

# INSTRUCTOR'S GUIDE MATERIAL

*HERBALAND (INTERREG SKHU /1601/4.1/150)*

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## **1. Herbal knowledge and cultivation-specific instructor's guide**

When compiling the training material, specifications of both the use of the herbs and the cultivation of herbs should be considered.

### **Proficiencies and skills**

It is important to know the herb, its life functions, its cultivation technology and the level at which we want to master the knowledge. Besides providing knowledge, it is also important to create the general and special **proficiencies and skills**.

*The applicable knowledge requires proficiencies and skills that rely on the knowledge and are perfected by practice and repetition.*

The degree of **proficiency** is reached when the activity is carried out independently, continuously and mostly flawlessly, but during the application it is necessary to recollect the acquired knowledge again and again, so consciousness can never be excluded from the activity of proficiency.

Multiple repetitions and exercises of work operations and partial activities create **skills** that are the automated components of conscious activity. So, some partial activities become automated.

The proficiencies and skills are built on knowledge, complementing each other, and these can be built on each another mutually and multiply.

### **Bequeathing the knowledge**

When bequeathing the knowledge, when teaching, the **first** and most important thing to do is to draw the awareness to the **goals**, tasks, to motivate the learning. *There is no learning without motivation.*

The **second** most important thing is the **acquisition of knowledge**, which consists of multiple partial tasks:

- expounding the specific facts, phenomena, objects, tools, work processes, technological procedures
- analysis of the learnt facts and processes
- deducing the necessary conclusions

Bequeathing the facts may happen in several different ways:

- by **direct observation** (presentation of herbs, work operations, work moves)
- **indirect detection** (presentations, pictures, books, movies, etc.)

Be aware that presenting too many *non-essential* information may interfere with the recognition of the relevant correlations.

The **third** task is the consolidation. The acquired knowledge should be ascertained. Then condition of memorizing, of inculcation are the repetition and the understanding.

The **fourth** task is the practical application of the knowledge. The prerequisite of the practical applicability is that the knowledge needs to be grounded, conscious and lasting. Proficiencies and skills are only developed in practical action.

The **fifth** task is control and evaluation. During the learning process, you always and constantly need to monitor and learn about the results achieved. The control is a continuous feedback to the instructor, so that it can confirm the performance or correct the errors.

## Required elements the knowledge

Considering the specificities of the herbs, the mandatory elements of the basic knowledge is as follows:

### The names of the plants

The **dual nomenclature** (Binominal nomenclature):

Related to the Swedish botanic, Carl Linnaeus (Carl von Linné).

#### *Genus species*

- The first name is the **genus**, which includes many species, *always write capitalized*.
- The second name is the name of the **species** (abbreviated: *sp.*), always write in lower-case.

In the nature, smaller plant taxonomical units may occur related to the species and directly to the specific species (*subspecies, ssp.*; variation: *varietas*; form: *forma*).

The **cultivar** (*cv.*) never occurs naturally, it's an artificial taxonomic unit. Created by breeding works, and is always capitalized, with upper one-comma quotation marks.

**Herbs:** plants that have been used or are currently used for healing on the basis of the traditions or the literature data. It contains as much active substance as it can cause changes in the body.

**Drug:** the part of the herb containing the active ingredient. A dried plant part or a plant product, which is used for medical purposes, or from which a preparation is prepared for medical purposes.



1. figure: fructus drugs (lovage, fennel, coriander)

The **drugs' names** are binominal.

The *first name* is from the first part of the plant's name (*genus*) or from the second part (*species*), more rarely from both, or from a completely different name (e.g., name established in trade).

The drug's *second name* is the scientific name of the appropriate plant part in subjective case. The drugs' names are to be used in singular form.

**The plant parts' names in Latin and in English:**

<i>bulbus</i> - bulb	<i>bacca</i> - berry	<i>anthodium</i> - inflorescence
<i>calyx</i> - calyx	<i>bractea</i> - bract	<i>folium</i> - leaf
<i>caput</i> - head (fructus)	<i>frons</i> - branch end, branch	<i>lignum</i> - tree
<i>cortex</i> - bark	peak	<i>oleum</i> - oil
<i>flos</i> - flower	<i>galla</i> - gall	<i>pericarpium</i> - pericarp
<i>folliculus</i> - follicle	<i>gemma</i> - bud	<i>semen</i> - seed
<i>fructus</i> - growth (fruit)	<i>herba</i> - aboveground part of	<i>stigma</i> - pistil
<i>stipes</i> - pedicel	the plant ( <i>floral sprout</i> )	<i>tuber</i> - tuber
<i>strobulus</i> - cone	<i>nux</i> - nut	
	<i>radix</i> - root	
	<i>resina</i> - resin	
	<i>rhizoma</i> - rhizome	
	<i>summitas</i> - peak, branch	
	peak	

**The most important terms regarding the quality of drugs:**

<i>albus</i> - white	<i>magnus</i> - large	<i>silvestris</i> - sylvan
<i>amarus</i> - bitter	<i>medius</i> - middle	<i>sordidus</i> - dirty,
<i>bis</i> - twice	<i>naturalis</i> - natural, raw goods	contaminated
<i>canellatus</i> - "tubular", (tub- like)	<i>odoratus</i> - scented	<i>succus</i> - sap
<i>communis</i> - common	<i>officinalis</i> - official / medical	<i>tertius</i> - third-grade
<i>conscissus</i> - to chop	<i>palmatus</i> - palm-formed	<i>usitatus</i> - in use
<i>constundo</i> - to crush	<i>parvus</i> - small	<i>venalis</i> - commercial
<i>crispum</i> - frill-like	<i>primus</i> - first-rank	<i>verus</i> - real, genuine
<i>crudus</i> - raw, rough	<i>pulmo</i> - lung	<i>virginis</i> - virgin, raw
<i>decorticatus</i> - peeled	<i>purpureus</i> - purple	<i>viridis</i> - green
<i>depuratus</i> - cleaned	<i>purissimus</i> - the purest	<i>vulgaris</i> - common
<i>dulcis</i> - sweet	<i>purus</i> - pure	
	<i>qualitas</i> - quality	

<i>electus</i> - selected	<i>quantitas</i> - quantity	
<i>flavus</i> - yellow	<i>raffinatus</i> - purified	
<i>fluidus</i> - liquid	<i>recens</i> - raw	
<i>fragmentum</i> - fragment	<i>ruber</i> - red	
<i>fuscus</i> - brown	<i>sanquineus</i> - blood red	
<i>granum</i> - granule	<i>scissus</i> - cut, roughly chopped	
<i>grossus</i> - rough	<i>secundus</i> - secondary	
<i>lamina</i> - plate, sheet	<i>siccatus</i> - dried	
<i>longus</i> - long		
<i>lucidus</i> - shining, radiant		
<i>luteum</i> - yellow		

Besides the name of the plant drug, there are other terms used in commerce, which refer to the origin, the place of collection, the colour, the cleaning of the plant, to the shape of the drug and to the method of preparation. Therefore, it is recommended to deal with these terms at the suggested level of knowledge.

**Figures of plant parts:**

bulbus - bulb (Figure 2)



calyx - calyx (Figure 3)



caput - head (fructus) (Figure 4)



cortex - bark (Figure 5)



flos - flower (Figure 6)



fructus - growth (fruit) (Figure 7)



stipes - pedicel (Figure 8)



strobulus - cone (Figure 9)



bacca - berry (Figure 10)



galla - gall (Figure 11)



gemma - bud (Figure 12)



herba - aboveground part of the plant (floral sprout) (Figure 13)



nux - nut (Figure 14)



radix - root (Figure 15)



resina - resin (Figure 16)



summitas - peak, branch (Figure 17)



anthodium - inflorescence (Figure 18)



folium - leaf (Figure 19)



semen - seed (Figure 20)



stigma - pistil (Figure 21)



tuber - tuber (Figure 22)



## The grouping of plant drugs:

Grouping can be performed by multiple criteria:

1. In alphabetical order, either in Hungarian or Latin
2. In taxonomic order
3. Morphological grouping
4. Grouping by efficiency strength
5. Grouping by pharmacological and therapeutic effects
6. Grouping by chemical composition of active substances and their biogenetic system
7. Grouping by usage:
  - a. raw materials of phytotherapeutic medicines
  - b. pharmaceutical raw materials
  - c. chemical /cosmetic/ raw materials
  - d. food industrial usage /canned goods, spices/
  - e. nutrition supplement raw materials

The herb contains certain substances (active ingredients) in such concentration that they can be used for medical purposes.

