Approved by:
YSMU Foreign Students Educational and Methodological Council, Educational and Methodological Council of Pharmaceutical subjects by protocol N3, 23.02.2018 YSMU Methodological and Educational Council by protocol N4, 22.03.2018 Recommended for publishing by the Academic Council of YSMU after M. Heratsi by protocol N6, 30.05.2018


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This manual is for the foreign students of Pharmacy faculty. It is compiled in accordance to YSMU “Phytotherapy Program” for international students. It contains information about the treatment ways of several gastrointestinal, cardiovascular, urinary and respiratory system disorders as well as represents uses of several animal origin products. Etiotropic, pathogenetic and symptomatic ways of treatment are represented in this manual. This book will serve as a basic source of information for “Phytotherapy” course and proper material for exam.

UDC 615.322:582(075.8)

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INTRODUCTION

By WHO classification phytotherapy is a part of traditional medicine, as the results of WHO statistical analysis reveal, that 80% of world population uses natural origin traditional drugs. In Germany 50% of respondents prefers to be treated by natural origin drugs and only 20% considers, that chemical drugs are more effective.

Plant origin drugs have been used much more often in recent years. In 1997 only 14% of Europe population used plant origin drugs, and since 2005 about 55% have been using them. In European countries 20% of pharmacy products are of plant origin. The first places take Germany, France and Italy. In Armenia 20-30% of pharmacy products are of plant origin.

Most plant origin drugs are sold without prescription and are widely used by population even in case of self-medication.

Phytotherapy is considered to be safer and less toxic and not to cause serious side effects. In Soviet Union manuals brief descriptions of plants and their chemical compositions are represented. In those manuals no information about results of qualitative analysis, clinical and experimental studies are found. But for recent 20 years it has become more possible to find lots of articles about plant standardization, activity, safety and efficacy in scientific literature worldwide. And based on the analytical, clinical, pharmacological and toxicological data many standards, directories are created, which meet the needs of plant origin drug safety and efficacy. In European countries European Pharmacopea is periodically refreshed, unified articles about plant origin drugs safety and efficacy are published. Unfortunately these articles haven’t been evaluated by relevant authority in our country so far and drug efficacy and safety are estimated by Soviet Union literature, which is beyond of European standards. There are a lot of clinical and experimental studies, which describe toxicity of plant biologically active compounds. But these data are not unified and are not represented in Normative Technical Documents of those plants. This is why, the same plant, possessing a lot of side effects may be forbidden in one country, and can still be used in another one. Safety measures are very important especially for the plants, which embryotoxic, carcinogenic, hepatotoxic activities are experimentally proved. For example, Calamus, Coltsfoot, Comfrey and other plants are potential carcinogenic, but no definite standards of their use risk evaluation have been created so far. Toxic compounds contained in these plants are defined, but their maximal permissible densities (MPD) are not determined, so their safety is uncertain.

Anyway there are scientifically proved methods of plant safety evaluation. For example, in 1990 in Germany a drug from Gingko leaves extract was created in which MPD of ginkolic acids (which possess carcinogenic and mutagenic activities) was determined. The experiment reveals that, the amount of ginkolic acids in Gingko leaves should not exceed 5 mg/kg. That standard was created in 1995 and is valid so far.

E Committee was created by Germany Health Ministry for the objective estimation of plants’ therapeutic efficacy and safety. 299 plants were analyzed by E Committee. 191 out of which were allowed for medicinal use, and 108 of them were forbidden, due to the lack of clinical and toxicological studies. Nowadays safety and efficacy indications of plants are based on E Committee opinion and conclusions. The most attention is paid to the reduction of such plants usage, that contain toxic compounds. Much attention is also paid to medicinal and chemical drug combined use. In recent years lots of data have been obtained, stating, that some
medicinal plants change efficacy and safety of chemical drugs, impacting on their pharmacokinetics and pharmacodynamics. Interaction between medicinal plants and chemical drugs has a great practical meaning. According to scientific literature combined use of medicinal plants and chemical drugs in 16% of cases causes side effects. Nowadays 50 plants are described, to cause serious side effects, while being used with chemical drugs. Doctors often have to prescribe more than one drug including plant origin ones. Medicinal plants and chemical drugs can interact, which may lead to the chemical drug efficacy and safety change. Interaction, leading to the increase of chemical drug efficacy and safety, states rational combination of medical herb and chemical drug. Otherwise we deal with not rational combination. There is also potentially dangerous combination, when development of undesirable side effects increases. The following types of interactions between medicinal plants and chemical drugs are:

Pharmacokinetic interaction—plant impacts on chemical drug pharmacokinetics (absorption, distribution, metabolism, elimination), leading to drug concentration changes in blood plasma.

Pharmacodynamic interaction—medicinal plant impacts on pharmacodynamics of chemical drug without changing its concentration in blood plasma.

The latter is carried out by phytoning. Phytoning includes all the stages of plant origin drug creation—starting from the plant cultivation and ending with creation of unique plant origin drug, the efficacy of which is verified by clinical studies.
CHAPTER 1
1. MODERN TREATMENT AND THEORETICAL RATIONALE OF PHYTOTHERAPY. OPPORTUNITIES, LIMITATIONS AND CONTRAINDICATIONS OF PHYTOTHERAPY.

1.1. Definition and classification of herbal medicine

Herbal medicine is defined as a scientifically based method of treatment or prevention of illness with a use of the medicinal products obtained from plants (whole or partially) or their preparations in which complexes of biologically active substances are represented. Herbal medicine has the following means of treatment - etiotropic, pathogenetic, symptomatic.

Etiotropic treatment is directed on elimination of disease etiology. Pathogenetic means of herbal medicine is responsible for suppression or elimination of various mechanisms which have led to an illness development. Symptomatic one is used to weaken or completely eliminate separate symptoms of a disease.

Advantages and Disadvantages of herbal medicine

1.2. Advantages

1. Herbal medicines are very cheap in comparison to conventional form of medication
2. Herbal medicines can be consumed without prescription. They can be found very easily from a local drug store.
3. Herbal medicines are known to be more productive in comparison to other forms of medication in curing certain conditions
4. One of the greatest benefits associated with herbal medicine is fewer side effects.
5. Herbal medicines have a wide therapeutic range (the gap between therapeutic and toxic doses is very large) and a superior risk-to-benefit ratio. A number of recent published studies involving thousands of patients reveal that patient reports concerning adverse effects are close to those of placebo.
6. When given a choice, patients with above-listed conditions tend to accept them more readily than synthetic drugs, thereby increasing their compliance.

Although advantages dominate disadvantages, there are a few risks associated with herbal medicine as well. Let’s have a look at demerits.

Disadvantages of Herbal Medicines

1. Herbal medicines are known to be ineffective against serious ailments. Herbal medication cannot cure a broken hand, nor is it able to deal with heart attack. The same is about acute infections.
2. Although herbal medicines have the potential to cure many ailments, curing period is usually longer in comparison to conventional medication. One needs to have immense patience while undergoing herbal treatment.

3. Herbal medicines can cause allergic reactions and other side effects in some cases. Before resorting to herbal medication you need to ensure that a patient is not allergic to particular herb that is consumed. Conventional medication can also cause allergic reactions, but they are usually taken upon prescriptions which is why the chances of allergic reactions are less.

4. Diseases may be drawn out unnecessarily when self-prescribed herbal drugs are taken improperly.

2. MODERN PHYTOTHERAPY. PHYTOPREPARATIONS IN MODERN MEDICINE. STANDARDIZATION OF NATURAL ORIGIN DRUGS ACCORDING TO WHO DEMANDS. PRECLINICAL AND CLINICAL TESTING SYSTEM OF NATURAL ORIGIN DRUGS.

The use of drugs, and search for them, plant origin dietary supplements derived have accelerated in recent years. Pharmacologists, microbiologists, botanists, and natural product chemists are combing the Earth for phytochemicals and leads that could be developed for treatment of various diseases. In fact, approximately 25% of modern drugs used in the United States are derived from plants. At least 7,000 medical compounds in the modern pharmacopoeia are derived from plants.

A great variety of plants are used for medicinal treatments. Either a dried plant, or a specific part of it (root, leaves, fruit, flowers, seeds) is formulated into suitable preparations, i.e. compressed as tablets or made into pills, or used to make infusions (teas), extracts, tinctures, etc., or mixed with excipients to make lotions, ointments, creams, etc.

Few herbal drugs are subject to legislative control. Obviously control is needed for poppy capsules (which contain opium), belladonna, digitalis, nux vomica beans (which contain strychnine), and rauwolfia (which contains reserpine). Most herbal remedies are freely available, although rarely have any been investigated with thoroughness of orthodox medicines. The claims made for many herbal remedies are for trivial or minor ailments.

Due to the restrictions of legal claims concerning efficacy, herbalists claim to treat person as a whole to restore normal physiological balance, rather than to treat or cure a particular medical illness. Activities of herbal medicines are often described in very general terms — such as carminative, laxative, demulcent, antitussive, expectorant, sedative, antiseptic, or astringent. Unlike orthodox medicine, which usually consists of a single, isolated principle (often synthetic), plants or plants extracts of contain multiple constituents, not all of which are active. Herbalists often claim that admixture of multiple components leads to synergism between active moieties. Similarly, many consider that since plants are natural materials they are safer and produce fewer side effects than synthetic drugs. There is little evidence or reason in either of these claims. For example, comfrey (Symphytum officinale) is considered to be a safe one and is used as a demulcent. However, it contains pyrrolizidine alkaloids, which are toxic to liver and can cause liver cancer. Media attention can often cause a major increase in the
demand and use of herbal drugs, for example, evening primrose oil, feverfew, ginko biloba, and ginseng.

One of the problems with herbal drugs, especially those with active principles having well-defined medicinal effects (e.g. digitalis), is that the amount of active principle varies according to plant growing location, the prevailing weather conditions, etc. So according to these instances it is vital, that crude material is assayed appropriately so that the dosage can be accurately controlled, especially in case of low therapeutic ratio.

From time to time new drugs are discovered from herbal sources — for example, taxol, derived from the yew, is an important drug for types of cancer. The active principle is extracted and purified from plant material for as long as that process remains economically viable compared with chemical synthesis.

The practice has existed since prehistoric times and flourishes today as the primary form of medicine for perhaps as much as 80% of the world's population. Over 80,000 species of plants are in use throughout the world. Along with acupuncture, herbal medicine is considered primary health care in China, where it has been in documented use for over 2,500 years.

