☐ 0.5 ml: 10-15 drops.
- • Measuring cups (cups, cups, spoons, etc.) are used for dose calculation.

- Durability / Shelf life
- Herbal substances;
 - By protecting from air, light, heat and humidity,
 - In appropriate cups (such as paper, wood, glass) that are tightly closed,
 - Store in dark and cool places (usually 10-20°C).
- Dry plants can be stored for long periods of time protected from heat, light and humidity; Can be safely stored in cool and cold environments ($\leq 11^{\circ}\text{C}$).
- The shelf-life of dry plant extracts is usually around 1 year.
- The aqueous extracts prepared by soaking or brewing should usually be prepared on a daily basis.
- They can be used for 48-72 hours with the condition of being stored in the ice-cup.
- Tinctures are usually kept for 2-3 years; In some cases the duration can be up to 10 years.
- Microbial (such as bacteria, fungi) transmission / reproduction in glycerin-added tinctures is easier; These tinctures can be stored for 1-2 years.

- Label / Distribution
- • All kinds of herbal substances and products (dry plant, fluid extract, extract, tincture, powder, etc.) should carry appropriate labels on appropriate packages.
- O Obviously the following information should be available.
- Madden's name
- Influence (Extracts 4: 1, 5: 1, 50: 1, Tinctures 1:2, 1: 3, 1: 5, 1:10)
- Production date
- Expiration date
- Name of the hospital
- Usage shape
- Dose
- As the duration of use
- O There should be information about the name and communication of the physician.

- Medical plant production / trade
 - Medical plants are either obtained directly from natural / wildlife or are cultured.
 - The number of plants subject to international trade in the world is around 2500.
 - It is believed that 2/3 of the medicinal plants are obtained in the wild by half of the medicinal plants in the trade.
 - It is preferred that plants grown in abundant quantities and slowly (such as perennials) are obtained naturally / wildly.
- In recent years, western societies have also begun to use medical plants, while medical plants have been used predominantly in Far Eastern countries.
- These practices (also known as food-support products, supplementary foods), made with the name of complementary medicine or alternative medicine, have created a rapidly rising and expanding market for medicinal plant / product trade.

- • The volume of medicinal plant trade in the world today is around 50 billion dollars.
- It is \$ 4.8 billion in 2007 in America
- O \$ 5 billion in Europe in 2003
- It is \$ 3.6 billion in 2010 in China
- • This represents approximately 15% of the medical product trade (> \$ 350 billion).
- • The size of the medicinal and aromatic plant market in Turkey is about 4.5-5 billion TL in 2011.

- • Turkey is extremely rich in natural plant community; But the medicinal plant culture / production is extremely limited.
- • Most of the plants are cultivated and utilized locally.
- • Overseas sales of medicinal plants collected from most natural sources in 2010 resulted in more than 50 million USD income.
- • The first order was laurel leaf in the plants sold for export; Followed by thyme, sage, rosemary, bonito and lime.
- • The number of imported drugs that are obtained as economic value is about 40.

- • WHO has made many arrangements, preparing and publishing lists on quality control and control of medicinal plants.
- • In this context, prepare lists of plants to be protected (eg Annex 1, 2).
- O Annex 1: Plants forbidden to trade because of danger of extinction.
- O Annex 2: Valuable-precious-such as plants that need to be monitored.
- • The Himalayas-Saussurea lappa (used to increase skin diseases and sexual desire / power) found in the countries of Western Asia and the Middle East In Annex 1,
- • American Ginseng (*Panax quinquefolius*) and Hidrastis (*Hydrastis canadensis*) are included in Appendix 2.
- • The relevant institutions in the countries (Ministry of Food, Agriculture and Livestock in Turkey, Ministry of Health) are making their own local regulations.