- Most of the herbs are **collected**, wild plants (in pastures, arable lands, in water banks).
- The number of **grown** herb species and varieties is constantly increasing.

**Collection knowledge** (instructor's sketch is highlighted):

The **collection's** most important **conditions**:

- basic professional knowledge
- area knowledge
- drying capacity
- nature protection knowledge!
- conservation of original plant population
- maintaining permanent collection possibilities
- area of collection
- date (active substance content)
- busy roads, chemical plant protection!

**General directives**

1. Collecting when the highest active substance content is reached
2. Forbidden when wet!
3. Collection in basket, box, bag - ventilation
4. Storage: hygroscopic material

**Directives for collection plant parts:**

1. Inflorescence: at full blossoming, with calyx, without calyx
2. Leaf: mature, full-grown, intact, healthy drying - frequent turning over
3. Herba: after dried off, when blossoming, in correct length
4. Root: autumn, early spring (rough cleaning, washing, peeling, splitting, chopping, drying)
5. Bark: during fluid circulation, in case of branch of at least 2 cm in diameter
6. Growth: according to specific regulation.

**Conditions for value retention of the herbs:**

- The optimal choice of the collection, harvest date
- Optimal choice of collection method (manual, mechanical)
- Gentle and quick transport of raw material to the place of processing
- Qualification of the basic material (same species, healthy and intact plant parts, on the basis of foreign matter content, colour, odour, etc.)
- Storage before processing (separating the toxic, strong odour, etc.)

**Preparatory operations for drying:**

- Cleaning
- Chopping
- Dehusking

**Drying:****The physical factors of drying:**

- the drying air's temperature (30-40 °C, maximum 60-80 °C)
- moisture content of the drying air
- flow rate of the drying air
- drying duration

**Drying methods:****1. Natural drying:**

- laid out
- tied, hanged
- warm, in ventilated, dark place
- rarely on sun (e.g. verbascum's flower)

**2. Artificial drying:**

- cold air drying (fan)
- warm air drying
- hot air drying of (in case of pharmaceutical drugs)

**The extraction methods of the essential oils:**

1. Extraction (solvent extraction)
2. Pressing (for Citrus species)
3. Enfleurage (Pomade-procedure)
4. Distillation - most commonly used extraction method of essential oils (water, water and steam, steam distillation)
5. Super critical extraction (with liquid gases, at high pressure)

## Usage knowledge

### Aromatherapy:

Sum of medical procedures based on the use of essential oil plants and essential oils.

The essential oils are the active ingredients of aromatic plants. For the purpose of differentiation from fatty oils, the essential oils are called Aetheroleum and the fatty oils are called Oleum. Essential oils do not dissolve in water. Use with caution for medical purposes.

### Phytotherapy:

Treatment with herb (plant), its parts (with drug, fresh plant parts) or its preparations. It has utmost importance in the field of health preservation, disease prevention, and healing well-being disorders, diseases. Phytotherapy medicines are called phytotherapeutics.

Phytotherapy is not an alternative medicine, it is part of the drug therapy.

### The application forms of herbs:

- powdered drugs or drug mixtures (boxed powder, capsules, granules, tablets)
- herbal teas: usually aqueous extract is prepared at home from tea mixtures
- infusion (*infuzum*)
- decoction (*decoctum*)
- extract made with cold-water soaking (*maceratum*)
- solution (*solutio*) - water with solvent
- spirituous extracts (tinctures) - alcohol is the extraction solvent
- liquid extract (*fluid extract*)
- thick-flowing or dry extract (spissum and siccum extracts)
- ointments (*ungventum*)
- tablet

**Preparation method:**

In the case of flowers, leaves, herbs, usually soft-tissue drugs or essential oils, **infusion** should be made in a covered pot, to prevent the evaporation of volatile compounds.

Pour specified quantity of boiling water on the properly prepared tea mixture and leave it for 10-15 minutes in a covered pot and then pour off.

From coarse, hard, woody drugs (roots, rhizomes, barks), **decoctions** are made, as well as from drugs with active ingredients that are extracted after longer heating (e.g. tanning substances).

Cook the specified amount of properly prepared tea mixture with the specified amount of water for 4-5 minutes from the boiling, replacing the evaporated water and then pour off.

**Cold water extracts** are used for drugs with active ingredients that are heat-sensitive (e.g., vitamin C-containing, mucous drugs).

Cold water extraction takes place at room temperature, requires approx. 5-10 hours. Then pour off.

The proportion of **tea mixture and extractant** is usually given as follows:

1 cup (about 3dl) of water is used for 1 tablespoon (2-3g), or 2.5dl of water is poured on 2 teaspoons of mixture

The **ratio** of drug-water varies according to whether the extract is used internally (for drinking) or externally (poultice, etc.).

**For external purposes**, 2x, 3x amount of drugs are used to make poultice masks.

When making **bath additives**, start from 200-500 grams of tea mixtures from which extracts are made with 1-2 L of boiling water and these are added to the bath water.

For **internal use**, the proportion of drug and extracting agents varies according to whether the tea is prepared for an adult or for a child. For children, a reduced (approximately half) dose is used.

In some cases, not decoctions are prepared from woody drugs, but infusions or cold extracts are made (e.g. frangula bark). When preparing infusion, substances may also dissolve that could cause unwanted side effects (e.g. cramping).

The **consumption of prepared herbal teas** varies according to the indication area:

- Stomach teas should usually be consumed half an hour before meals
- Liver and gall teas before meals, perhaps after meals, preferably without sweetening
- The time of consumption of lactation tea mixtures is in the evening, as the active ingredients act 8-10 hours later.
- Soothing teas should also be consumed in the evening, before sleeping. These may be sweetened.
- Anti-diarrhoea (obstinate) teas should be consumed several times a day, to compensate for the lack of liquid. Mustn't be sweetened.
- Cough-suppressing teas can be consumed daily, with several cups. It is advisable to flavour these with honey.
- In other tea mixtures (e.g. kidney, diuretic, circulatory, rheumatoid), consumption time is not prescribed. Should be consumed usually several times a day, warm, sip by sip.

**Pressed plant juice:** Fresh plant, with high vitamin content, consumed fresh. Growth, leaf or root should be squeezed.

**Syrup** - sugar solution with thick consistency:

- Freshly pressed plant juice
- Aqueous or alcoholic extract
- Cooked to a thick solution by adding sugar
- Little alcohol, keep in a cool place

**Fruit syrup:** Flavouring, anti-thirst, anti-fever, nutrition, beverage

**Embrocation:**

- Nettle - arthritis, muscle pain, hair water
- Garlic - insect bites
- Bulb onion
- Calendula
- Plantago
- Chamomilla
- Poppies
- Hypericum

## Natural plant materials

The range of substances in the organisms (thousands of compounds), most of which are plant materials, are called natural substances.

The herbs are distinguished from other members of the flora, that they have therapeutic value. The compound responsible for the healing effect of the herbs is the **active substance**. The active substance in plant drugs can be single, uniform compound, but more common is the combination of active substances in the plant drugs. In both cases, we need to consider the effect of the supporting materials, which may cause side effects, unwanted side effects. The supporting substance is not a group of substances with expressed physiological effect.

### The main groups of natural plant substances

- Carbohydrates
- Glycosides
- Flavonoids
- Coumarins
- Saponins
- Tanning

substances

- Essential oils
- Alkaloids

**The qualification of herbal drugs**

The purpose of qualification is to protect health, to prevent abuse, to protect consumer interests, to protect producers and trade interests.

Requirements are prescribed by the valid Pharmacopoeia and national and sectoral standards.

The drug must first be examined by means of sense-perception (colour, odour, taste, morphology) and determine whether it is the same as the indicated product.

Morphological examination is of paramount importance for the identification of herbal drugs, for which the understanding of basic botanical concepts is essential.

## Botanical basic concepts

### Organs in the soil:

- root formula (tap-root, side-root system, tuber)
- stem formula (rhizomes, bulbs, tuber, bulb tuber)

### Root

- Its task is to fix the plant, nutrition and water absorption, storage.
- Allocation:
  - Tap-root system: typical for dicotyledons, root branches connect to the vertical main branch from the sides, which ramify further, the final branches are root hairs. The tap-root's upper part is the root head. E.g. dandelion
  - Side root system: typical for monocotyledons. Several roots of similar size and equal value, no major branches e.g. grasses
  - Additional root: formed from stems or leaves (crampoon, its task is fixation, water intake e.g. Moonsera, or assimilation e.g. Orchid species)
  - Tuber: its task is storage. The root branches are thickened.