Herbs may be used directly as teas or extracts, or they may be used in drug production. Approximately 25% of the prescription drugs sold in the United States are plant based. Many more herbal ingredients are present in over-the-counter drugs, such as laxatives. Medicines that are derived from plants include aspirin from willow bark (Salix species) and digitalis from foxglove (Digitalis purpurea).

Scientific interest in herbal medicine in the United States has lagged behind that of in the countries of Asia and W Europe; in Germany, for example, one third of graduating physicians have studied herbal medicine. Besides a comprehensive therapeutic guide to herbal medicines has been published there. Nonetheless, millions of people in the United States use herbal products to treat a wide variety of ailments or to enhance health.

Among the most popular remedies used are ginseng, to increase stamina and as a mild sedative; St.-John's-wort, for mild depression; echinacea, to aid the immune system and alleviate colds; kava, to calm anxiety and treat insomnia; saw palmetto, for enlarged prostate; and ginkgo biloba, to improve short-term memory (see ginkgo). Some people have used botanicals in an attempt to stave off serious illnesses such as AIDS. This widespread use has prompted demands that herbal remedies be regulated as drugs to insure quality standards. The U.S. Food and Drug Administration (FDA) can require a clinical trial on any herb that has a health claim on its label, but medical testing, which is geared toward observing a particular active component, is difficult to apply to herbs, which may have many interacting ingredients. Debate over botanicals' validity and safety as medicines and over the appropriate degree of government regulation continues. The Dietary Supplement Health and Education Act, passed in 1994, reclassified herbs as dietary supplements rather than food additives. It forbids unreasonable health claims by the manufacturers, but makes it the FDA's responsibility to prove that a marketed product is unsafe. (In contrast, in prescription and over-the-counter drugs, it is the manufacturer's responsibility to prove safety and effectiveness before a drug can be marketed.)

With only a few exceptions, most herbal treatments have not been tested for safety and efficacy utilizing scientific studies or clinical trials. So they should be consumed only by health care provider's prescription.
3. BIOLOGICALLY ACTIVE COMPOUNDS

Pharmacologically (biologically) active substances - PAS – these are those substances that cause a specific therapeutic effect on the human and animal organisms of. A complex of PAS is contained in plants, identifying the therapeutic effect of the plant.

PAS are mainly secondary synthesis substances, but primary synthesis ones can also be pharmacologically active, for example, some carbohydrates, lipids, all vitamins.

The compounds of primary synthesis are proteins, carbohydrates, lipids, enzymes, vitamins and hormones.

The compounds of secondary synthesis are - terpenoids or isoprenoids (volatile oils, steroids, iridoids, resins and balsams), carotinoids, organic acids, alkaloids, glycosides, phenolic compounds (coumarines and their derivatives, flavonoids, antraquinone derivatives, tannins) and many other compounds, that when accumulated in plants stipulate their feature: taste, odor, pharmacological activity. The compounds of secondary synthesis and only few compounds of primary synthesis, such as carbohydrates, lipids and vitamins, are studied during the course of phytotherapy.

Carbohydrate (starch, inulin, mucilage, gums, pectins, cellulose)
2. Lipids and lipid compounds
3. Vitamins
4. Terpenoids or isoprenoids (acyclic monoterpenes, monocyclic mononterpenes, bicyclic monoterpenes, sesquiterpenes, aromatic terpenes, resins and balsams)
5. Glycosides (cardiac glycosides, saponins, bitter glycosides, cyanic glycosides and others)
6. Phenolic compounds and their glycosides (simple phenols, phenolic acids, phenolic alcohols, phenyl acetic acid, coumarines, furocoumarines, chromones, lignans, antracene derivatives and their glycosides, tannins)
7. Medical plants and raw material of different chemical content and little-studied ones.
8. Medical plants and raw material used for their technical properties

4. COLLECTIONS (COMBINED FORMS) AND TEAS

General rules for preparation and administration

- *Tea mixtures: Before usage* shake the container holding tea mixture to ensure the equal distribution of all components.
- *Herbal teas containing essential oils:* Crude drugs (fruit or seeds such as fennel) should be chopped or crushed just before the usage.

The caking of hygroscopic preparations such as water-soluble (instant) teas makes it impossible to measure the preparation accurately. Therefore, the spoon used to remove tea granules or powder should be completely dry and the container should be immediately recapped. In North America, instant tea powders are mostly available only for Chinese herbs, and most extract powders are in capsules or tablets for ease of usage.
**Tea preparation**

– *Infusion*: Pour boiling water into the required amount of the herb, cover, and leave to steep for 10 to 15 minutes, then strain. A dose of 1 teaspoon herb per cup (150 mL) of water is generally recommended.

– *Decoction*: Pour cold water into the required amount of the herb, boil, then cover and leave to simmer for 10 to 15 minutes. Remove from heat and leave to stand for a few moments, in some cases up to 10 minutes if a slightly stronger preparation is desired, then strain. Tea can be stored safely in the refrigerator, for several days then warmed at the time of consumption.

  A dose of 1 teaspoon herb preparation per cup (150 mL) of water is generally recommended.

– *Maceration (cold extract)*: Pour cold water into the comminuted herb. A dose of 1 teaspoon herb per cup (150 mL) of water is generally recommended.

  The herb–water mixture is left at room temperature for 5 to 8 hours, stirred occasionally, then strained. Because of bacteria and molds rapid spread, teas prepared by maceration may be briefly boiled before consumption, though the use of sanitary utensils and refrigeration of tea mixture for up to 3 days in the refrigerator makes this mostly unnecessary.

  Make sure utensils are clean.

**Combined forms of preparation**

– Recommended for the preparation of tea mixtures containing certain constituents that should preferably be extracted with cold water and while others should be extracted with boiling water.

– A dose of 1 teaspoon tea mixture per cup of water is generally recommended. Half the required water amount is poured onto the full dose of the tea mixture, which is then left to steep for 5 to 8 hours and finally strained. The rest part of the water is later boiled and poured onto the herbs caught in the tea strainer, then added to the cold extract.

**General tips**

– Medicinal teas should be prepared in a non-metallic receptacle such as a glass coffeepot or teapot. Teapots with a lid are preferable.

– The tea should be stirred occasionally while steeping, then pressed against the tea strainer when finished.

  Teas for colds and flu should be sweetened with honey, whereas those for gastrointestinal, liver, and biliary complaints are ideally taken unsweetened.

  Use only as much sweetener for these herbs as it is necessary to take them regularly, because bitter taste enhances the therapeutic action.

  Diabetics should use a sugar substitute.

– Special tea cups with a tight-fitting lid should be used to reduce the loss of volatile constituents by evaporation.

**Dosage**

– *Adults*: 1 teaspoon of herb per 150 mL (5 ounces) of water.

– *Children up to 10 years of age*: 1 teaspoon of herb per 250 mL (8 ounces) of water.

– *Children up to 1 year of age*: 1⁄2 teaspoon of herb per 250 mL of water.

– Daily dose: 2 to 3 cups per day, sipped slowly.
Certain tea preparations should not be administered to children. The patient or guardian should always read the product label and, if uncertain, ask a pharmacist or herbalist. Certain medicinal teas can produce side effects when overdosed.

**Usage duration**
- Medicinal teas should generally be taken for 4 weeks. Afterwards, the patient should discontinue the tea for 4 weeks or consume another tea with similar effects.
  
  *Exceptions:* St. John’s wort or hawthorn teas, which must be used for at least 3 months. Many “tonic” teas recommended by a licensed traditional Chinese medicine practitioner are taken for several months or more, depending on the patient’s response, although the formula is often changed regularly.

### 5. PHYTOTHERAPY IN PEDIATRICS. THE MAIN PRINCIPLES OF PHYTOMEDICINES PRESCRIPTION

In general, phytomedicines for children essentially doesn’t differ from herbal medicine for adults. However there are some features about which it is necessary to know during administration of those or other herbs even if they are released in a drugstore without prescription:

1. In pediatric practice only officinal herbs must be used, and the prescriptions have to be approved scientifically
2. Herbs are prescribed to children individually taking into account therapeutic action and possible contra-indications.
3. The mixtures composed from 2-3 plants are used and the mixtures with more difficult structure are rare.
4. The dose of medical tincture, extract for children makes 1-3 drops for a year of life for one intake. The tincture of a ginseng is not recommended for children to 7-year-old age, and to children of 1 year of life — all spirit tinctures.
5. In pediatrics the herbal juices are used more frequently.
6. In case of raw material possible choices with similar pharmacological action in children’s practice it is preferable to supply fruits. Fruits, as a rule, contain pectins which form sparingly soluble complexes with active ingredients, from which their active ingredients are released slowly, thus they act more softly and prolonged.

Although the herbal medicine is useful and popular, there are several side effects of herbal preparations. In clinical practice were the cases when phytopreparations caused various complications and even with a lethal outcome. Therefore it is necessary to define restrictions and contra-indications to herbal medicine in children. They are:

1. Individual intolerance to a phytopreparation;
2. Severe cases and diseases demanding urgent therapy;
3. Use of the herbs which are not included in the State Register of medical products;
4. Poisonous and highly effective plants are contraindicated for children under 14, and in all other cases the dose should be reduced;
5. The preparations obtained from plants that may cause allergic reactions are contraindicated for allergic children;
6. The plants influencing endocrine system should be prescribed carefully. For example, the plants raising estrogenic background are not beneficial in case of long application to girls till the puberty period, and the preparations of a ginseng rendering gonadotropic action — during all period of the childhood;

7. In pediatrics it is undesirable to prescribe plants containing antraquinones (cascara, senna etc.) because of possible irritation and carcinogenic action.

As the general issue of phytotherapy is dose correlation, in pediatrics the dosage of herbal preparations will be more important than for adults. Here are some examples of dosage. So, following daily doses of dried crude drug are recommended for children.

- under 1 year — 0,5-1 teaspoon;
- from 1 till 3 years — 1 teaspoon;
- from 4 till 6 years — 1 dessertspoon;
- from 7 till 10 years — 1 table spoon;
- more than 10 years — 1-2 tablespoons.

The following daily doses of infusions from made from crude drugs are recommended for children of various age:

- under 2 years — 30 mL;
- from 3 till 4 years — 40 mL;
- from 4 till 7 years — 60-70 mL;
- from 8 till 12 years — 70-100 mL;
- is more senior 12 years — to 200 mL;

The daily dose must be divided into 3-4 intakes.