- Main effects of medical plants / Treatment values
 - Herbs or herbal substances were generally accepted as folk medicine.
 - Some have well-defined effects and places of use; Or there are situations where some of them are good with their use.
- It is impossible to fully assess the efficacy / utility of plant substances.
 - Even if they are produced by different companies in the same subject (such as extract, tincture, essential oil), there are differences in terms of operations such as collection, drying, processing and storage.
 - Vegetable products produced by various companies have similarities with respect to their main constituents, but there may be more or less differences between them in terms of other substances in lesser quantities.
- The effects occur slowly and take a long time.
 - The effects are often noticeable for one week's use.
 - During chronic illness, they should be used for weeks / months.
- •

- Instead of treating acute and severe illnesses, it is recommended that the herbal substances be used for milder illnesses and functional disorders (such as muscle / joint pain) and chronic illnesses.
- O For this reason, the treatment of herbal products;
- ☐ Instead of alternative treatment,
- ☐ Evaluating it as a supportive and ancillary treatment method is a more correct approach and expression. Accordingly, herbal medicinal products;
- • The content and its effects have been scientifically proven,
- • Establishing the dose-activity relationship,
- • Production and use of medicines in standardized form,
- • Determination of interactions with traditional medicines
- must.

- In-patient / patient usually causes the following effects; They are also used for the specified effects.

- • Painkiller
- • Antiparasitic (such as internal and external parasites)
- • Antiseptic-antimicrobial (such as bacteria, fungi, viruses)
- • Fire Reduction
- • Immune stimulant / emollient
- • Expectorant, respiratory facilitator
- • Shrinking (such as skin, mucous membranes)
- • Sexual desire / augmentor (aphrodisiac)
- • Prevents degenerative diseases
- • Supporting / supporting
- • Protect tissue / organs
- • Urine enhancer / expectorant / urine flow facilitator, stone reducer
- • Bleeding breaker
- • Preventing blood clotting / facilitating bleeding
- • Blood cleaner
- • Blood pressure lowering
- • Candidate sugar, cholesterol, substances such as uric acid to remove / reduce
- • Itching remover
- • Liver and gall bladder disorders
- • Prevention of bone erection
- • Anger regulator

- • Edema remover / remover.
- • Cough suppressant / sedative
- • Slowing / retracting prostate growth
- • Bubble enhancer / exterminator, stone reducer
- • Tranquilizer / sedative / relaxant (moderate effect)
- • Protect the digestive tract (including ulcer / protective effect)
- • Respiratory / respiratory (analeptic effect)
- • Spasm Solver (striped and smooth muscles)
- • Syndrome (mild-moderate-severe)
- • Anti-shooter
- • Pollutant
- • Tonic / booster (heart, nerve stimulator)
- • Preventing tumoral formations
- • Compliance / compliance enhancer / compliance facilitator / voltage surge / prevention
- • Anti-inflammatory
- • Wound healing / healing accelerator
- • Antioxidant, protecting tissue / organs, aging retardant (antioxidant effect)
- • Attenuator / weight loss

- Safety of medical plants (Annex 3)
 - • Many of the medicinal plants contain highly active substances / substances.
 - • The effects of most active ingredients on the body are known to be desirable and undesirable (side effects and toxic / harmful effects).
 - O Many of these effects have been encountered and learned during their use, especially the undesirable effects.

- • There are a wide variety of active ingredients that can interact with traditional medicines in plants and / or herbal products.
 - O Herbal product-drug interactions may increase the severity of the desired and / or undesirable effects.

- • The cure safety of medical plants (the distance between the amounts of the remedies and the toxic / harmful amounts) is usually large; That is, benefit: the damage rate is high.
 - O However, many undesirable effects can be encountered even during the use of some well known and recognized plants (such as Ginkgo "Ginkgo biloba", Mehan "Glycyrrhiza glabra").
 - O Herbal products;
 - ☒ "Totally natural"
 - ☒ "100% vegetable",
 - ☒ "No side effects / harmful effects",
 - ☒ "Herbal solution to your discomforts"
 - Marketing is a very serious risk for the society.

- • In a review of the Food and Drug Administration in the United States between June 1997 and March 1999, 140 poisonings occurred during the use of substances containing food-supplement products.
- ○ a significant portion of these (87 events) came from food-supplement products containing Ephedra; Deaths in 10 of them, and permanent impairments in 13.
- ○ a review / evaluation by the Ministry of Agriculture in the United States annually covering the year 2000;
- ☐ 40 deaths from vegetable matter,
- ☐ It is stated that 80-120 thousand people have died from medicines.
- • In Belgium, in 1993, 70 cases of use of Chinese origin Lohusaoti plant (*Aristolochia clematitis*, *A. debilis*, *A. fangchi*) were reported to cause kidney fibrosis and 35 cases of advanced renal insufficiency.
- ○ A similar case was reported in 2 patients in England; One of them developed carcinoma in the urinary tract.