### Stem formulas

- Rhizoma: separated by stem nodes, stem members, roots originate from the upper parts (leaves/sub-leaves) and from the lower part of the stem nodes. Situated in the soil vertically, horizontally, obliquely. Their task is storage, propagation (iris)
- Stolo: a root stem with sections among the stem that are highly stretched, thin, and contain no nutrient (couch grass)
- Bulb (*bulbus*): its axis is widened as a disk (onion stipe), covered with sub-leaves, which are dry, scaly on the outside, the middle ones are fleshy, the inner ones are mucous (common onion)
- Bulbotuber: transition between the onions and the tubers. The onion stipe is larger than the bulbus, it's the storing part, and not the sub-leaves (autumn crocus)
- Tuber: the root stem's roots parts are thickened, modified for storage.

**Aboveground sprout system:**

Main axis is the **stem**, from which side branches, leaves originate, which location is typical for the plant.

**Stem:**

The originating place the joints, the **stem node (*nodus*)**, which is thickened like a cam. The stem members lie between two stem nodes, **the joint interval (*internodium*)**.

The stem's task is to fix the plant, nutrition and water delivery, and nutrient storage.

Can be herbaceous and woody. A part of the **herbaceous** don't make it through the winter (one year), others are perennials, the **woody ones** live several years (e.g. trees).

The stem's **shape** can be cylindrical e.g., rose species, rectangular e.g. labiates, or ribbed, e.g., complex umbrella-shaped.

The stem, according to **branching** may be bunched: the main axis is grown stronger than the side sprouts, e.g. lilac. Cyme junction: the main axis growth is limited, overgrown by the side shoots e.g. elderberry

The shoots, according to the **length** of the stem member: short e.g., lettuce, long e.g. lilac. The shoots with long stem members, on the basis of the **situation of** the shoots, can be erecting stems e.g. straw stem, lying or reclining stems e.g. cucurbits and attaching stems e.g. hops, clinging stems e.g. grapes

The body shaping of woody plants:

- semi-shrubs *e.g. thyme*
- shrubs *e.g. hawthorn*
- tree-size *e.g. poplar*

## Structure and function of the leaf

- Seed leaves: they are stores of nutrients, they feed the young plant
- Squamae (onion leaf): they protect the organ in the ground and they store nutrients
- Bracts: they are set over the foliage leaf, they have protective role
- Flower leaves: they have altered for protection and multiplication
- Foliage leaf (*folium*): its tasks are production of nutrients, vaporization, breathing, protection, storage
- The parts of the foliage leaf: leaf base, leaf-blade, leaf-stalk.
- The parts of the leaf-blade: acumen, leaf shoulder
- The shape of the leaf-blade:
 

★ egg, e.g. belladonna	★ heart, e.g. violet
★ reverse egg, e.g. bearberry	★ needle, e.g. pine
★ kidney, e.g. coltsfoot	★ ellipsis, e.g. coca
★ sword, e.g. iris	★ lance, e.g. flax
★ shield, e.g. delphinium	★ round, e.g. malvaceae, etc.
★ pike, e.g. sorrel	
- Edge of the leaf-blade:
 

★ sound, e.g. senna	★ jagged, e.g. sage
★ lacy, e.g. sage	★ crenate, e.g. coltsfoot
- Craggedness of the leaf-blade:
 

★ lobed, e.g. poppy-seed	★ partitioned, e.g. milfoil
★ creviced, e.g. pumpkin	★ pinnatifid, e.g. sweet fennel
- Rib of the leaf-blade:
  - ★ there is no main rib, only side ribs equivalent to each other
  - ★ there is a main rib, side ribs in pinnation (Rosaceae)
  - ★ they branch in digitation (malvaceae)
- Surface of the leaf-blade:
 

★ naked, e.g. bearberry	★ only the back is crinite, e.g.
★ crinite, e.g. sage	horehound

- Colour of the leaf-blade:
  - ★ green, e.g. bearberry
  - ★ coloured, e.g. beetroot
  - ★ striped, e.g. Sansevieria

- A leaf can be: - simple and
  - complex: The leaf's main rib forms into stalk and leaflets are connected to it:
    - ★ imparipinnate complex, e.g. walnut
    - ★ paripinnate complex, e.g. senna
    - ★ digitated complex, e.g. buck-bean
- Phyllotaxis can be
  - ★ scattered, e.g. sunflower
  - ★ adverse, e.g. sage
  - ★ whorled, e.g. woodruff

### **Structure and function of the blossom**

The blossom is an offset with short internode, modified for multiplication.

According to their function there are: cover leaves, staminate leaves, carpels

The parts of the blossom:

- pedicel, which wears the floral leaves, its upper part is the thalamus
- at the place of the pedicel's origination you can find the bract

The leaves constituting the blossom can be divided in 3 parts: verticil, androecium, gynaecium

The **verticil's** function is the protection of the internal organs, enticing insects in order to promote multiplication (flashy colour).

The verticil can be homogeneous (perigone), e.g. in case of monocotyledons (lily of the valley).

If the verticil is disparate, we speak about calyx and corolla.

Calyx and petal can stand freely, e.g. poppy-seed or joined, e.g. primrose.

According to this there are eleutheropetalous and gamopetalous plants.

The **androecium** is the aggregate of the stamina. In most cases they consist of two parts, phalanx and anther. The anthers contain pollen specs. It happens that the phalanges, for example in case of the malvaceae, or the anthers, for example in case of the dandelion, adhere.

The **gynaecium** is the aggregate of the carpels. In case of the angiosperms they form a closed formula, called pistil. The pistil consists of 3 parts: ovary (*ovarium*), style (*stylus*), stigma (*stigma*)

The ovary is unilocular or multilocular. As compared to the position of the other parts of the blossom it can be of lower, middle and upper position.

#### Frequent **inflorescence**

- In case of **raceme** the rachis does not end in apical blossom: raceme, e.g. lily of the valley, spica, e.g. nettle, ament, e.g. willow, runt, e.g. sweet-flag, corymbiform, e.g. mustard, umbrella-shaped, e.g. cumin, nest, e.g. chamomile
- In case of **cyma** the major axis is shorter than the pedicels and they end in a blossom: single knot, e.g. pansies, double knot, e.g. carnation, multiple knot, e.g. spurge

#### **Structure and function of the fruit**

The fruit is a part of the plant that forms from the pistil, its function is the protection and spreading of the seeds. There is real and false fruit. In the formation of the real fruit only the pistil takes part, in the formation of the false fruit other parts of the plant also participate, such as thalamus.

The fruit can be **carnose** (when ripen, the fruit wall is thick and **carnose**, e.g. berry) and it can be **dry** (the fruit wall is thin and **dry**, e.g. cod).

Both can be closed and dehiscent.

Classification of the real fruits:

- Dry dehiscent: follicle, cod, pod, silicle, valve, etc.
- Dry closed: nutlet, bud, ash-key, twin as-key, carcerulus, etc.
- Carnose opened: berry
- Carnose closed: berry, orange, drupaceous, etc.

Classification of the false fruits:

- Dry, not dehiscent: spear-thistle
- Carnose, not dehiscent: rose-hips

The **seed** serves for the multiplication of the plant.

In case of the gymnosperms they are located on the **carpel** freely, in case of the angiosperms

they are in a closed formula, in the **seed-vessel**.

The **parts** of the seed are: embryo, perisperm, episperm.

Appendices often can be found on the seed, such as hair formulas, seed wing, seed coat, strophiola.

The most important part of the seed is the embryo, which contains budlet, rootlet and seed-leaf. Monocotyledons shoot with one seed-leaf and the dicotyledons with two seed-leaves.

**Examples of quality defects:**

The root of the dandelion (*Taraxaci radix*) has to be collected in spring or in autumn otherwise the root's substance is not dense but loose, cellular and spongy. Its extract content will be lower than it is prescribed, it will not be suitable.

The burdock's root (*Bardanae radix*) has to be collected in the first year because the underground of the shot plant is lignescant, dry-rotten, it is not suitable for therapeutical purposes.

If the root-stock of the tormentil (*Tormantillaerhizoma*) is lignescant, dry-rotten, its extract content is lower than it is prescribed.

The root of the althaea (*Althaeae radix*) is often fretted by insects, sometimes it is mouldy or strongly lignescant, from which only a certain limit value is allowed.

The leaf of the althaea (*Althaeae folium*) is often attacked by fungus diseases and as a result of the improper drying they fade. From such leaves only a certain value limit is allowed.