6. PHYTOTHERAPY IN GERIATRICS. THE MAIN PRINCIPLES OF PHYTOMEDICINES PRESCRIPTION.

In recent years the preparations of herbal origin are more widely applied particularly in treatment and preventive maintenance of various diseases in people of elder and senile age. The reason is that, as a rule, the preparations of herbal origin combine a wide spectrum of biological activity and harmlessness. It is especially important in the treatment of chronic diseases requiring long-term rehabilitation of patients, which is extremely actual in geriatrics.

The role of phytotherapy in geriatrics is defined by the structure of diseases in elder and senile age patients, where the prevalence of cardiovascular system, nervous system, digestive organs, kidneys and urinal tract disorders are detected.

Other important sign to consider in geriatric practice is the plurality of pathology, so that the whole "bouquet" of illnesses can be revealed in elder patients. Therefore a particular interest determined according to complex herbal preparations combining a wide spectrum of action and "softness" of therapeutic activities.

Potentially effective and rather safe herbs in geriatrics can be divided into 3 groups

1. Officinal herbs, except poisonous or highly effective plants.
2. The herbs popular in national medicine
3. The herbs popular in foreign scientific medicine.

One of the major groups of medical products in geriatrics are phytopreparations with tonic actions, it means the adaptogenic properties are especially important, because it is known that at a growing old organism decrease it’s adaptable possibilities. The most valuable in this case is a prescription of such medical products, as tincture of a ginseng and others adaptogenes. It is necessary to know that these preparations possess not only toning up, but also immune modulating, hypoglycemic and antistress actions.

The use of herbal medicine for treatment of diseases of digestive organs is approved by the constituent of following substances flavanoids, carotinoids, polysaccharides e.t.c which possess antibacterial, antispasmodic, hepatoprotective actions.

The good effect is given also by plants during the treatment and prevention of cardiovascular pathology, kidney urinary tract diseases, especially against an immunodeficiency, and the diseases connected with infringement of a metabolism as it is native for the patients of elder age.

Sample tests

Mention the main risks of phytotherapy
1. herbal medicines may be used instead of other remedies which efficiency and safety have been tested
2. all herbal remedies are contraindicated during pregnancy
3. due to misunderstandings in the composition of phytoremedies they may be harmfull
4. due to the lack of information about many herb’s composition and biochemical effects

a) 1.2.3.4
b) 1.2.3
c) 2.3.4
d) 1.3.4

right answer: d

All following ways of treatment are parts of phytotherapy except.

a) symptomatic
b) homeopathic
c) ethiotropic
d) pathogenetic

right answer: b

The pathogenetic part of phytotherapy is based on following.

a) weakening and eliminating the symptoms of disease
b) enhancing the resistance of human body
c) the elimination of the reason of illness
d) suppression of various mechanisms of the development of illness

right answer: d

Mention the features of phytotherapy in pediatrics

1. the used mixtures have to be simple (2-3 compounds)
2. the preferred raw materials are fruits
3. the complicated mixtures have to be used because of bouquet of illnesses
4. only officinal plants may be prescribed
a)1.2.4
b)3.4
c)2.3.4
d)1.3.4
right answer: a

The most preferable group of plants in phytotherapy in geriatrics possess following activities:

a) astringent
b) expectorant
c) laxative
d) adaptogenic

right answer: d
2. PHYTOTHERAPY IN CARDIOVASCULAR DISEASES

2.1. Heart failure

In heart failure, the heart is unable to maintain adequate circulation because of decrease in heart muscle function (cardiac output) resulting from cardiac myocyte death. The main causes are hypertension with increased venous pressures or cardiac volumes, valvular defects, and ischemia due to sclerotic coronary artery disease.

- The body attempts to compensate for the circulatory deficiency by stimulating mechanisms such as the sympathetic nervous system and by narrowing the blood vessels, resulting in a higher workload on the heart. Additional compensatory mechanisms lead to a further decrease in cardiac performance.
- Effective treatment measures should be initiated as early as possible to prevent the progression of heart failure.

**Classification:**

According to the system of the New York Heart Association (NYHA), heart failure is divided into four clinical stages:

- NYHA I: Symptoms do not occur during normal physical exercises.
- NYHA II: Symptoms occur during more strenuous exercises.
- NYHA III: Symptoms occur during light exercises.
- NYHA IV: Symptoms occur even at rest.

**Clinical value of herbal medicine:**

Hawthorn and digitaloid herbs are used in NYHA I and II. The current knowledge does not support treatment of NYHA III and IV by herbal remedies.

**Recommended Herbal Remedies**

Flavonoid-containing Herbs

**Hawthorn fruit, leaf and flower**

(Crataegie fructus, folium cum flore)

Many species of hawthorn are distributed throughout the moderate zones of the Northern Hemisphere. The usage of its leaves and flowers as a remedy for heart disorders dates back to the nineteenth century.

**Active compounds:** Flavonoids (1.8 %) such as hyperoside (0.28 %), rutin (0.17 %), and vitexin (0.2 %), and oligomeric procyanidins (2–3 %).

**Pharmacological properties:** The procyanidins and flavonoids in hawthorn determine its therapeutic action. Procyanidins enhance the influx of calcium into cardiac muscle fibers, only moderately increasing the oxygen demand. These compounds widen the coronary arteries and other cardiac vessels, thereby extending the refractory time. This results in an antiarrhythmic effect. These substances increase coronary blood flow and dilate blood vessels, thereby enhancing myocardial circulation and perfusion. The herb has positive inotropic, chronotropic and dromotropic effects, and improves the tolerance to hypoxia. The cardiotonic effects of *Crataegus* are attributed to an increase in the membrane permeability to calcium ions and an increase in the intracellular cyclic AMP concentration. Altogether, this makes the heart work more economically.
**Indications**
- Supportive treatment for heart failure (NYHA class I–II)
- As a strengthening tonic for prevention of heart irregularities and congestive heart failure

**Contraindications:** None known.

**Adverse effects:** There are not any side effects if therapeutic doses are administered.

**Advantages of hawthorn**
Effective and well-tolerated in the early stages of heart failure, especially in patients with age-related degenerative changes in the heart muscle. With a high rate of acceptance by patients, hawthorn leaf and flower have only few side effects. Since flavonoids do not reduce the afterload, hawthorn can also be used by patients with low blood pressure. Hawthorn can be recommended for long-term use, and may be combined with cardiac glycosides, but may have a synergistic effect. This potential interaction should be watched. It may allow a reduction in medications like digoxin while maintaining the same overall therapeutic effect.

**Dosage and administration:** One oral dose, 2 to 3 times daily. Relatively large doses over time are needed for sufficient effects. A daily dose of ca. 900 mg hawthorn total extract is generally recommended. Tea infusion is not the best way to extract water-soluble compounds from hawthorn. Hawthorn tea therefore has only weak effects and cannot be recommended only for a health-promoting effect in the very early stages of cardiac insufficiency, or as a long-term preventative means.

Digitaloid Herbs

**Adonis** The aerial plant parts of *Adonis vernalis* L. are used in medicine.

*Active compounds:* Flavonoids and cardiac glycosides.

*Pharmacological properties:* Glycosides have a positive inotropic action.

**Indications**
- Heart failure (NYHA classes I–II)
- Cardiac arrhythmia
- Nervous heart disorders

**Contraindications:** Pregnant or nursing mothers, children under 12 year old, and individuals, who are hypersensitive to digitaloid drugs should not use adonis.

**Dosage and usage duration**

*Daily dose:* Mean 0.5 g, maximum 3 g.

**Adverse effects:** Vomiting, diarrhea, headache, loss of appetite, gynecomastia.

Signs of overdose range from mild cardiac arrhythmias to life-threatening ventricular tachycardia, atrial tachycardia with AV block, stupor, confusion, hallucinations, impaired vision, depression, and/or psychoses. Adonis poisoning is rare since the oral absorption rate is low.

**Lily-of-the-valley** The dried, cream-colored petals and flower heads, leaves and herb are used in medicine. The plant was originally native to Europe, but was later introduced to North America and Northern Asia.

- **Herb:** Lily-of-the-valley herb (*Convallariae herba*). The herb consists of the aerial parts of *Convallaria majalis* L. or closely related species, collected during the period of flowering.
- **Active compounds:** Cardiac glycosides (cardenolides, 0.1–0.5 %). Depending on its type, the herb may also contain convallatoxin (Western and Northwestern Europe) or
Convalloside (Northern and Eastern Europe) or convallatoxin and convallatoxol (Central Europe).

Pharmacological properties: The glycosides in Convallaria have effects similar to those of digitoxin and strophanthin. The herb increases the contractile force and velocity of the myocardium while extending the relaxation time. It also reduces heart rate, slows stimulus conduction, and increases the excitability of ventricular muscles (positive inotropic, negative chronotropic, negative dromotropic, and positive bathmotropic effects). Lily-of-the-valley was found to have diuretic, natriuretic, and vasoconstrictive effects in animals.

Indications
– Heart failure (NYHA classes I and II)
– Cardiac arrhythmias
– Nervous heart disorders

Contraindications: Hypokalemia, hypercalcemia

Dosage and usage duration: All specifications refer to standardized lily-of-the-valley powder.
– Tincture (1:10): Single dose, 2.0 g; daily dose, 6.0 g.
– Fluid extract (1:1): Single dose, 0.2 g; daily dose, 0.6 g.
– Dry extract (4:1): Single dose, 0.05 g; daily dose, 0.15 g.

Adverse effects
– The side effects caused by therapeutic doses of plants are not known. Overdose can induce nausea, vomiting, headaches, stupor and cardiac arrhythmias and can impair color vision.
– The risk of lily-of-the-valley poisoning followed by oral administration of the herb is relatively low because only small quantities of the glycosides are absorbed.

Warning:
All digitaloid preparations can be toxic (similar to the glycosides digoxin and digitoxin), producing symptoms such as nausea, vomiting, stomach complaints, diarrhea, and cardiac arrhythmias.

Combinations of Flavonoid and Digitaloid Herbs
Advantages
The tolerance is said to be better than that of preparations containing digitaloid herbs alone.

Disadvantages
Their therapeutic range is smaller than that of pure hawthorn preparations, and their toxic effects are similar to those of digitaloid drugs.

2.2. Atherosclerosis

– Half of all mortality in many countries is attributed to atherosclerosis, a disease in which the walls of the arteries degenerate progressively over the course of several decades. Free radicals of oxidized lipoproteins have been implicated as cofactors in the etiology of atherosclerosis.
Individuals with high serum cholesterol levels and LDL: HDL ratios of more than 4.0 have a particularly high risk of developing atherosclerosis. This constellation is mostly prevalent in men of all ages and in postmenopausal women.