- • In the United Kingdom, a report on liver damage (jaundice, increase in serum enzymes, liver failure) was published in 21 of those who used Karayilan plant (*Actaea racemosa*) between 1998 and 2006.
- O Similar events have been reported in countries such as the USA, Germany, Australia, Sweden and Canada.
- • In many countries (such as America, China, European countries) because it is not safe for human health;
- O Poultry and its products,
- O *Symphytium officinale* and its products,
- O For ephedra-containing food-support products
- Sale and use is prohibited.

- • According to synthetic medicines, it is much easier for the herbal substances to be accepted by the patient / patient owner.
- It is used and / or consumed or consumed and / or consumed to the extent of abuse, especially in human medicine for some purposes (such as increasing body resistance, slowing / stopping tissue / organs, delaying aging, facilitating adjustment).
- O It is constantly fomenting that advertising and their use, especially visual and written, are constantly promoted and easily accessible and available through e-commerce.
- ☒ In a study covering the years 1990-1997 in the United States, the consumption of herbal medicines has been increased 4-fold.
- • Many substances in medical plants can also interact with other medicines used by the patient or the person, some of which may be dangerous or interfere with the effects of those substances.
- O This is especially important for medicines for cardiovascular disease.
- • Some plants may be dangerous for pregnant / lactating mothers.
- O Indications or warnings about them should be clearly indicated on the label (Annex 4).

- Some significant toxic / harmful effects and the resulting plant examples are as follows.
- • Stimulating / enhancing uterine movements
- ☐ Karayilan-like *Actaea racemosa*

- • Hormonal balance disruptors
- ☐ Çayırçgülü-*Trifolium pratense*
- ☐ Cemenotu-*Trigonella foenum-graecum*

- • Teratogenic effects
- ☐ *Symphytum officinale*

- •

- Carcinogenic agents
- ☐ Acığiğdem-Colchicum autumnale
- ☐ Shrimp-Arctostaphylos uva-ursi
- ☐ Curl-Acorus calamus
- ☐ Fern-Aspidium filix-mas
- ☐ Felfelek-Areca catechu
- ☐ Basil-Ocimum basilicum
- ☐ Hindfism-Ocimum sanctum
- ☐ Karahardal-Brassica nigra
- ☐ Symphytum officinale
- ☐ Lohusaotu-Aristolochia species
- ☐ Vebaotu-Petasites officinalis

- Pregnancies / Feeds-Use in Breastfeeding
- • Some of the substances found in the plants may have negative effects on the collecting which consume the fetus and the milk that sucks the milk or the milk. For this reason,
- O "Not used in pregnancy",
- O "Not used during milking / breastfeeding",
- O "Milk is not used for serving consumables"
- As warnings are written.

- The American Herbal Products Association (AHPA) collects plants and / or herbal substances for use in pregnancy / lactation in 4th grade (Annex 4).
- Class 1. It is a safe material when used normally.
- Class 2. The items in this class are divided into sub-classes as follows.
 - 2 a. It is only used externally.
 - 2b. Not used during pregnancy.
 - 2c. Not used during breastfeeding.
 - 2d. Other special limitations.
- Class 3. There are warnings in the label information of the items in this class such as "should be used for expert control"; Accordingly, information such as dosages, warnings, recommendations, limitations, conditions that should not be used, drug interactions, adverse effects should be given to these substances.
- Class 4. Items that do not have enough information to classify.

- Advantages / weaknesses of medical plants
- • Superiority
- O The medical care of medical plants is widespread.
- O Potential for interaction with other drugs is low.
- They are more easily accepted by the patient.