The leaves of the lungwort (*Pulmonariae folium*) are often collected with too long leaf-stalk; in case of improper drying the plant discolours.

The leaves of the coltsfoot (*Farfarae folium*) are often attacked by rust and they are often fretted by insects. Due to the improper processing the leaves may rust or they may fade. It happens that they are collected with longer stalk than it is allowed. The standard allows only a certain value limit from this.

If the leaf of the narrow-leaved plantain (*Plantaginis lanceolatae folium*) is dried improperly, the leaf become darker, it rusts.

The leaves of the peppermint (*Menthae piperitae folium*) is often attacked by rust fungi. This time, reddish brown sporangia are seen in the lower surface of the infected leaves. Standard allows 2% of them.

Among the raspberry leaves (*Rubi idaeifolium*), there shall not be European dewberry and blackberry leaves. The lower surface of the leaves of the blackberry is not white pubescent contrary to the raspberry leaves.

Upon the collection of yarrow (*Millefolii flos*), white flowers are allowed and the red flowers can be present only in a limited quantity. The flowers losing their colours due to the inappropriate drying and the large number of withered flowers are quality errors.

The flower of the mullein (*Verbasci flos*) loses its colour as a result of inappropriate drying and gets brown. Standard allows 10% of brown flowers. It sometimes occurs that flowers are picked together with the calyx, which is allowed with a rate of 5% by the standard. The flowers with purple stamen are produced by other mullein species. These stamens are allowed at a rate of 1%.

The flower of chamomile (*Chamomillae anthodium*) is sometimes picked with a pedicel longer than allowed. As a foreign matter, flowers with a stuffed and not hollow receptacle, not containing ray florets or of unpleasant odour may get to the drug. These are the species of anthemis, the wild chamomile and the scentless chamomile. The Hungarian Pharmacopoeia allows 0.1% of them.

The characteristic yellow flower of the dwarf everlast (*Helichrysi flos*) may get brown due to an inappropriate drying and may easily disintegrate. Only a minimal quantity of such disintegrated flowers is allowed.

To the flower of the black elder (*Sambuci flos*), no flowers of dwarf elder can be mixed. This latter has a velvet stamen instead of yellow and the petals are straight.

Among the flowers of the small-leaved lime or the small-leaved linden (*Tiliae flos*) no flowers and bracts of the silver lime may occur. In the flowers, in addition to the 5 standard petals, there are also 5-10 paracorolla as well. The lower surface of the bracts are of silver

pubescence due to the starry hairs. The flower has a heady scent.

The juniper (*Juniperi galbulus*) can be collected in a ripen stage with blueish black colour. The immature berries (green or reddish) are allowed at a rate of 10% at most.

The unlignified overground parts of the thyme (*Serpylli herba*) may contain a lignified part with a rate of 4%.

The stem parts of the absinthe (*Absinthii herba*) shorter than 50 cm and thinner than 5 mm are collected. 5% of the stem parts are allowed. It shall not contain mugwort shoots.

The white horehound (*Marrubii herba*) may contain the shoots of the horehound only in a minimum quantity. The leaves of the horehound are significantly smaller, are oblong and lanceolate, the upper and the lower surface have the same colour and they are slightly pubescent. The herb must be collected before flowering, therefore, the flower and the fruit part in the drug must be minimal.

The drug of savoury (*Saturejae herba*) consists of mostly leaves and flowers, therefore, it can contain stem only at a given rate.

The marjoram (*Majorannae herba*) drug can contain only the leaves and the flower parts shredded from the stem and can contain stem only at a highly restricted rate.

The hyssop (*Hyssopi herba*), the verbena (*Verbenae herba*) and the St. Benedict's thistle (*Cardui benedicti herba*) can contain stem parts with a diameter over 3 mm only at a restricted rate.

The withered and the fruit part of the erysipel (*Hyperici herba*) must not exceed the permitted rate (5-8%).

The flowering overground shoots of the common chicory (*Cichorii herba*) must not contain the leaves of the herb of the produced chicory. The leaves of this are larger and curled.

The herb of the motherwort (*Leonurus cardiaca*) can include a length of 40 cm at most and the allowed withered part content is determined as well.

The strobulus of the hops (*Lupuli strobuli*) consists of the female flowers of the wild and the planted hops and it cannot contain male flowers. The drug must not be of unpleasant odour reminding slightly of valerian.

The stigma of the maize (*Maydis stigma*) consists of the filamentous stigmata of maize. Upon drying, attention must be paid to prevent the adhesion of the stigmata and their blackening.

Upon the collection of the field horsetail (*Equiseti herba*), no shoots of other horsetail species are allowed to mix. Out of these species, the marsh horsetail is the most dangerous, on the sheath of the leaves of which the teeth are black.

**It shall be valid for all drugs that if it has a musty or mouldy odour, contains the dusts of pesticides and herbicides or it contains inorganic contaminants at a higher rate, it is of inappropriate quality.**

## Knowledge of medical plants

For plant knowledge, one has to get to know the:

- the origin and the distribution,
- the way of life and the habitat,
- the appearance and the structure (at a proficient level),
- the active agent,
- the use and the used drug and
- the characteristics of the species, e.g. upon its comparison with other species
- together with other data about it.

This knowledge is different for each plant and to use the drugs, this knowledge must be known in a different level, therefore, each medical plant must be discussed separately.

*In popular medicine the most valuable knowledge is the ones having a history of thousand years, are spread and maintained. The useless or inefficient knowledge has fallen into oblivion.*

*A significant part of the medical plants acknowledged nowadays arrived from the traditional and the popular medicine to the medicine based on science.*

Due to the large number of these medical plants, first the most significant ones must be discussed regarding their use for certain diseases.

**Diseases and medical plants for their healing:**Cold diseases

marsh mallow	ribwort plantain	small-leaved lime
dog rose	primula species	wooly mullein
purple coneflower	black elder	heath speedwell
coltsfoot	thyme	black locust
white horehound	common thyme	

Stomach and gut diseases, digestion problems

absinthe	St. Benedict's	marjoram
yarrow	thistle	spearmint
common agrimony	wild cumin	peppermint
hairy lady's mantle	common chicory	wild marjoram
aloe species	chamomile	rhubarb
dill	Roman chamomile	raspberry
anise	coriander	rosemary
angelica	artichoke	savoury
silverweed	fennel	milk thistle
common basil	buckthorn	tormentil
common barberry	flax	
calendula	liquorice	

Medical plants affecting the cardiovascular system

garlic	clover	motherwort
hawthorn	common evening-	
buckwheat	primrose	
buckeye	European mistletoe	
yellow sweet	ginkgo	

Medical plant affecting the nervous system

oat	hops	valerian
erysipel	sweet balm	
lavender	passion flower	

Vegetal urological medicines, urine disinfectants and medical plants affecting prostate

birch	couch grass	black currant
common heather	common juniper	goldenrod
culinary pumpkin	lovage	common nettle
and its varieties	maize	
hoary willowherb	spiny restharrow	
field horsetail	parsley	
lady's bedstraw	bean	

Medical herbs to be used for musculoskeletal diseases

red pepper	white willow	black mustard
meadowsweet	white mustard	common dandelion

Treatment of dermatological symptoms with medical plants

mountain arnica
shepherd's purse
safflower
sumac
eyebright
American witch-
hazel
walnut
white dead-nettle
black poplar
oak species
sage
field pansy

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## **Methodological knowledge - Detailed description of medical plants**

To teach the knowledge about medical plants in a familiarity and proficient level, multiple procedures must be applied. Procedures are the methods of teaching, which are the procedures applied at certain points of the teaching process. These procedures are: disclosure, instruction, narrative, description, explanation, presentation, introduction, observation, discussion, learning from written material and practice.

### **Disclosure**

It is applied when data or facts are disclosed during the processing of a study material or during analysis. *e.g. In the coneflowers genus there are 9 species.*

### **Instruction**

A method applied during organisation.

### **Narrative**

A type of the oral interpretation of knowledge. It is used when we are to process events far from us both in space and time. *E.g. The Eastern purple coneflower is native to North-America where this is one of the most popular medical plants. Mostly the Indians of the Great Plains used it.*

### **Description**

It is appropriate to combine description with introduction. It is applied when the expressive presentation of tools, phenomena, plants etc. take place. They are a significant part of the professional material and without them, the professional level cannot be achieved. *E.g. The Eastern purple coneflower is a herbaceous perennial plant with rhizomes. Its stem is long and branched. Its oval, lanceolate leaves are rounded at their bases. They are coarse, their blade is smooth edged and sparsely toothed. Its flowers are hermaphrodite, it is pollinated by bees and butterflies etc.*

### **Explanation**

It has a gap filler role. It is applied, if unresolved relationships or knowledge has to be made more understandable. It is recommended to ask questions to see whether the

explanation is successful. E.g. One of the special care works of onion is the scape removal. Who knows what it means? Scape is the seed stalk of onion. If it is not removed, the bulb of the onion will not develop and the onion will be not edible.