**General treatment means:** Dietary means are the first and foremost treatment measures. The patient should be placed on a reduced fat diet and use dietary fats high in polyunsaturated or monosaturated fatty acids (e.g., olive oil, flaxseed oil), as well as fatty fish with DHA and EPA (salmon, halibut). Foods with both added refined sugar and saturated fatty acids should be strictly avoided. Therapy should be combined with regular aerobic exercise for best results, according to recent research.

**Clinical value of herbal medicine**

- Herbal medicinal preparations play an especially important role in prevention.
- Their therapeutic action is directed against important mechanisms involved in the development of atherosclerosis.
- The herbal drugs have a very low incidence of side effects and can be recommended for medically supervised self-treatment.

**Recommended herbs**

- Plants, which inhibit absorption of cholesterol
- Steroidal saponins and sterins containing plants (Dioscorea nipponica)
- Plants which inhibit synthesis and utilization of endogenous cholesterol and triglycerides
- Damarane-type triterpenoidal saponins, steroidal saponins, polysaccharides (Ginseng root, Aralia root, Eleuterococcus root, Plantain leaves).
- Lignan-containing plants such as Schizandra seeds and fruits.
- Plants, which activate metabolism and increase elimination of cholesterol and triglycerides.
- Different types of oils such as Sunflower oil, Olive oil, Sea buckthorn oil contain unsaturated lipid acids, which activate metabolism. The same action possess some other plants such as Rose hips, Fennel seeds, Parsley fruits etc.
- Plants which stimulate bile secretion increase elimination of cholesterol
  - Everlasting flower, Centaury, Sweet corn, Chicory, Milk thistle etc.

The role of garlic is irreplaceable in the treatment of atherosclerosis.

**Garlic cloves** (Allii sativi bulbus)

Garlic is an ancient culinary and medicinal herb, the bulbs of which are used in medicine.

**Pharmacology**

- **Crude drug:** Garlic (Allii sativi bulbus). The herb consists of the fresh or dried bulbs of *Allium sativum* L., which consist of a main bulb and several daughter bulbs.
  - Active compounds: Alliins (ca. 1 %), propenylalliin (ca. 0.2 %), methylalliin, and alliaceous oils (allicin and ajoene).
  - **Pharmacological properties:** Garlic is antimicrobial, antilipemic, vasodilatory, antioxidant, and fibrinolytic, and inhibits platelet aggregation. Clinical studies demonstrated that the herb inhibits platelet aggregation, increases the bleeding and coagulation times, lowers serum lipids in some individuals, and enhances fibrinolytic activity.

**Indications:** The following indications are recommended in the monographs:

- Prevention of arteriosclerosis
– Hypertension

**Contraindications:** Not known.

**Dosage and usage duration:**
– *Daily dose:* 4 g fresh garlic, that is, 1 to 2 fresh garlic bulbs per day or the corresponding dose of a commercial preparation. Garlic must be crushed to release allicin immediately before it is used in any way.

**Side effects:** There are not known side effects if therapeutic doses of herb are administrated. Consumption of large quantities of garlic can irritate the stomach.

**Herb–drug interactions:** There is a little possibility of interaction with blood thinning medications such as dicoumarol.

**Warning:** Avoid of garlic usage for approximately 1 week before and after major surgery.

### 2.3. Hypertension

**General considerations and classification**

– Hypertension is defined by the World Health Organization (WHO) as systolic blood pressure > 139 mmHg and/or diastolic pressure > 90 mmHg.

– *Classification according to severity:*
  • First degree: 140–159/90–99 mmHg
  • Second degree: 160–179/100–109 mmHg
  • Third degree: ≥180/≥110 mmHg
  • Isolated systolic hypertension: ≥140/＜90 mmHg

– Arterial hypertension can be found in 25–30 % of the population. The incidence increases with age.

**General treatment means:** Lifestyle changes should be carried out before initiation of therapy (e.g., endurance sports, dietary measures such as reduced refined fat and sugar intake, weight and stress reduction).

**Clinical value of herbal medicine**
– Although a number of very safe and effective synthetic drugs are available, the patient compliance rates with these drugs are rather low.

– Although few study data are available on herbal anti--hypertensives, and although they tend to be low-potency medications, many European patients request them.

– We feel that medically supervised attempts to manage hypertension using herbal preparations are justifiable in the initial stages of the disease. Moreover, herbal preparations make it easier for relatively young and older patients to accept the lifelong need for treatment.

**Recommended Herbal Remedies**

**Sympatholytics**

**Rauwolfia** (Rauwolfia serpentine)

Rauwolfia is native to Southeast Asia, where the root is used to treat insect bites, snake bites and diarrhea and may be used as a sedative.

**Pharmacology**
– *Crude drug:* Rauwolfia root (Rauwolfiae radix). The herb consists of the dried roots of *Rauwolfia serpentina* (L.).
Active compounds: Indole alkaloids (1–2.5%) including reserpine, serpentinine, raubasine, and ajmaline.

Pharmacological properties: Reserpine and other rauwolfia root alkaloids induce sympatholytic effects by depleting the stores of norepinephrine and inhibiting its reabsorption at the nerve endings, thus inducing blood pressure reduction. Ajmaline has membrane-stabilizing and antiarrhythmic effects. A central sedative effect was observed in animals.

Indications
– Hypertension
– Nervousness and insomnia

Contraindications: Depression, ulcers, pheochromocytoma, pregnancy, breast feeding.

Dosage and usage duration: Daily dose of 600 mg herb, equivalent to a total alkaloid content of 6 mg. Rauwolfia can be taken for several years.

Side effects: Stuffy nose, depressive mood, tiredness, reduced potency. Rauwolfia can impair the responsiveness to external stimuli, thus impairing one’s ability to drive a motor vehicle or operate machinery.

Herb–drug interactions
– The responsiveness to external stimuli slows down considerably when rauwolfia is used in combination with alcohol.
– Combination with neuroleptics and barbiturates leads to a mutual increase in potency.
– Combining rauwolfia with digitalis glycosides results in severe bradycardia.
– Rauwolfia decreases the potency of levodopa while causing an undesirable increase in extrapyramidal and motor symptoms.
– When combined with sympathicomimetics (contained in cold and flu remedies, for example), it can cause a large initial increase in blood pressure.

Rauwolfia is used rare owing to its numerous side effects.

Vasodilators

Garlic cloves (Allii sativi bulbus) and Hawthorn fruits, flowers and leaves (fructus, folia et flores Crataegi) see heart failure.

Drugs with Unclear Effects

Mistletoe (Visci albi herba). The medicinal use of mistletoe dates back to the pre-Christian era. The plant grows mainly in Europe.

Mistletoe Herb (Visci herba)

Pharmacology: Mistletoe herb consists of the leaves, fruit, and flowers on the fresh or dried young branches of Viscum album.

Active compounds: Lectins (glycoproteins with an 11% carbohydrate fraction) and mistletoe lectin (ML) 1 (ML1, VAA-1, viscumin), ML2 and ML3.

Action: The antihypertensive constituents in aqueous mistletoe extracts have not yet been identified. They are said to reduce occasional symptoms such as headaches, dizziness, restlessness, nervousness, and reduced exercise tolerance.

Dosage and administration
**Tea**: Add 1 cup of cold water to 2.5 g (1 teaspoon) of finely chopped herb, and leave at room temperature for 12 hours, then strain.

**Dosage**: One to two cups per day. Tincture (1 : 1) 20 to 30 drops, several times daily.

### 2.4. Hypotension

**General characteristics**

- Hypotension is defined as a chronic reduction in systolic blood pressure to <100 mmHg.
- *Primary hypotension* is common, it is clinically significant only in case of severe symptoms. The causes of hypotension are unknown. Fatiguability and orthostasis are typical symptoms.
- *Secondary hypotension* is rare. It may be a result of cardiac or adrenal insufficiency, or as the result of liver disease or cancer. The causes of the disease should be treated, when possible. No clinical data on herbal treatment of hypotension are currently available.

**Clinical value of herbal medicine**

- Primary hypotension can usually be managed by nonpharmaceutical measures, such as exercise and physical therapy. There is no point in prescribing medications unless a patient recovers from surgery or is under great physical and mental stress.
- Herbal remedies for primary hypotension are low-side-effect alternatives to synthetic drugs and chemical remedies, which often fail to provide satisfactory results, especially in long-term treatment. The herbal remedies are safe to use for self-treatment. Clinical studies are not available.

**Recommended Herbal Remedies (Overview)**

**External Remedies**

**Rosemary leaf** *(Rosmarini folium, Rosemary has been used as a medicinal herb since ancient times. Its leaves are used in herbal medicine.)*

*Action*: The essential oil in rosemary leaves stimulates the blood flow and has central analeptic effects attributed to the compounds camphor and cineol.

A circulatory tonic effect of the herbal remedy has been empirically demonstrated.

*Contraindications*: Pregnancy.

*Dosage and administration Tea*: Steep 2 g (ca. 1 teaspoon) of the finely chopped herb in boiled water for 25 minutes and strain.

- **Dosage**: One cup, several times a day.
- **Daily dose**: 4–6 g herb.
  - **Internal use**: As they contain higher concentrations of the essential oil, alcohol extracts are more effective for treating circulatory complaints than the tea.
  - **External use**
    - Semisolid and liquid analgesic preparations containing 6–10 % essential oil: Apply 2 to 3 times daily.
    - **Bath additive**: Infuse 50 g of the herb in 1 liter of water. Add to bath water or use to make a sitz bath.
Steep 50 g of rosemary leaf in 1 liter of boiled water for 30 minutes, then strain and add to full bath or hip bath. Bathe for 10 minutes at 34–36 °C after getting up in the morning and rest for 1 hour afterward.

**Adverse effects**
- Contact allergies have been observed as an occasional side effect. Pregnant women should avoid rosemary.
- Very large quantities of rosemary leaves are considered to cause deep coma, convulsions, vomiting, gastroenteritis, uterine bleeding, kidney irritation and in severe cases, cause pulmonary edema and death. However, no exact cases of its have been reported.