- • Weaknesses
- O They are not effective fast enough in acute-dangerous diseases.
- O Usually they have to be used longer.
- ☒ In such a case, they sometimes cause serious adverse effects (such as those involving pyrrolizidine alkaloids leading to liver damage).
- O It should not be overlooked that plants that have not been well characterized, and that have been collected from nature, may contain extremely harmful / dangerous substances (see the Features Document).

- Legislation on herbal products
 - To be used in the treatment of plant medicinal products;
 - O Being prepared in an effective and standardized manner,
 - O Determination of durability,
 - O Pharmacological, clinical and toxicological effects must be established.
 - • So, as in traditional medicines, they must be of good quality, effective and safe.
- •

- Legislation on herbal medicines and / or products differs from country to country.
- • plant products in some European countries (Germany, France, Switzerland); Herbal medicine.
- • Herbal products can be sold in prescription and / or non-prescription pharmacies in EU countries.
- O Drug and / or drug preparations in plant products in EU Member States are required to comply with pharmacopoeial monographs.
- O EU countries; Studies on herbal products are based on the European Pharmacopoeia (AF); When necessary, the European Scientific Phytotherapy Cooperative (ESCOP) and WHO Monographs.

- Regarding plant products in Turkey, the Ministry of Food, Agriculture and Livestock (GDHB) and the Ministry of Health (MoH) are implementing applications (definition, registration, distribution, sales, etc.) according to their own legislation.
- • GTHB Turkish Food Codex "Regulation on Reinforcing Grafts" (OG No: 28635 dated 02.05.2013)
- O "supplements"; Concentrates or extracts of plant, animal and plant materials, bioactive substances and similar substances which have nutritional elements such as vitamins, minerals, proteins, carbohydrates, fibers, fatty acids, amino acids or other nutritional or physiological effects in order to supplement normal nutrition Products that have been prepared in the form of capsules, tablets, lozenges, disposable powder packets, liquid ampoules, dropper bottles and other similar liquid or powdered formulations and purchased on a daily basis " .
- O Based on this definition, it permits the sale of herbal products which are sold in Turkey and which are considered as "supplementary food" by the Ministry but which should be regarded as most of the "herbal medicinal product" .
- "Evaluation and licensing of applications related to the industrial production or import of traditional herbal medicinal products which have protective and therapeutic effects on human health" and "Regulation of Traditional Herbal Medicinal Products" published by MoH (OG dated 06.10.2010, No 27721)

- Due to uncertainties in terms of legislation;
- • Medicinal products / preparations prepared from a medical plant or plant part and licensed by the MoH
- O Pharma warehouses (wholesale) and
- O While marketing in pharmacies (retail)

- • If the product is prepared from the same medical plant or plant part and is another product that is given by the GHGB to the declaration mainly (production or import), the producer / external buyer / processor;
- O in their own place of sale, in the food business that they supply to the market, or
- O wholesale stores of these businesses or
- O the domain name (www.abc.com) and URL address / address (full web address where supplementary food information is available) declared by the food operator or
- O It is sold under the name of "supplementary food" by the direct seller who contracts with the food business operator.

- "Reinforced Foods Regulation" published by GTHB,
- • Traceability (application of the data matrix at all stages of the raw material-production-production-import-processing-supply to the market)
- • Precautionary measures (production-import-processing-stopping supply to the market),
- • Official controls (according to the Regulation on Official Control of Food and Feeds, dated 17.02.2011, No. 28145),
- • Labeling (dated 29.11.2011, numbered 28157, 3rd edition, according to the Turkish Food Codex Tagging Regulation).

- • By legislation; Traceability and controlled use are taken as basis, as well as many exploitation points.
- • via mass media and internet;
- O They must be presented in every level,
- O Extremely easy to obtain
- Are just a few of the exploitation points.

- • Therefore;
- O The definition and boundaries of the phrase "supplementary food" are well-defined,
- O These products must be licensed for the intended purpose,
- O Following their introduction to the market, they should be monitored in a programmed manner and regular checks should be made, if possible, in accordance with the formulas / labels.
- • It is believed that the gaps in these areas can be filled to a significant extent with the "Reinforcing Plant Regulations" published by GDHB.