### **Presentation**

The continuous expression of knowledge. This method requires sustained attention, developed thinking and good memory. When presentation is applied, it is especially important for it to be rich in content, varied in style, experience-like, clear, understandable, organised and expressive.

### **Introduction**

The first step of knowledge acquisition is the formation of sensation, the images of detection, while its second step is the grammatical description of the noticed things and phenomena. Introduction is not only a passive inspection by the student, but an active activity and observation as well. When one gives the plant to the student, he/she experiences the smoothness of the leaf, the hairs on it, sees the shape of the plant, smells the scent of it etc.

### **Discussion**

It is an often used method for the performance of all didactic tasks. Discussion gives a possibility for the student to notice relationships by himself/herself and to draw conclusions about the material he/she studies.

### **Studying from written materials**

Studying from the literature and from books after the lecture is the recording of the knowledge learnt. The purpose of this type of studying is not only recording, but the repeated processing of the knowledge as a new material, which has been just experienced. Additionally, it facilitates autonomous work as well.

### **Practice**

The aim is to train experts able to appropriately apply theoretical and practical knowledge. For this, the creation of multilateral conditions is necessary. We must make

possible the practising of partial operations or full operations to let the students reach the required skill and knowledge level. In this way, we should make the students practice the partial operation basically constructing the whole operation.

## Types and structures of presentations

The certain stages of the structure of the presentation or the lecture are determined by the didactic tasks to be achieved.

Accordingly, the name of the lecture is given according to the tasks.

- Introductory lecture: the task is partly the raising of the interest and partly the introduction of the next material.
- Preparatory lecture: its aim to link the new material to the already existing knowledge.
- Lecture for the processing of new knowledge: It is applied, if the amount or the importance of the material to be processed requires to spend a whole lecture to the processing of new knowledge.
- Lecture for the strengthening of knowledge: The task is the deepening and the recording of the knowledge contrary to that knowledge strengthening takes place in every lecture. Sometimes, it is necessary to apply strengthening as the main task.
- Lecture dedicated to application: To let the students be able to apply the acquired and understood knowledge in a skilful and professional manner, it is sometimes necessary to give a determining role to application.
- Control lecture: After the completion of a teaching unit or a topic, the processing of the next material can be based only on an existing and stable knowledge. Therefore, it is sometimes necessary to test the knowledge, to reveal deficiencies and to correct the incidental misunderstandings.
- Combined lecture: This lecture type is used most frequently. Two or more didactic tasks of the teaching process are dominantly present in it. Usually the control and the processing of the new material are the two dominant didactic tasks and the recording and the application may also take place with a non-dominant gravity.
- Structure:
  - ★ Control, evaluation
  - ★ Aims
  - ★ Processing of a new material
  - ★ In the meantime, primary and sequential recording

- ★ Primary summarising recording
- ★ Discussing lecture: Experiences, experience or questions are discussed regarding the given subject.
- ★ Evaluating lecture: A lecture dedicated to the application and it plays a role after the control lecture.
- ★ The full documentation of a single lecture consists of three parts: lecture planning, lecture draft and tabular draft.

## **Lecture draft about the growing of medical plants**

### Draft of the medical plant growing lecture:

Topic: Growing of composite flower medical plants.

Teaching unit: Introduction of chamomile, description of its growing technology

Lecture type: combined

Structure: - oral control

1. What is the sowing depth of chamomile?
2. When is it worth harvesting?
3. What is the relationship between flowering and the accumulation of

essential oil?

- evaluation by disclosure
- Aims: Getting to know the growing technology of chamomile
- Preparation: Importance of the knowledge of the plant in the healing with medical plants
- Processing of new knowledge:

### **1. Partial purpose setting (by disclosure): Drug, active agent and pharmacological effects of chamomile:**

Its main active agent is the blue coloured essential oil. This is formed during distillation; the essential oil within the plant is colourless or yellowish. Additionally, there may be flavonoids, phenolic acids, coumarins, slime and minerals in the flower. Its flowers used for medical purposes should be collected at the start of flowering when the white ray florets are horizontal and the receptacle is still flat. It can be applied both internally and externally. Its tea or essential oil are proven to have anti-inflammatory, antibacterial, antispasmodic, slight tranquilising and gastric ulcer inhibiting and healing effect, if internally consumed. By steaming (3 tablespoons of flowers in a flat container, by adding hot water and inhalation for 10 minutes), the respiratory tract can be disinfected, the healing of bronchitis can be accelerated and the operation of the immune system can be stimulated. Its tea is perfect for the treatment of gastric problems and enteritis. It is a perfect cure for ear inflammation, when dripped into the ear, it

terminates it. Its external use is also multifaceted: by wet wrapping, acnes, ulcers, lesions, inflamed skin can be treated with it. It is beneficial against ophtalmitis as well, but allergic people must not use it. It is suitable to treat female problems: it decreases the inflammation of female genitalia and alleviates menstrual cramps. Chamomile has a beneficial effect on nervous system as well: it is applied as a natural tranquiliser. This is beneficial for the alleviation of teething pain and for nervous children. It energises human body, reduces stress in mind and it is great in the slow recovery process of serious diseases. If one has sleep disorders, one should drink chamomile tea before sleeping.

**2. Partial purpose setting (by disclosure and introduction): Morphological characterisation and environmental demands of chamomile. What are its root, stem, leaf, flower, fruit and seed like?**

It is an annual plant, but it often comes up in autumn and it overwinters. Its stem is lying or standing, its height is 5-80 cm and it flowers from the end of April until the beginning of June. Its leaves are alternated, hairless, with pinnatisect and multifid leaves and the multifids are narrow and filamentous. The apical calathidium has a width of 1.5-2.5 cm and the scales are greenish with a darker edge. The side, ray florets are white, have a cut or emarginated apex and lean back in case of maturity. The florets are yellow. An important characteristic of chamomile is that at the end of flowering, the receptacle of the flower is conical and hollow within. Its fruit is greyish white achene. Environmental requirements: sun-loving and thermophile plant. Its seeds within the soil are able to germinate until 10-15 years. It tolerates saline soil. It tolerates drought well, but in case of stem elongation, it has a great water demand.

**3. Partial purpose setting: Growing technology of chamomile**

It does not require previous cropping. It can be grown in monoculture. Crop rotation is recommended when resistant weed flora emerges.

In the first year, it requires 40-60 kg/ha phosphorus supply on sandy soil and in the second year, a fertiliser of 60-70 kg/ha P, 50-70 kg/ha K and 10-40 kg/ha N content must be distributed before sowing and 40-60 kg/ha N is necessary in spring.

Preparation of the soil: shallow ploughing or disking, the formation of a smooth and

even seedbed.

It is sown around the end of August and the beginning of September with ground flower, the so-called cribrate, with a quantity of 8-10 kg/ha onto the soil surface and after sowing, rolling must be performed with clod crusher.

For weed regulation, presowing and preemergent substances can be used.

The optimum of harvesting is when the majority of the flowers are in blossom. For the production of essential oil, the cutting height must be determined in a way to introduce the least possible stem parts in the cut material.

After the primary processing, the contaminant and foreign matter is removed and the next step is the natural or the artificial drying.

**Tabular draft:**

Chamomile (*Matricaria recutita*)

- Drug: its blossoms, Chamomillae flos
- Active substance: essential oil, flavonoids, coumarins, mucilage, phenolic acids
- Anti-inflammatory, anti-convulsant, exfoliating, antioxidant, sedative
- Popular medicine: eye inflammation, dermatitis, wound healing, digestive, stomach ulcer, causing sweat
- (Homeopathy: anti-anxiety, painkiller)
- Saline regions, roadside areas, ruderal areas, ditches, land lying fallow
- Its stem is cylindrical, upstanding or lying. Its leaves are distributed and flowery. Its inflorescence is an open head, in which ray flowers in the outer circle are white, while florets in the center are yellow.  
The receptacle of the inflorescence becomes elongated and hollow at the time of flowering
- Previous cropping: it can be produced in a monoculture
- Sowing: End of August, early September, by ground blossom, 8-10 kg/ha
- Care: with Presowing and preemergens herbicides
- Harvest: most of the blossoms are blooming, by a reaping and loading machine
- Processing: it is dried spread in a thin layer, either in an aerated and shaded areas, or in a dryer (max 40 °C)
- Cleaning: from parts of the stem and from foreign substances
- Storage: carton boxes

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## Lesson plan on the use of medicinal plants

### Lesson plan of medicinal plants:

Topic: Medicinal plants used in cases of illnesses related to colds

Teaching unit: Origin, description, use of marshmallow, applied drug

Type of lesson: combined

Structure: -oral test

1. What types of plants can be used in case of colds?
2. What is the connection between the origin and demand of plants?
3. What is the connection between the structure and demand of plants?