**Herb–drug interactions:** Can accelerate the metabolism of some pharmaceutical medications when taken concomitantly.
- **Contraindications:** Heart failure.
- **Dosage and administration:** Steep 50 g of rosemary leaf in 1 liter of boiled water for 30 minutes, then strain and add to full bath or hip bath. Bathe for 10 minutes at 34–36 °C after getting up in the morning and rest for 1 hour afterward.

**Note:** Rosemary baths are stimulating, they should not be taken before retiring at night.
Tonic plants such as Ginseng, Eleuterococcus, Rhodiola, Schizandra also can be used to increase blood pressure.

### 2.5. Circulatory Disorders

- The incidence of peripheral and/or cerebral circulatory disturbances is growing since the average age of the population is increasing in many states.
- Peripheral vascular disease (PVD) is characterized by the development of arteriosclerotic vessel changes, especially in the extremities. Low-density lipoprotein (LDL), elevated cholesterol levels, the coagulatory system, and platelet function play a decisive role in these changes. Their interactions are responsible for the deposition of arteriosclerotic plaques on blood vessel walls. This ultimately leads to narrowing and occlusion of the blood vessels.

Since this is related to an oxygen deficiency, larger quantities of free radicals develop and damage the vessel walls by way of oxidized LDL.

**General treatment means**
- It is essential to eliminate the risk factors (e. g., smoking and lack of exercise) and to ensure optimal management of diabetes, elevated serum lipid levels, and arterial hypertension.
- Regular physical therapy and physical exercise are achieved in only one third of all patients with peripheral vascular disease because of concomitant cardiological or orthopedic diseases and/or lack of motivation.

**Clinical value of herbal medicine:** *Ginkgo biloba* extracts are useful alternatives to the corresponding synthetic drugs and chemical remedies.

**Recommended Herbal Remedies**

**Symptomatic Treatment** *Ginkgo leaf* (Ginkgo bilobae folium)

**Pharmacology**
- **Crude drug:** Ginkgo leaf (Ginkgo bilobae folium). The herb consists of the dried leaves of *Ginkgo biloba* L. and preparations of the same. **Important constituents:** Flavonoids (0.5–1.8
%, including quercetin biosides, monosides, and triosides, isorhamnetins, and 3’-O-methyl
myristicins as well as biflavonoids (0.4–1.9 %), proanthocyanidins (8–12 %), diterpenes (0.06–
0.23 %; ginkgolides A, B, C), and sesquiterpenes (bilobalide, 0.04–0.2 %).

Pharmacological properties:

Action:
• Positive rheological effect (reduction of erythrocyte and platelet aggregation)
• Inhibits free radical production
• Increases prostacyclin synthesis
• Antagonizes platelet-activating factor (PAF)
• Neuroprotective
• Improves cellular energy metabolism

Ginkgo has antioxidant and membrane-stabilizing activity and improves the circulation.
In addition, it increases cerebral tolerance to hypoxia, reduces the age-related reduction of
muscarinic choline receptors and α2-adrenoceptors, and increases the hippocampal
absorption of choline. In animals, bilobalide and ginkgolides were found to improve the flow
capacity of the blood by lowering viscosity, inactivating toxic oxygen radicals and improving
the circulation in cerebral and peripheral arteries. The herb inhibits the development and
promotes the elimination of cerebral edema, improves the utilization of ATP and glucose, and
stabilizes the cell membranes. Clinical, controlled double-blind studies in humans have
confirmed the results of animal experiments (ginkgo was found to improve the memory
capacity and microcirculation and reduce the viscosity of plasma).

Indications
– Circulatory disorders (peripheral artery occlusion, especially intermittent claudication,
  for which some controlled studies reported a benefit).
– Memory enhancement in young people or people with no preexisting memory
  impairment has been suggested, with both positive and negative recent clinical trials, but this
  remains controversial.
– For symptomatic treatment of cerebro-organic impairment of mental performance.
  (Controlled studies showed modest, but statistically significant positive results for
cerebral insufficiency. Several reports have indicated modest benefit in controlled studies for
Alzheimer’s and non-Alzheimer’s dementia.)

Contraindications: Hypersensitivity to ginkgo preparations.

Dosage and usage duration
– For decreased mental performance: Oral daily dose: 120–240 mg of a specially
  formulated, standardized Ginkgo biloba extract (GBE; 24 % flavone glycosides, 6 % terpenoids),
  divided into 2 to 3 portions, to be taken for a period of at least 12 weeks. Thereafter, treatment
  should be continued after a positive assessment result.
– For peripheral artery occlusion, vertigo, and tinnitus: 120–160 mg GBE per day. Used
  for 6 to 8 weeks for treatment of vertigo and tinnitus; longer use is only justified if some
  improvement can be registered. According to some studies use for at least 3 months is necessary
  for full effect.

Side effects: Mild gastrointestinal complaints, headaches, and allergic reactions are very
rare side effects.
**Herb–drug interactions:** May potentiate anticoagulant activity of aspirin, warfarin, heparin, and other similar drugs.

**Warning:** Caution may be indicated during the perioperative period.

### 2.6. Chronic Venous Insufficiency (Varicose Veins)

**General comments**
- Lack of physical exercise, prolonged sitting or standing at work, and obesity contribute to the development of venous insufficiency (varicose veins).

The disease occurs when the supporting and stabilizing connective tissue structures around the veins weaken due to congenital factors, fat deposition, or hormonal changes, which leads to the veins walls damage and incompetence of the valves.

**Symptoms:** Venous insufficiency develops gradually, with the first signs of tiredness and heavy legs and swelling of the ankles (edema) in the evening. Increased venous pressure and oxygen free radicals render the venous walls increasingly permeable, allowing fluids, leukocytes and proteins to penetrate into the adjacent tissues. This results in edema formation and a reduced supply of nutrients and oxygen to the surrounding tissues. In severe cases, necrotic leg ulceration can also develop.

**General treatment means**
- It is important to start treatment early, i.e., as soon as the first symptoms develop, to delay the progression of the disease.
- Physical treatment means can be very helpful: for example, regular leg exercises, short exercise breaks between sitting work, weight loss.
- Elastic stockings should be used regularly, but most of patients refuse to wear them.
- In certain rare cases, short-term treatment with diuretics may be necessary.

Loop diuretics are not suitable for this indication.

**Clinical value of herbal medicine**
- The efficacy of “vein ointments” has not been conclusively demonstrated. Use of these preparations should be limited to adjuvant therapy of varicose veins parallel to physical therapy and treatment with oral preparations. Treatment with herbal medicinal compounds should be initiated in the early stages of chronic venous insufficiency to maintain the decongestant effects of treatment. The herbal means combine well with physical treatment means.

**Internal Remedies**

**Horse chestnut seed** (Hippocastani semen). The horse chestnut tree was originally native to Southeastern Europe and the Near East, but has naturalized throughout Europe. The seeds are used in herbal medicine.

**Pharmacology**
- **Herb:** Horse chestnut seed (Hippocastani semen). The herb consists of the dried seeds of *Aesculus hippocastanum* L. and preparations of the same.
- **Active compounds:** Aescin is the most important constituent. Triterpene saponins (3–5\%\) and flavonoids are also present.
- **Pharmacological properties:** Horse chestnut extract was found to be antiexudative and reduce capillary wall permeability, leading to an overall antiedematous effect. Clinical data on the venotonic effects are available. In humans, the herb significantly reduces transcapillary
filtration. It is found, that oral application significantly improves the symptoms of chronic venous insufficiency in double-blind studies and significantly reduces leg edemas, similarly to the results of compression treatments.

**Indications**
- Complaints associated with chronic venous insufficiency
- Posttraumatic or postoperative soft-tissue swelling

**Contraindications:** Not known.

**Dosage and usage duration:** Daily dose should be equivalent to 100 mg of aescin.

**Side effects:** Inflammation of the mucous membranes in the gastrointestinal tract can occur as a rare side effect after internal use.

**Herb–drug interactions:** Not known.

**Important:** Ointments containing aescin should not be rubbed vigorously into the skin, but applied gently. Otherwise they might otherwise cause or worsen phlebitis.

**Important:** High-dose horse-chestnut preparations should not be used in the last two trimesters of pregnancy or when nursing a baby unless absolutely necessary.

**Melilot** (Melioti herba): The herb is derived from *Melilotus officinalis* (sweet clover).
- **Action:** Melilot contains antiedemic flavonoids and coumarins with antioxidant, antiphlogistic, antiedematous, antispasmodic and lymphokinetic effects. The herb does not affect blood coagulation.
  - **Dosage and administration:** Up to 30 mg coumarin per day (oral).
  - **Side effects:** Headache is a rare side effect. Preparations with a high coumarin content can also cause hepatitis.

**Sample tests**

Mention the plant, that possess antilipidemic, antiagregant, antihypertensive activity.

a) Rauwolfia  
b) Hawthorn  
c) Garlic  
d) Dioscorea  
right answer: c

Mention the plant, that possess antihypertensive and sympatholythic activity.

a) Ginkgo  
b) Rauwolfia  
c) Rosemary  
d) Melilot  
right answer: b

Phytotherapy is not effective in the following cardiovascular diseases:

1. Atherosclerosis  
2. Venous insufficiency  
3. Hypertension  
4. Heart failure (IV stage)  
a) 1. 2. 3  
b) 3. 4
c)1.2.4.
d)1.2
right answer: b
Cardiac glycosides containing plants are not effective in the treatment of the heart failure in the form of extracts, because
a) they don’t possess enough activities to solve existing problems
b) they are emetic and toxic in large doses
c) their action is very fast and short
d) their action is very strong
right answer: a
Following plants can be effective during the therapy of atherosclerosis except.
a) garlic cloves
b) black currant fruits
c) Rose fruits
d) Foxglove leaves
right answer: d
CHAPTER 3
3. PHYTOTHERAPY IN RESPIRATORY SYSTEM DISORDERS

3.1. Cold and flu

The role of medicinal plants in the treatment of respiratory system diseases has been great since ancient times. A lot of antitussive drops and juices were included in the traditional medicine of various nationalities. The aim of phytotherapy is to find the most rational medicinal plant in the treatment of each disease.

– Around 90% of all catarrhal disorders are caused by viruses, especially rhinoviruses. Secondary bacterial infection can also develop. Viral and secondary bacterial infections are especially common in individuals with temporary or permanent asthenia of the unspecific (congenital) or specific (acquired) immune system. Drafts, cold weather, excessive indoor heating, stress and loss of sleep are the factors that promote development of cold. When the body (especially lower body) is subjected to hypothermia or ischemia, responds by reducing the blood flow to the mucous membranes in the upper respiratory passages. The later and the drying of the mucous membranes due to excessive room heating promote the growth of pathogens.