- Medical plants in veterinary medicine
- There are 18 medicinal products in Turkey that contain licensed herbal substances for use in animals.
- Plants and / or parts of plants permitted to be used in food-grade animals have been determined by the GDHR GDFIC and published in the Communiqué no 2011/20 (OG dated 29.04.2011, numbered RG-27919).
- These substances are given in Annex 2 of the Book.
- Veterinary Medicinal Products (18 products) licensed by the GGPC are listed in Annex 5.
- Medical plants and drugs are extremely important for organic farming / animal husbandry. Regulation on the Principles and Implementation of Organic Agriculture in Turkey (OJ dated 18.8.2010, no. 27676) has been published on this subject; Article 18 on "Animal Health and Veterinary Intervention" is as follows.

- Article 18/1. The rules of animal health and veterinarian intervention in organic animal husbandry are given below.
- A. Disease preventive measures in organic animal breeding are:
 - 1. Organic animal breeding, animal health, preventive medicine is essential.
 - 2. Appropriate breeding breeds are selected.
 - 3. Regular exercise to increase the natural immunity of animals is provided for access to navigation areas or pastures and the use of quality feed.
 - 4. With the cause of overcrowding, appropriate placement frequency is provided to prevent health problems in animals.
- B. Despite all preventive measures, if an animal is sick or injured, it is isolated and treated promptly in a suitable shelter.

- C. The procedures and principles for the use of veterinary medicinal products under the supervision of a veterinarian in organic livestock are:
 - 1. Allopathic products, phytopathic products, other than chemically synthesized veterinary medicinal products, in accordance with the provisions of paragraph 3 of Annex-5 of this Regulation and Section 1.1 of Annex-6 of this Regulation, provided that the therapeutic effect on the animal species being treated is compatible with the treatment conditions Listed products are used. Homeopath treatment methods are also applied in treatment.
 - 2. In cases where the use of the above-mentioned substances is inadequate to combat the disease or injury and the animal is not suffering from pain, the therapeutic purpose and the chemical compound drugs or antibiotics are used with the permission of the authorized body.
 - 3. Chemically synthesized veterinary medicinal products or antibiotics may not be used for disease-inhibiting applications.
- Ç. In organic animal breeding, the genetic structure of animals can not be altered and organisms whose genetic structure has been altered can not be used as inputs in organic animal production. Animal breeding is not permitted with gene technology methods. The use of hormones or similar substances for the purpose of controlling growth and proliferation of substances or for other purposes is prohibited. However, hormones can be given to the sick animal as a veterinary practitioner for treatment purposes.
- D. When veterinary medicinal products are used; The product used in conjunction with the diagnosis, the method of intervention, the substance of the drug, the substance of the drug, the duration of the treatment and the duration of the drug remnant are recorded.

- to. The time between the last application of a veterinary medicinal product given to a pet under normal conditions and the date when the organic product is obtained from these animals is 48 hours in organic farming, twice as long as the conventional farming application or no residual wastage.
- F. In the case of application of more than three chemically synthesized veterinary medicinal products or antibiotics to a poultry or animal group within one year, or in the case of animals that are productive for a period of less than one year, except for vaccination applications, parasitic treatment or programs to combat animal diseases and pests which are mandatory in our country, The animals or the products obtained from these animals can not be sold as organic products and are taken back into the process of transition. These records are kept by the entrepreneur.
- G. Veterinary biological materials which comply with and comply with the provisions of the Veterinary Services, Plant Health, Food and Feed Law and other relevant legislation no. 5996 shall be used in the event of an outbreak of an infectious and contagious disease,
- Article 17/1-L of the same Regulation entitled "Feed Supply in Organic Livestock Production and Animal Feeding" is as follows.
- Article 17/1-L. Antibiotics, coccidiostats, medicinal products and other substances that grow or proliferate can not be used in animal feeding.