- evaluation by communication

- Objective: Getting to know the marshmallow

- Preparation: The importance of knowing the plant in healing with medicinal plants

- Processing of new knowledge:

- 1 Partial objective (by communication): Name and locations of the marshmallow

The marshmallow or white mallow (*Althaea officinalis*) is an Eurasian flora element, but it also grows in N-Africa and N-America. It is indigenous in Hungary and can be found in wet areas or saline regions.

Since the IX. century, it can be found in every monastery.

2. Partial objective (by communication and introduction): The morphological characterization of the marshmallow. What is its root, stem, leaves, blossoms, fruit, seed like?

The plant has a **main root and root branches** that are cylindrical, and they are of greyish brown color on the outside, while in the inside, they are of white color, and their fracture is stringy and fibrous. It is distributed on the market peeled and cut into cubes. It is odorless, it tastes like mucilage and sweetish. The **leaves** are egg- or heart-shaped, have 3-5 slices, the edge of leaves is scalloped and jagged, and the base of leaves is cut in a wedge-shape. The leaf vein structure is palm- and finger-shaped. Both the surface and the back of leaves are woolly and of greyish green color. It is odorless and slimy.

The **blossoms** have a double circle of cups. The number of petals is 5, they are of white

or pink color, the stamens have grown together to form a tube, the pistil is formed by several carpels. They bloom from July to September. Its fruit is formed by 15-20 hairy and circular partial fruits separated into sections (so-called mallow fruit)

3. Partial objective: The use, application of the marshmallow, its drugs.

Drugs made both from the root, leaves and blossoms can be used to reduce stimuli in case of inflammation of either the oral mucosa or the throat, or pharynx, due to their coating effect. As a result of this, dry cough is reduced. Leaves that dissolve mucilage, are diuretic and skin soothing are collected in summer. Their brew is used to treat the inflammation of urethra and kidney stones. Roots are collected late fall and they can coat the intestines, they are diuretic, skin soothing and wound healing. They are used as a coating product in case of the inflammation of the mucus membrane of the stomach. Their brew is generally used for digestive issues and dermal problems, and mainly to treat the inflammations of the mouth, gastritis, stomach ulcer, enteritis, intestinal inflammation and the chronic inflammation of the large intestine. It increases lactation and soothes the bronchi. The drug made from the blossoms is used by pediatrics. Method of application is cold extraction and preparation of macerate, according to the following: 1 tablespoon of drug from chopped roots shall be soaked in 150ml of cold water for 1.5 hours while stirring, then it has to be filtered and consumed by 1 cup several times a day.

Preparation of macerate from drug made of leaves: 1 teaspoon of chopped drug shall be soaked in 150ml of cold water for 1 hour while stirring, then it has to be filtered and consumed by 1 cup several times a day. 1-2 g of blossom shall be added to 150ml of water.

The mucilage can slow absorption down when taking other medicines.

Its drugs: Root (*Althaeae radix*)

Leaves (*Althaeae folium*)

Blossoms (*Althaea flos*)

The main component of all three drugs is polysaccharide (mucilage)

- Strengthening:

How are the medicinal properties of the marshmallow manifested?

What serves as the basis for the drug of the marshmallow?

How are these drugs applied?

- Application:

Compare macerates made from the marshmallow

## **Board draft:**

### Marshmallow (*Althaea officinalis*)

#### Characterization:

#### **Morphological**

Main root with root branches, cylindrical, greyish brown on the outside, white in the inside, their fracture is stringy and fibrous

Leaves are egg- or heart-shaped, have 3-5 slices, their surface and back of leaves are woolly

Blossoms are of white or pink color, stamens have grown together to form a tube

#### **Biological**

Grows in wet or saline regions

drug made from root, leaves and blossoms

Effect – anti-tussive, stimuli reducing

## Preparation of macerates

### Dog rose (*Rosa canina*)

Wild rose, indigenous medicinal plant and culinary herb, grows wild in Hungary.

It can be found at the edge of woods and in thickets. It is located in semi-shade and in sunny places. It is drought-tolerant. It grows best in soils of medium consistency and with medium nutrient content.

It is a 0.5 – 3 m high thorny bush and stolon shrub.

Leaves: the stipule is connected from two sides to the stele of distributed, unequally pinnated, naked or hairy, or non-glandular or glandular leaves. Its blossoms bloom in spring, they are of white color blended with pink, nice-smelling, with free petals, a lot of stamens and carpels. Its fruit is a false fruit, rosehip. In some places, it is called hip or hip rose.

The false fruit can be collected without stalks, ripe, hard and in red color. Unripe and black-colored false fruits are defective from a quality perspective and they are worthless. The sliced drug is elongated, boat-shaped, bending at the two edges, leathery. It is odorless, has a sour-sweet flavor with a bitter aftertaste. Substances: ascorbic acid (vitamin C), vitamins A, B, K, P. It strengthens the immune system.

It is used to prevent illnesses related to colds. It shall be used by soaking in cold water. 2-2.5 g of chopped drug shall be soaked in 150ml of cold water for several hours, then filtered. We can consume it by 1 cup several times a day. Popular medicine uses it as a laxative due to its high pectin and fruit acid content. Food industry also uses it to prepare marmalade, wine, syrup, etc.

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## **Compilation of illustrative materials for the topics of medicinal plants**

### ***Herbaria pages***

Dill, [Figure 23.]



Latin name: Anethum graveolens

English name: Dill

Family: Apiaceae

Form of life: Th

Name of drug: Anethi herba, Anethi fructus, Aetheroleum anethi

Main active substance: Essential oil

Time of collection: 2006

Angelica, [Figure 24.]



Latin name: *Angelica archangelica*

English name: Angelica

Family: Apiaceae

Form of life: TH

Name of drug: Angelicae rhizoma et radix, A. folium et fructus, Aetheroleum angelicae

Main active substance: Essential oil

Time of collection: 2006

Borage,[Figure 25.]



Latin name: Borago officinalis

English name: Borage

Family: Boraginaceae

Form of life: TH

Name of drug: Boraginis herba, B. fructus, Oleum boraginis

Main active substance: fatty oil

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Time of collection: 2006

Marigold, [Figure 26.]



Latin name: *Calendula officinalis*

English name: Marigold

Family: Asteraceae

Form of life: Th

Name of drug: *Calendulae flos cum calycibus*, *C. f. sine calycibus*

Main active substance: flavonoids

Time of collection: 2006

### Safflower, [Figure 27.]



Latin name: Carthamus tinctorius

English name: Safflower

Family: Asteraceae

Form of life: Th

Name of drug: Carthami flos, Oleum carthami

Main active substance: safflor yellor, safflor red

Time of collection: 2006

### Caraway, [Figure 28.]



Latin name: Carum carvi

English name: Caraway

Family: Apiaceae

Form of life: TH

Name of drug: Carvi fructus, Aetheroleum carvi

Main active substance: essential oil

Time of collection: 2006

Coriander, [Figure 29.]



Latin name: Coriandrum sativum

English name: Coriander

Family: Apiaceae

Form of life: Th

Name of drug: Coriandri fructus, Aetheroleum coriandri

Main active substance: essential oil

Time of collection: 2006

Hyssop, [Figure 30.]



Latin name: Hyssopus officinalis

English name: Hyssop

Family: Lamiaceae

Form of life: Ch

Name of drug: Hyssopi herba, Aetheroleum hyssopi

Main active substance: essential oil

Time of collection: 2006

### Lovage, [Figure 31.]



Latin name: Levisticum officinale

English name: Lovage

Family: Apiaceae

Form of life: H

Name of drug: Levistici rhizome et radix, L. folium, Aetheroleum levistici

Main active substance: essential oil

Time of collection: 2006

Flax, [Figure 32.]