**Herbal and general treatment means**

– Once a cold has fully developed, treatment focuses on alleviating typical symptoms, such as a runny nose, sore throat and hoarseness with or without fever. Nasal douches, throat wraps, inhalation, sweat-inducing agents (diaphoretics) and baths with aromatic herbs have been proved to be effective. Cold remedies usually contain secretolytic and expectorant herbs with essential oils, mucilage and saponins.

– Hot baths for cold and flu are prepared with aromatic oils, such as spruce oil, pine needle oil, eucalyptus oil, thyme oil, camphor and/or menthol.

– The administration of a *diaphoretic tea* after a hot bath can enhance the febrifuge effects of the treatment.

**Clinical value of herbal medicine:** All measures that improve the natural function of the mucous membranes of the upper respiratory tract, alleviate cold symptoms and strengthen the immune system, can be recommended for symptomatic treatment of all virally induced catarrhal disorders. There are no comparable synthetic drug preparations. Self-treatment means should be coordinated with the help of a physician.

**Purple echinacea herb** (Echinacea purpureae herba);

– *Action*

*Echinacea:* Certain compounds in echinacea (arabinogalactans, arabinogalactan proteins) enhance the body’s nonspecific immune defenses by activating the granulocytes and macrophages, thereby improving the body’s capacity to phagocytose viruses and bacteria. Activated macrophages substances stimulate the specific immune system and protect the cells from viral attacks. These mechanisms are activated when the pathogen comes in contact with the oral mucous membranes.

• Caffeic acid derivatives such as chicoric acid and alkylamides are responsible for the antiviral effect of purple echinacea juice.
• Echinacea juice inhibits hyaluronidase, thereby reducing the permeability of the blood vessels and inhibiting the spread of local infection.

  – **Side effects:** Not known for oral administration.

**Diaphoretics (Sweat Inducers)**

**Elder flower** (Sambuci flos, Elder flowers are used in medicine.

**Pharmacology**

  – **Herb** Elder flower (Sambuci flos). The crude drug consists of the dried and sifted flower heads of *Sambucus nigra* L.

  – **Active compounds:** Flavonoids (3 %), including rutin, isoquercitrin, quercetin, and hyperoside, essential oil (0.03–0.14 %), and caffeic acid derivatives (ca. 3 %).

  – **Pharmacological properties:** Elder flower is found to increase bronchial secretion in animals. The essential oil and flavonoids produce sudorific (sweat-producing) effect, but no scientific investigations are available on the subject. Elder fruit is used to alleviate the symptoms of cold and flu. Some researches in human cell cultures have demonstrated antiviral and immunomodulating effects of the plant. Two minor clinical trials reveal quicker recovery time in patients with influenza.

**Indications**

  – Fever and cold, mild cases of flu
  – Coughs and bronchitis (supportive)
  – Antiviral and immunomodulating effects as revealed in some little clinical trials

**Contraindications:** Not known.

**Dosage and usage duration**

  – **Tea:** Steep 2 teaspoons (3–4 g) of elder flower in 150 mL of boiled water for 5 minutes.

  – **Dosage:** One to two cups of the tea, as hot as possible, several times a day (especially in the second half of the day).

  – **Daily dose:** 10–15 g drug.

  – **Fruit and syrups:** Infuse 1 teaspoon of the drug in 1 cup of freshly boiled water for 30 minutes, and drink 1 cup 2 or 3 times daily. For syrups, 2 to 3 teaspoons daily.

  – **Side effects:** There are no known side effects in proper administration of the therapeutic doses of the herb.

**Herb–drug interactions:** Not known.

**Linden flower** Lime tree;

**General characteristics:** The linden tree is commonly used in the wood processing industry. Linden flower has been used in medicine since the eighteenth century.

**Pharmacology.** Linden flower (Tiliae flos). The herb consists of the dried flowers of *Tilia cordata* M. and/or *Tilia platyphyllys* L.

  – **Active compounds:** Flavonoids (1 %) including astragalin, isoquercitrin, kaempferol 3-O-rhamnside, quercetin, and tiliroside. Mucilage (10 %) containing arabinogalactans with a uronic acid component), essential oil (0.01–0.2 %) and tannins (2 %) are also present.

  – **Pharmacological properties:** Linden flower is known to have antitussive, astringent, diaphoretic, diuretic, and general immunostimulant effects, but there is a lack of scientific evidence to confirm these properties. The tannins, glycosides, and essential oil in linden flower have antimicrobial effects in humans.
The inhalation of steam enriched with linden flower extract was more effective in improving the symptoms of uncomplicated colds than the inhalation of steam alone (in the control group).

**Indications:** Cold and associated cough.

**Contraindications:** Not known.

**Dosage and usage duration**
- *Daily dose:* 2–4 g of the herb.
- *Tea:* Steep 2 g of the herb in 1 cup of boiled water for 5 to 10 minutes (1 teaspoon = ca. 1.8 g herb). The tea should be drunk as hot as possible and is best taken during the afternoon.

**Side effects:** There are no known side effects in proper administration of the therapeutic doses of the herb.

**Herb-drug interactions:** Not known.

Elder and linden flowers have febrifuge and anti-inflammatory effects due to the inhibition of prostaglandins with their flavonoid constituents. Linden flower tea also activates the nonspecific immune system.

### Vitamin C Supplements

- **Black currant** (Ribes nigræ fructus); **rose hip peel** (Rosae pseudofructus).
- **Action:** Increases the stores of vitamin C, activating nonspecific immune system.
- **Indications:** To prevent and treat upper respiratory tract infections.
- **Contraindications:** Not known.
- **Dosage and administration:**
  - *Black currant juice:* Dilute with hot water. Take 1 glass with meals at noon and in the evening. It may be consumed by all age group patients.
  - *Rose hip tea:* Steep 2–5 g of the herb in 1 cup of boiled water for 15 to 30 minutes. Take one cup, several times a day.
  - *Cold rose hip tea* is an effective thirst quencher for patients with fever.

**Note:** These preparations have relatively low concentrations of vitamin C, and their beneficial action depends also on their flavonoid or anthocyanin content. Their effectiveness has not proven in clinical trials; they mostly appear to be pleasant-tasting home remedies.

- **Side effects:** Not known.

**Remedies be applied for first signs of a cold**

Circulatory Stimulants

Powdered **black mustard seed** (Sinapis nigrae semen) or **white mustard seed** (Sinapis albae semen).

**General characteristics:** White mustard is an ancient garden and medicinal plant. Its seeds are used externally and internally. Black mustard (*Brassica nigra* L.) has the same uses as white mustard.

**Pharmacology:** White mustard seed (Sinapis albae semen). The crude drug consists of the ripe, dried seeds of *Sinapis alba* L.

- **Active compounds:** Glucosinolates such as sinalbin (2.5 %), which produces hydroxybenzyl mustard oil when the seeds are chewed or ground and blent to a paste with
warm water. Phenylpropane derivatives such as sinapine, a choline ester of sinapic acid (1.5 %), are also present.

- **Pharmacological properties:** p-hydroxybenzyl mustard oil induces bacteriostatic, skin irritative, and hyperemic effects in the acral regions.

**Indications**
- Coughs and bronchitis
- Rheumatic complaints
- Cold

**Contraindications:** Gastric and intestinal ulcers, inflammatory nerve diseases. Should not be used by children under 12.

**Dosage and usage duration**
- **External use**
  - **Poultices:** Mix 4 tablespoons of the powdered herb with water immediately prior to use. The poultice is applied to the skin for 10 to 15 minutes in adults, and for 5 to 10 minutes in children. Patients with sensitive skin should reduce the application time.
  - **Baths:** Tie 150 g of mustard flour in a bag and add to bath water (35–45 °C).
  - **Footbaths:** Add 20–30 g of mustard flour per liter of water.
  - Maximum duration of treatment: 2 weeks. Rinse with water after application.
  - **Daily dose:** 60–240 g herb.

**Side effects:** Long-term topical use of mustard can damage the skin. The herb has a slight potential for sensitization (and is a potential cause of food allergies). Caution: supervision is always necessary because of the possibility of falling asleep with the plaster on place, which can result in severe burns.

**Herb–drug interactions:** Not known.

**Warning:** After the treatment, all mustard particles should be removed by rinsing the skin with warm water. Prolonged exposure can cause skin irritation and blistering, especially in patients with sensitive skin.

### 3.2. Bronchitis

- **Acute bronchitis**
  Usually caused by an ascending viral infection. Irritant bronchitis is due to the inhalation of toxic or allergic substances. The disease is marked by abnormal mucus production and impaired ejection of mucus from the bronchi. The bronchial passages become obstructed owing to the thick mucus secretions and inflammation. Coughing and phlegm production, the hallmark symptoms of bronchitis, ultimately occur. The initial symptoms are dry cough accompanied with a burning sensation in the chest. The cough gradually becomes productive and increasingly troublesome. The viscosity of the mucus starts to decrease over the course of time (2 to 3 weeks). Yellowish-green mucus is indicative of secondary bacterial infection.

  **Note:** If there is severe cough (especially with a presumed lung involvement), frequent relapsing, or persistent cough with expectoration, the patient should consult a physician to assess the need for antibiotic treatment.
Complications: The primary complication is chronic bronchitis, which can cause irreversible damage to the mucous membranes. The damaged membranes provide a foundation for further complications, such as pulmonary emphysema, bronchiectasis, and bronchopneumonia.

- **Chronic bronchitis**
  Smoking is usually responsible for the persistence of bronchitis. Chronic adenovirus infection may be another cause. Increased quantities of CD8+ T lymphocytes can be found in the larger airways (beneath the basal membrane). The bronchial glands are swollen, and large quantities of neutrophil granulocytes and macrophages are present, even in the alveolar fluid.

**Herbal and general treatment means**
- Increasing the fluid intake is essential. In mild cases, the patient should drink large quantities of tea made from herbs selected according to the type of cough.
- Herbal preparations with soothing effects should be applied first. Expectorants, preferably those with antispasmodic or immunostimulatory effects, can be prescribed later if necessary.

**Clinical value of herbal medicine**
- The objective of herbal treatment is to prevent complications. Treatment should therefore be initiated at the early stages of disease.
- Herbal medicinal products containing single or multiple ingredients can decrease the viscosity of mucus, counteract inflammation, ease bronchospasms, and stimulate the immune system.
- In chronic bronchitis, herbal remedies are used for adjunctive treatment.