- Plant monographs
- Information (monograph / s) that have been examined by various national and international institutions and / or organizations (such as WHO) that inspect every plant and / or vegetable substance in a certain system have been published. This information; It can also be regarded as a summary of the "Specification Document" of the plant.
- The number and number of plant monographs published by some institutions and / or organizations is as follows.
- • German Commission E Monographs: Commission E in the German Ministry of Health publishes herbal monographs since 1993.
- O A total of 324 herbal drugs and about 300 monographs of approved and approved drugs were listed (positive list).
- •

- American Herbal Pharmacopoeia (AHP): Up to now, 33 plant monographs have been published.
- • European Scientific Cooperative for Phytotherapy (ESCOP): 80 herbal drug monographs have been published by this organization.
- • European Pharmacopoeia (AF) Monographs (Ph.Eur.): There are 249 herbal drug monographs in AF, including traditional Chinese drugs; Monographs are located in the special section of the 1st skin of the pharmacopoeia.
- • WHO Monographs: Five monographs (WHO Monographs on Selected Medicinal Plants - WHO Monographs) were published by WHO between 1999-2010.
- O The number of medicinal plants and / or medicinal plant parts in these is 147.
- O WHO monographs are arranged in the form of the following "features document".

- • British Herbal Pharmacopoeia (BPH): First edition (1983) 232, second edition (1996) contains 169 plant monographs.
- O These monographs include the British Herbal Compendium in two volumes.

- • Committee on Herbal Medicinal Products (HMPC): Created by the European Medicine Evaluation Agency (EMA), this committee publishes community monographs on herbal medicines.
- O Each monograph is in two columns;
- ☐ Both "well-defined use"
- ☐ It also contains "traditional usage" information.
- O This information includes subheadings such as full use effect, drug form, dosage, side effect, harmful effect, safety, warnings.
- O Licensing of well-defined usage medical herbal products; While traditional information is used for the registration of traditional medicinal herbal products.
- 169 monographs were handled by the Committee so far, of which 84 were accepted.

- Quality control of medical plants / Specification document
- O Many contaminants may be present in medical plants; Some of them are given below.
- O Other plants
- O Microorganisms (such as E. coli, Salmonella, Shigella, Psaaeruginosa, Staph. Aureus)
- O Microbial toxins (such as aflatoxins, bacterial toxins)
- O Pesticides (such as fungicides, herbicides, insecticides)
- O Incense substances (such as ethylene oxide, phosphine, methylbromide)
- O Heavy metals (arsenic, mercury, cadmium, lead, etc.)
- O Radioactive substances (such as I-131, Cs-134, Cs-137, Pl-239, Ru-103, Sr-90)
- O For this reason, the official bodies of the countries and some international organizations (such as WHO) have determined the minimum characteristics / requirements that medical herbs / herbal products should carry and publish them in the documents of their characteristics.

- In the current sense, medicinal plant terminology / definition is used to express certain essential substances / elements which are characteristic documents and which carry some information. This information is defined by WHO and is expressed as follows.
 - Botanical name
 - Peer name / names
 - Local name / names
 - Description of the plant (plant / plant part)
 - The plant part of interest
 - O General appearance
 - O Organoleptic properties
 - O Microscopic properties
 - Geographical distribution
 - General recognition tests
 - Purity tests
 - O Microbiology
 - ☑ Anerobic bacteria: Number / g or ml
 - ☑ Mushrooms: Number / g or ml
 - ☑ Enterobacteria and some Gram-negative bacteria:
 - Number / g or ml
 - ☑ E.coli: Not to be found
 - ☑ Salmonella species: Not available
 - O Total ash (<6% for garlic)
 - O Asitte-insoluble ash (<1% for garlic)
 - O Water-soluble substances (<5% for garlic)
 - O Alcohol-soluble substances (<4% for garlic)
 - O Pesticide residues (aldrin and dieldrin for garlic <0.05 ppm)
 - O Heavy metal residues (lead for garlic <10 ppm, cadmium <0.3 ppm)
 - O Radioactive substances (such as I-131, Cs-134, Cs-137, PI-239, Ru-103, Sr-90)
 - O Other foreign substances (such as moisture and water-soluble substances)
 - Chemical analysis: Analysis methods of the main components
 - Important components
 - Pharmacology
 - O Experimental pharmacology
- O Clinical pharmacology
 - Medical use
 - Situations that should not be used
 - Warnings
 - Measures
 - O Drug interactions
 - O Pregnancy
 - O Breeders
 - O Other measures
 - Inverse effects
 - Dosage shape / shapes
 - Usage and Dose