Latin name: *Linum usitatissimum*

English name: Flax

Family: Linaceae

Form of life: Th

Name of drug: Lini semen, Leum lini

Main active substance: fatty oil

Time of collection: 2006

Marjoram, [Figure 33.]



Latin name: Majorana hortensis

English name: Marjoram

Family: Lamiaceae

Form of life: Th

Name of drug: Majoranae herba, Aetheroleum majoranae

Main active substance: essential oil

Time of collection: 2006

Lemon balm, [Figure 34.]



Latin name: Melissa officinalis

English name: Lemon balm

Family: Lamiaceae

Form of life: H

Name of drug: Melissae folium, M. herba

Main active substance: essential oil

Time of collection: 2004

Basil, [Figure 35.]



Latin name: Ocimum basilicum

English name: Basil

Family: Lamiaceae

Form of life: Th

Name of drug: Basilici herba, Aetheroleum basilici

Main active substance: essential oil

Time of collection: 2003

Anise, [Figure 36.]



Latin name: Pimpinella anisum

English name: Anise

Family: Apiaceae

Form of life: Th

Name of drug: Anisi fructus, Aetheroleum anisi

Main active substance: essential oil

Time of collection: 2006

Milk thistle, [Figure 37.]



Latin név: Silybum marianum  
Magyar név: Máriatövis  
Család: Asteraceae  
Életforma: Th  
Drognév: Cardui mariani fructus, C. m.  
folium  
Fő hatóanyag: flavonoidok  
Gyűjtési idő: 2006

Latin name: Silybum marianum

English name: Milk thistle

Family: Asteraceae

Form of life: Th

Name of drug: Cardui mariani fructus, C. m. folium

Main active substance: flavonoids

Time of collection: 2006

Mustard, [Figure 38.]



Latin name: Sinapis alba

English name: Mustard

Family: Brassicaceae

Form of life: Th

Name of drug: Sinapis albae semen, S. a. farina et oleum

Main active substance: mustard oil glycosides

Time of collection: 2006

Thyme, [Figure 39.]



Latin name: Thymus vulgaris

English name: Thyme

Family: Lamiaceae

Form of life: Ch

Name of drug: Thymi vulgaris herba, Aetheroleum thymi

Main active substance: essential oil

Time of collection: 2006

Chamomile, [Figure 40.]



Latin name: Chamomilla recutita

English name: Chamomile

Family: Asteraceae

Form of life: Th, TH

Name of drug: Chamomillae anthodium, C. cribratum, Aetheroleum chamomillae

Main active substance: essential oil, flavonoids

Time of collection: 2006

Yarrow, [Figure 41.]



Latin név: Achillea collina  
Magyar név: Mezei cickafark  
Család: Asteraceae  
Életforma: H  
Drognév: Achilleae herba, A. flos.  
Aetheroleum achilleae  
Fő hatóanyag: illóolaj  
Gyűjtési idő: 2004

Latin name: Achillea collina

English name: Yarrow

Family: Asteraceae

Form of life: H

Name of drug: Achilleae herba, A. flos., Aetheroleum achilleae

Main active substance: essential oil

Time of collection: 2004

Fennel [Figure 42.]



Latin name: *Foeniculum vulgare*

English name: Fennel

Family: Apiaceae

Form of life: TH, H

Name of drug: *Foeniculi fructus*, *Aetheroleum foeniculi*

Main active substance: essential oil

Time of collection: 2006

Horehound, [Figure 43.]



Latin name: Marrubium vulgare

English name: Horehound

Family: Lamiaceae

Form of life: H

Name of drug: Marrubii herba

Main active substance: bitter substance (marrubiin)

Time of collection: 2006

### Savory, [Figure 44.]



Latin name: Satureja hortensis

English name: Savory

Family: Lamiaceae

Form of life: Th

Name of drug: Saturejae herba, Aetheroleum satorejae

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Main active substance: essential oil

Time of collection: 2006

### ***Dissection, drug***

Dill, [Figure 45.]



Angelica, [Figure 46.]



Borage,[ Figure 47.]



Marigold, [Figure 48.]



Caraway, [Figure 49.]



Coriander, [Figure 50.]



Lovage, [Figure 53.]



Flax, [Figure 54.]



Marjoram, [Figure 55.]



Lemon balm, [Figure 56.]



Basil, [Figure 57.]



Anise, Figure 58.]



Rosemary, [Figure 59.]



*Ruta graveolens*, [Figure 61.]



Savory, [Figure 62.]



Milk thistle, Figure 63.]



Mustard, [Figure 64.]



Thyme, [Figure 65.]



Chamomile, [Figure 66.]



Yarrow, [Figure 67.]



Fennel, [Figure 68.]



Blueberry, [Figure 69.]



Robinia, [Figure  
70.]



Dog rose, [Figure  
71.]



Linden, [Figure 74.]



Field horsetail,[ Figure 75.]



Juniper, [Figure 79.]



## ***Seeds***

Dill, [Figure V-1.]



Angelica, [Figure V-2.]



Borage, [Figure V-3.]



Marigold, [Figure V-4.]



Safflower, [Figure V-5.]



Caraway, [Figure V-6.]



Coriander, [Figure V-7.]



Purple coneflower, [Figure V-8.]



Hyssop, [Figure V-  
9.]



Lovage, [Figure V-10.]



Flax, [Figure V-  
11.]



Marjoram, [Figure V-12.]



Horehound, [Figure V-13.]



Lemon balm, [Figure V-14.]



Basil, [Figure V-15.]



Anise, [Figure V-16.]



Rosemary, [Figure V-17.]



Rumex, [Figure V-18.]



Ruta graveolens, [Figure V-19.]



Savory, [Figure V-20.]



Milk thistle, [Figure V-21.]



Mustard, [Figure V-22.]



Thyme, [Figure V-23.]



Chamomile, [Figure V-24.]



Yarrow, [Figure V-25.]



Fennel [Figure V-26.]



## ***Compilation of illustrative materials***

### *Engineering of medicinal plant production and means of processing*

#### Soil cultivating tools



Reversible ploughs



Notched disc



Harrow



Rotary tiller



Rotary harrow



Spike tooth harrow



Seed drills



Root washer



Riddle system



Dryer



Drying tunnel



Tobacco dryer



Shredder



Separator

## **- Compilation of follow-up questions**

### *Workshop*

The term 'workshop' refers to a training session, or sometimes to a short training; it is a consciously organized and controlled team work /training process based on team work/ of a defined structure (structured), in the procedure of which the participants process certain knowledge (topics) and then solve tasks individually and together, reveal and solve problems, develop approaches and possibilities to a solution. An essential benefit of this method is that participants develop an approximately identical attitude, and cooperation is established within the unity of individual efforts and group targets.

Workshops belong to activation education and training procedures, it denotes its complex type, which can be thought of as a version of a meeting, "round-table work". Usually it includes the processing of a defined topic with the active contribution of participants, and with the demonstrative achievement of the application. Preparedness of students and their awareness of the subject matter of the workshop are key requirements.

### **The workshop**

***is a complex training (educational) /primarily adult education / procedure, which involves the learning of the content of a topic (theoretical field of knowledge) through presentations, or through the individual activities of students; its processing based on the activity of participants; and the demonstrative ("serving as a pattern") application of the knowledge.***

To put it simpler: workshop is a training method promoting the processing of a field of knowledge and the application of knowledge acquired.

Elements of a workshop process are the following:

In the complex training procedure

- the concentrated processing of a theory, a theme or topic of knowledge based on presentation and individual gain of knowledge,
- stating, debating and discussing the observations, opinions of participants in relation to the topic of the workshop (training),
- demonstrative application of knowledge processed,  
    lessons from the application of knowledge processed and gained,
- formulation of conclusions.

***A workshop is a procedure requiring complex methods***

It is a complex training procedure, which synthesizes, applies certain “classic” educational-training procedures and inserts them into the process according to the purpose (similar to trainings). A key starting point in case of workshops is the lecture, or presentation to process the knowledge background. In a different approach, the content of the work is provided by the preliminary and continuous processing of the academic material or that of the assigned parts of literature. The presence of the presentation-like means of communication is determining, in addition to which, the application of procedures based on the activity of participants (training community), and the insertion of discussion, debate and workshop are also dominant. It is an essential factor that every member of the training group (“student group”) actively participates in the processing of the theoretical knowledge, as it can serve as the basis of application, putting the knowledge gained into practice and providing feedback of knowledge gained.