**Demulcents**
- **Marshmallow root** (*Althaea radix*). The herb consists of the dried, chopped, peeled, or unpeeled roots of *Althaea officinalis* L.
  - **Active compounds:** 10–20% mucilage (colloid-soluble polysaccharides, rhamnogalacturonans, arabinogalactans) and 30–38% starch.

**Indications**
- Inflammations in the mouth and throat and associated dry cough

**Contraindications:** Not known.

**Dosage and usage duration:** The chopped roots are used to make aqueous extracts and other galenicals for internal use.
- **Tea:** Add 6 g of the roots to 150 mL cold water and leave to steep for 90 minutes, stirring frequently. **Dosage:** One cup of the rewarmed tea, several times a day. The tea can also be used as a mouthwash.

**Side effects:** Not known.

**Herb-drug interactions:** Not known.

**Plantain** (*Plantaginis herba*) Plantain has been used in many indications since antiquity. It is distributed in cool to moderate zones throughout the world.

**Pharmacology**
- **Crude drug:** English plantain leaf, herb (*Plantaginis lanceolatae, mediae, majoris folium/herba*).
The crude consists of the fresh or dried aerial parts of *Plantago lanceolata*, major, media L. collected at flowering period.

- **Active compounds:** Iridoids (2–3 %), including aucubin, rhinanthin, and catalpol, as well as mucilage (2–6 %), flavonoids and tannins (6 %).

- **Pharmacological properties:** Fluid extracts and fresh leaves juices have bactericidal effects due to aucubigenin (hydrolyzed aucubin) and an antimicrobial saponin. English plantain preparations have a short shelf-life, because aucubigenin is unstable. Aqueous English plantain extracts promote wound healing and accelerate blood coagulation. Aucubin is assumed to protect the liver and soothe the mucous membranes when inflamed. Tannins have astringent effects.

**Indications**
- Cold and fever
- Cough and bronchitis
- Inflammation of the mouth and throat
- Runny nose

**Contraindications:** Not known.

**Dosage and usage duration**
- **Tea:** Pour boiling water into 2–4 g of the chopped herb, or place the dose in cold water and boil. Steep for 10 minutes then strain. 2 teaspoons = 3 g herb.

  - **Important:** The enzyme that hydrolyzes aucubin is inactivated upon heating.
  - **Dosage:** One cup, several times a day.
  - **Daily dose:** 3–6 g herb.
  - For inflammation in the mouth and throat, gargle with the tea infusion several times a day.

**Side effects:** There are no known side effects in proper administration of the therapeutic doses of the herb.

**Herb:** Mullein flower (Verbasci flos). The crude drug consists of the flowers of *Verbascum densiflorum* B. or *Verbascum phlomoides* L.

- **Active compounds:** Triterpene saponins, iridoids (aucubin, 6β-xylosylaucubin, catalpol), caffeic acid derivatives (verbascoside, acteoside), 0.5–4.0 % flavonoids (rutin, diosmin, quercetin-7-O-glucoside), and 3 % mucilage (arabinogalactans, xyloglucans).

- **Pharmacological properties:** The expectorant and soothing properties of mullein are due to the action of its mucilage and saponin constituents.

**Indications:** Dry, nonproductive cough and chronic bronchitis.

**Contraindications:** Not known.

**Dosage and usage duration**
- **Tea:** Steep 1.5–2 g (3 to 4 teaspoons) of the flowers in 150 mL of boiled water for 10 to 15 minutes.

  - **Daily dose:** 3–4 g of the herb.

**Side effects:** There are no known side effects in proper administration of the therapeutic doses of the herb.

**Herb–drug interactions:** Not known.

**Coldsfoot (Tussilago Farfara)** coltsfoot is one of the most popular European remedies for the treatment of a wide range of respiratory disorders.
**Pharmacology.** The leaves are rich in mucilage up to 10%, which during hydrolysis produces a number of sugars and uronic acids, iridoids, organic acids, carotene, saponins, β-cytosterines. The plant contains traces of liver-affecting pyrrolizidine alkaloids and is potentially toxic in large doses.

**Action.** The plant is antitussive, astringent, demulcent, emollient, expectorant, stimulant and tonic.

**Indication.**
- Cough and respiratory problems
- Chronic emphysema
- Silicosis.

**Contraindications.** The leaves should not be used for one course more than 4 - 6 weeks, the herb should not be taken during pregnancy or breast-feeding and it should not be given to children under the age of six.

**Herb-drug Interactions.** Not known.

Secretolytics and Expectorants.

**Aromatic herbs and pure essential oils:**

**Aniseed** (Anisi fructus). The essential oil extracted from the mature and dried fruit is used in medicine.

**Pharmacology.** Aniseed (Anisi fructus).

**Active compounds:**
Essential oil (2–6 %) consisting mainly of Trans anethole (ca. 94 %) as well as apigenin-7-O-glucoside and luteolin-7-O-glucoside.

**Pharmacological properties:**
Aniseed has expectorant, mild spasmolytic and antibacterial effect. Aniseed oil has antibacterial and antiviral activity.

**Indications**
- Fever, cold, and flu
- Cough, runny nose, bronchitis
- Inflammation of the mouth and throat
- Acute pharyngitis

**Contraindications:**
Hypersensitivity to aniseed or anethole, pregnancy.

**Dosage and usage duration**
- **Internal administration**
  - *Daily dose:* 3g dried seeds.
  - *Tea:* One cup in the morning and/or evening (expectorant). For gastrointestinal symptoms: 1 tablespoon daily (adults), 1 teaspoon in bottle (infants).
    - **In liniment form,** apply the oil every 30 to 60 minutes (acute) or 1 to 3 times a day (chronic).

**Side effects:** Occasional allergic reactions on the skin, respiratory tract and gastrointestinal tract. Unfavorable reactions in proper administration of drug therapeutic doses are not known. In very rare cases, sensitization can occur after repeated application.

**Herb-drug interactions:** Not known.
**Common misconceptions:**
Claims of estrogenic effect have never been proven.

**Contraindications:** Fennel oil should not be used by pregnant mothers or small children.

**Dosage and usage duration**
- **Fennel honey** (contains 0.5 g fennel oil per kg) or fennel syrup:
  - **Daily dose:** 10–20 g. The sugar content must be taken into account when used by diabetic patients.
- **Fennel oil**
  - **Dosage:** 2–5 drops, diluted in water or chamomile tea, after each meal.
  - **Daily dose:** 0.1–0.6 mL. Should not be used for more than 2 weeks.
- **Fennel seed tea:** Steep 2–5 g of the herb, crushed or ground immediately before the usage, in 150 mL of boiled water for 10 to 15 minutes.
  - **Dosage:** One cup between meals, 2 to 4 times a day.
  - **Daily dose:** 5–7 g crushed fruits.
- **Fennel syrup:** Fennel tincture: 0.8 mL (30 drops) to 2 mL, 3 times a day.
  - **Daily dose:** 10–20 g. Should not be used for more than 2 weeks without consulting an experienced practitioner.

**Side effects:** Unknown side effects. Allergic reactions are possible as a very rare side effect. Cross-reactions with celery, allergies are also possible.

**Herb–drug interactions:** Not known

**Thyme** (Thymi herba)
Thyme has been revered as a remedy for pulmonary and bronchial diseases since the middle ages. Its use as a culinary herb also dates back to the middle ages.

**Pharmacology.** Thyme (Thymi herba). The herb consists of the stripped and dried foliage leaves and flowers of *Thymus vulgaris* L and/or *Thymus serpyllum* L.

- **Active compounds:** Essential oil (1.0–2.5 %) consisting mainly of thymol (20–55 %), *p*-cymene (14–45 %), and carvacrol (1–10 %). Caffeic acid derivatives (rosmarinic acid, 0.15–1.35 %) and flavonoids (luteolin, apigenin) are also present.

- **Pharmacological properties:** Thyme has primarily expectorant effects based on the herb’s underlying bronchospasmolytic and secretomotor action. In addition, thymol and carvacrol have antimicrobial, antimycotic, and antiviral effects. The herb has spasmolytic effects (due to its flavone fraction) and expectorant effects in animals due to the action of terpenes on ciliary activity. Thyme has excellent antioxidant effects. Controlled clinical studies are not available.

**Indications**
- Internal use for coughs and bronchitis.
- External use for supportive treatment of acute and chronic respiratory tract diseases

**Contraindications:** Long-term or high-dose administration of thymol and carvacrol or thyme tincture and oil, which contain these active compounds, can be toxic.

**Important:** Usage by patients with severe liver damage or impaired thyroid function can aggravate these conditions. These individuals should therefore use thyme preparations with caution.

**Dosage and usage duration**
- **Internal use**
• **Tea:** Steep 1.5–2 g (1 to 1 1/2 teaspoons) of the herb in 1 cup of boiled water for 10 minutes. Dosage: One cup, several times a day.
  - **Daily dose:** 10 g herb with a 0.3 % phenol content, calculated as thymol.
  - **External use**
  - **Compresses:** Prepare using 5 % infusion.
  - **Baths:** Steep 500 g of the herb in 4 liters of boiled water for 10 minutes, then add to bath water.

**Side effects:** Side effects in proper administration of the therapeutic doses of the herb are not known. Thyme has a slight potential for sensitization.

**Herb–drug interactions:** Not known.

**Camphor tree** (*Cinnamomum camphorae aetheroleum*) Medicinal camphor is the product of Camphor tree wood chips steam distillation.

**Pharmacology:** Camphor (*Cinnamomi camphorae aetheroleum*)
  - The crude drug consists of either natural or synthetic camphor. Natural \( R (+) \) camphor is obtained by camphor tree wood steam distillation, the product of which is then purified by sublimation.
  - Camphor is applied locally in liquid (camphor spirit) or semisolid form (liniment or ointment). The liquid form is used for inhalation therapy.
    - **Active compounds:** \( D(-)+ \)-camphor and \( (1R,4R)-1,7,7\text{-trimethyl-bicyclo-[2,2,1]-heptan-2-one} \). Synthetic camphor is designated DL-camphor.
    - **Pharmacological properties:** Used externally, camphor induces hyperemia and bronchosecretolysis.

**Indications**
- Coughs and bronchitis

**Contraindications:** Camphor should not be applied to the face, especially the nose of infants and small children. It is not recommended for internal use.