The procedure applying methods in a complex manner means that procedures most suitable to the content of each workshop and each target to be attained must be applied in the process of the training. One of the requirements for the person conducting the education of adults is the “method expert” competence, which is of outstanding importance in this case. The effective workshop requires that the instructor of the

workshop applies the best combination of methods for efficiency, because the 'range' is wide as the alternating elements of the controlled or prepared individual preparation, the lecture, the presentation, the prospectus, the discussion, the debate are required for every participant, while the leading person shall be up-to-date regarding the variants of leading the debate and the discussion. The fact that the preparation and achievement of practices of various types require further procedural elements also contributes to the diversity of methods. We have to state that the leading of workshops requires an excellent preparedness in methodologies, as in this case, the autonomy of participants must prevail besides the indirect but explicit control of the instructor, for the appropriate contribution of the participants.

### ***The procedure of processing knowledge***

The basic characteristic of workshops is that the participants of workshops are precisely aware of the topic to be processed in advance and they 'collect information' from their current knowledge and collect experiences related to its application.

Basically, we can define workshops as an educational or training procedure (combination of methods) promoting the processing of a specific topic, which ensures the acquisition, completion of knowledge through the active participation of participants, as well as the practical application of that knowledge. This form of training also promotes the development and strengthening of a knowledge element, of a specific personality trait (skill, proficiency, or ability/partial ability), or of an attitude. This approach means that it can result in the completion of certain competences-partial competences or in the upgrade of them to a higher level.

Workshops can be interpreted in a way that we process a field of knowledge containing several elements within several workshops that are linked together, and as a result of the process of knowledge and its practical application, a more complete preparedness and more comprehensive level of knowledge is established. This entails the development and improvement of several and higher levels of personality

traits/characteristics (skill, proficiency, ability), and attitudes. This form of training is suitable to develop, improve and strengthen certain competences.

As a result of this training process – and of the one processing a more complete field of knowledge – we can reach the level of “reflecting-creator” through the more efficient and independent processing of knowledge, where the active participant is able to create something new and to apply their newly gained knowledge in their everyday work in a creative way. (8) This is the knowledge of being able to apply.

In case of workshops, we can generally say that it is a procedure suitable to process a topic or a smaller theme, which ensures the processing of several connected fields of knowledge by the application of linked workshops, and the development of a competence/competences. While the principle of trainings is a complex process in the first place, a form of training ensuring the development of a competence or competences, the process of linked workshops can also fulfill this task. (We should note that the exploration and exact definition of content-related and methodological questions of workshop-like trainings is important to be able to clearly admit the justification and efficiency of its application.)

### ***Discussion of opinions, views***

As one of the characteristics of an adult student, we have previously mentioned that it means a motivating factor for them to apply their experiences in the training. Activation methods are characterized by the exploration of opinions, experiences of students. One of the main features of workshops is that the discussion of opinions, experiences of ‘students’ is part of the training process. As we have previously mentioned, this procedure requires students to participate in the workshops prepared from the topic, and it is an essential element of the preparation to collect experiences and to express opinions-views. Workshops can achieve targets only if the processing of the individual approaches of participants forms part of the process. The substantial extra of workshops is that they process specific topics by taking into account factors that are typical of the organization concerned and participating people.

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### ***Application of the processed material***

It is an essential requirement in adult education and training that participants can use the knowledge gained in their everyday work. Various forms of trainings ensure the practical application of knowledge at different levels, and at a training, every student performs the tasks by giving effect to increasing requirements, so the gradual approach ensures exercising by components. Due to the duration of workshops and the number of participants, there is less time to apply knowledge, therefore the application ensures not an exercising by components but the demonstration of a complete potential use. By solving a practical task / tasks, the purpose is not to 'practice' person by person, but to provide a pattern to follow, as a result of which, an application is realized from which every student can draw the experience that seems to be the most appropriate for themselves, so they adopt the procedure or element of solution, which can be utilized most in their own activities.

In case of workshops, tasks related to application basically mean a model, by ensuring the demonstration of the optimum possibility of application in a specific community. One of the most essential efforts of workshops is to create a common approach within an organization, and to cause every subject to act in a similar or approximately similar way (by taking individual characteristics into account) in case of certain tasks. We have to emphasize that the model-like demonstration of the application of knowledge does not mean a 'template', but its purpose is to express equal requirements in the process of daily work, by also giving effect to individuality.

### ***Conclusions, lessons***

Processing of knowledge, expression of lessons related to specific tasks, situations, organizations based on the collation of experiences, and relating the knowledge processed to the usage of that knowledge in the daily work of participants mean an important procedural element of workshops. The goal of every educational/training session in adult education – including this – is to cause everyone to achieve better

results more efficient and by investing less time and energy after completion. The above requires the expression of objective conclusions in the closing section of the training that can be followed by everyone, that ensure coherent (more coherent) solutions within the organization, and that can be applied in the given practice.

Workshops are differentiated from other forms of education (e.g. from trainings as well) by that there is a pattern to follow, which is created by a joint activity, accepted by every individual, and which can be applied in practice by all participants. We have to highlight that in case of workshops, the active participation of every 'student' is required in all phases of the training, which makes the individual processing of lessons and conclusions more direct than in case of other procedures. One of the main characteristics of a good workshop is that besides collectively established views, due to active participation, the individual processing of the processed topic is most likely to be deeper than in case of applying other procedures.

### **Characteristics of a workshop**

The effective application of workshops makes it necessary to take into account the characteristics of the method during both the planning and implementation of the training. Giving effect to determining 'characteristics' also means a requirement for efficiency, therefore we consider them to be important to note.

1. Basically workshops belong to small group procedures, because to ensure efficiency, only 8-12 people is recommended to participate, with a maximum limit of 15, which number still ensures the ability to focus on individuals as we believe that an instructor paying attention to individuals is a requirement for efficiency. There are views mentioning 20 people or more (3), but we think that it is already close to the number of participants at a lecture.
2. Duration of workshops can only be determined based on content and purpose, as well as on proposed number of participants. Some considers 3-8 hours as optimum, while we believe that 6-8 (probably 10) hours can be considered to be more general with respect

to duration if we would like to give effect to every characteristic – which is the requirement for the appropriate application of the method –, so one training unit can be achieved within one day. Of course, we cannot exclude the possibility to devote two days to one unit, in which case we can spend 12-16 hours as well.

3. Workshops mean an education in a group, however, training is conducted oriented at the development of individuals. Defining characteristics make higher number of active participation necessary to allow experiences and opinions in relation to the topic processed to become an essential content element of the training. Workshops are interpreted as the realization of group and individual work in a single process.

4. Workshops primarily promote the acquisition, completion, strengthening of knowledge and putting them into practice to achieve a specific and current goal. This form of training does not mean a large-scale preparation but the assistance of “daily activities”. Workshops mean a very important combination of educational methods for companies and organizations, because a theoretical and practical training is provided in a realistic environment, which assists the achievement of actual tasks.

5. Workshops are group trainings that are based on the active participation of individuals, therefore they prepare all participants for independent gain of knowledge. Workshops can only achieve their purposes if every participant has prepared from the subject matter to be processed. It is a requirement even in case of trainings starting with lectures that every participant is informed of the subject matter to be processed, while in case of the procedure called second type, the starting point is the preparation from sources provided in advance. We explicitly state that this training method is based only on the independent and individual gain of knowledge, meaning that besides the specific topic, the procedure prepares for independent gain of knowledge as well, which means that it contributes to the knowing and application of various methods of independent gain of knowledge. This training procedure prepares also for independent learning.

6. The basic types of workshops (1. and 2.) do not promote directly the improvement of personality, as the complete training does, because the application of knowledge is demonstrated by only a few people. There is no feedback, which would ensure a possibility for the acting person / people to evaluate their personalities or the improvement of their personalities; at the same time, however, the practice provides the fellows with information on the method of working and on the personality of the person completing the task. We have to express that workshops do not ensure a direct improvement of personalities, although they have an effect on the personalities of fellow students, because the implementation and nature of the practice mean a pattern to follow, based on the individual evaluation of the activity. So workshops only have a partial and indirect effect on the development and improvement of personalities.

Linked workshops (Type 3) however, provide a surplus in this regard, as most participants, hopefully all of them, conduct an application of knowledge, which ensures an opportunity to get a more complete picture on the development and improvement of the personalities. We have to state however, that, even in this case, we get a picture only on the development and improvement of narrower personalities that appear in elements, so workshops do not promote directly the development and improvement of personalities.

We can use tests to explore and strengthen traits of personalities required for tasks, the use of which can be well inserted particularly into linked workshops.

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