**Dosage and usage duration**
- Semisolid forms (ointments, liniments) generally contain 10–20 % camphor (maximum camphor content 25 %); preparations for infants and small children should contain no more than 5 %.
- **Camphor alcohol** containing 9.5–10.5 % camphor (DAB 10): Apply to skin several times a day.

**Side effects:** Skin irritation; intoxication due to excessive drug absorption. Inhalation (especially in children) can induce states of intoxication, delirium, convulsions, and respiration regulatory disorders. Oily camphor liniments can induce contact eczema.

**Herb–drug interactions:** Not known.

**Peppermint oil** (*Menthae piperitae aetheroleum*). The herb consists of the essential oil distilled from the fresh, flowering branch tips of *Mentha piperita* L.
  - **Active compounds:** Menthol (35–45 %), menthone (15–20 %), menthyl acetate (3–5 %), neomenthol (2.5–3.5 %), isomenthone (2–3 %), menthofuran (2–7 %), and 1,8-cineole (6–8 %).
  - **Pharmacological properties:** Peppermint oil has antimicrobial, insecticidal, choleretic, and carminative effects. It induces smooth-muscle spasmolysis and produces a cooling sensation when applied to the skin.
**Indications**
- Cold and fever, runny nose
- Cough and bronchitis
- Decreased resistance to infectious diseases
- Inflammations in the mouth and throat

**Contraindications**
- *Internal use:* Individuals with biliary tract obstruction, gallbladder inflammation or severe liver damage should not use peppermint oil. Due to its cholangic action, the herb can induce acute abdominal pain in patients with gallstones.
- *External use:* Peppermint oil preparations should not be applied to the face, especially the nose or the eyes, of infants and small children due to the risk of respiratory side effects such as respiratory arrest.

**Dosage and usage duration**
- *Daily dose:* 6 to 12 drops. Daily dose for irritable colon: 0.6 mL; individual dose in enteric coated preparations: 0.2 mL.
- **Inhalation:** Add 3 to 4 drops to hot water and inhale the vapors.
- **External use:** Apply several drops of peppermint liniment to the affected area of the skin 2 to 4 times a day. Analgesic effects after application on the temples in tension headache could be proven in clinical studies.
- **Pediatric use:** Apply 5 to 15 drops to the chest and back.

**Side effects:** Peppermint oil can upset the stomach in sensitive individuals.

Persons who tend to develop gastroesophageal reflux should avoid peppermint oil. Menthol-containing essential oils can increase the spasms of bronchial asthma. Because of its menthol content, peppermint oil has a weak potential for sensitization.

**Herb–drug interactions:** Not known.

**Pine needle oil** (Pini aetheroleum, *Herb:* Pine needle oil (Pini aetheroleum). The preparation consists of the essential oil derived from the fresh needles and branch tips collected in the springtime from *Pinus sylvestris* L.
- **Active compounds:** *P. sylvestris* L.: \( \alpha \)-pinenes (10–50 %), \( \delta \)-3-carene (20 %), camphene (12 %), \( \beta \)-pinene (10–25 %), limonene (10 %), myrcene, terpinolene, and bornyl acetate
- **Pharmacological properties:** The essential oil has antimicrobial and expectorant effects and induces local hyperemia.

**Indications**
- Cough and acute bronchitis
- Decreased resistance to infectious diseases
- Inflammations in the mouth and throat
- Acute infections of the upper or lower respiratory tract
- Acute (obstructive) laryngitis, pharyngitis, or tracheitis
- Acute rhinopharyngitis or tonsillitis

**Contraindications:** Bronchial asthma, whooping cough. Individuals with extensive wounds, acute skin diseases, febrile and infectious diseases, heart failure and/or hypertension should not use pine oils as a bath additive.

**Dosage and usage duration**
Inhalation: Add 2 g (9 to 10 drops) of pine oil to 2 cups of hot water and inhale the vapors. Repeat several times a day.

Bath additive: Add one drop of the oil per liter of water. Bathe for 10 to 20 minutes at a water temperature of 35–38°C.

Externally: Apply a few drops of the oil to the affected areas of the skin and rub in thoroughly.

Ointment: Apply a 10–50 % ointment several times a day.

Side effects: Can irritate the skin and mucous membranes or worsen bronchospasms.

Herb–drug interactions: Not known

Saponin-containing herbs: Primula root (Primulae radix, Primula veris) is used in medicine. The useful parts are the roots.

Pharmacology. Primula root (Primulae radix). The herb consists of the dried rhizomes (with roots) of Primula veris L.

Active compounds. Primula root: 5–10 % triterpene saponins (primula acid A), phenol glycosides (0.2–2.3 %), with the highest concentrations in the spring (primulaverin).

Pharmacological properties

- Primula root: The crude drug contains saponins with bronchosecretolytic and expectorant effects. The herb takes effect by stimulating the gastric mucosa. This triggers the increased production of bronchial secretions due to a CNS reflex possibly transmitted by the vagal nucleus.

Indications: Acute and chronic coughs and bronchitis.

Contraindications: Known allergy to primula.

Dosage and usage duration

- Primula root tea: Add 0.2–0.5 g of the cut or pulverized drug (1 teaspoon = ca. 3.5 g herb) to cold water and boil. Steep for 5 minutes, then strain. Sweeten with honey.

  - Dosage: One cup every 2 to 3 hours.
  - Daily dose: 1 g herb.

Side effects: There are not known side effects in proper administration of the therapeutic doses of the herb. It can upset the stomach or cause nausea if overdosed.

Herb–drug interactions: Not known.

Licorice (Liquiritiae radix). Licorice is a shrub native to the Mediterranean region that grows to heights of 1 to 1.5 meters. The root is used in medicine.

Pharmacology. Licorice root (Liquiritiae radix). The crude drug consists of the dried, unpeeled roots and stolons of Glycyrrhiza glabra L.

- Licorice extract (Succus liquiritiae). The herb consists of the liquid derived by boiling licorice root in hot water and thickening it by concentration under vacuum (licorice juice).

  - Active compounds: Triterpene saponins (3–15 %) such as glycyrrhizinic acid, glycone 18β-glycyrrhetinic acid, and their salts classified as glycyrrhizin. Flavonoids (liquiritigenin) and isoflavonoids are also present. Saponins have expectorant and secretolytic effects in animals; the flavonoid component has spasmylytic effects. 18β-Glycyrrhetinic acid inhibits prostaglandin synthesis, lipoxygenase, and cortisol metabolism, thereby exerting antiphlogistic and ulceroprotective effects. No clinical data on the efficacy of licorice preparations in respiratory tract diseases are available.
**Indications**
- Cough and bronchitis

**Contraindications:** Chronic liver disease, cholestatic liver diseases, cirrhosis of the liver, severe renal failure, hypertension, hypokalemia, and pregnancy.

**Dosage and usage duration**
- *Tea:* Pour 150 mL of boiled water into 2–4 g (1 teaspoon = ca. 3 g) of the chopped or coarsely powdered herb, or place the herb in cold water and boil. Steep for 10 to 15 minutes, then strain.
  - *Dosage:* One cup, after meals, 2 to 3 times a day.
  - *Succus liquiritiae:* 0.5–1 g herb for catarrhs of the upper respiratory tract; 1.5–3 g herb for peptic ulcers.
  - *Daily dose:* 5–15 g herb (equivalent to 200–600 mg glycyrrhizin).

**Side effects:** Hypokalemia, hypernatremia, edema, hypertension, heart disorders and, in rare cases, myoglobinuria can occur after long-term, high-dose (50 mg/day or more) administration due to the mineralocorticimimetic (aldosterone-like) effect of the saponins in the root. Therefore, usage of licorice preparations should not exceed 6 weeks and the use of licorice fluid extract and commercial licorice products should be medically supervised.

**Important:** These side effects do not occur with deglycyrrhized succus preparations. These are commonly available as commercial preparations (capsules and tablets) under the name DGL (deglycyrrhized licorice).

**Herb–drug interactions:** Thiazide and loop diuretics can increase the mineralocorticoid effects of licorice.

**Sundew herb (Droserae herba)**

**General characteristics:** Sundew is distributed through the entire Northern Hemisphere and is typically found on wet or marshy soils. Various sundew species are used in medicine.

**Pharmacology.** Sundew herb (*Droserae herba*). The herb consists of the dried aerial and subterranean parts of *Drosera rotundifolia* L.
- *Active compounds:* Flavonoids, anthocyanins, and naphthalene derivatives (naphthoquinones, 0.5 %, such as plumbagin).
- *Pharmacological properties:* The herb was found to produce antimicrobial, secretolytic, bronchospasmolytic, and antitussive effects in animals. Plumbagin inhibits the synthesis of prostaglandins in vitro. An immunomodulatory effect has also been proposed.

**Indications:** Cough and bronchitis.

**Dosage and usage duration**
- *Tea:* Steep 1–2 g of the herb in boiled water for 10 minutes.
  - *Dosage:* One cup, 3 to 4 times a day.
  - *Mean daily dose:* 3 g herb.
- *Tincture (1:5):* 1–3 mL, 2 or 3 times a day.

**Side effects:** Plumbagin can induce allergic side effects.

**Herb–drug interactions:** Not known.

No controlled clinical studies on the herb are available.
3.3. Symptomatic cough

**General characteristics**

– Cough clears uncommon particles and accumulated mucus from the respiratory passages. Cough is a response to uncommon particles caused by stimulation of neuroreceptors located on the larynx and esophageal bifurcation at the opening of the stem bronchi. The stimulation is usually mechanical, but sometimes also chemical or thermal in nature. The cough reflex transfers through afferent nerve fibers to the cough center of the medulla oblongata. Additional cough receptors are located in bronchi, alveoli, and throat. A smaller number of receptors can be found in the nose and paranasal sinuses. Connected to the cough center are receptors in the auditory canal, esophagus, and stomach. Cough is induced when these receptors are stimulated.

– Cough for reasons other than to eject mucous secretions and uncommon particles places unnecessary strain on the respiratory tract and should therefore be treated. Expectoration should be boosted through appropriate means.

– If the cough becomes chronic, a thorough work-up should be performed to determine the cause and to initiate proper treatment means. Besides lung and heart disease, other common causes include medications, such as ACE inhibitors, and environmental factors, such as irritant gases, cigarette smoke, and solvents.

**Herbal and general treatment means**

– Herbal remedies that quiet cough (antitussives) or promote the ejection of mucus (expectorants) are applied either by inhalation or orally.

– *Herbal antitussives with central effects*: The essential oil in eucalyptus leaves (cineol) and licorice root may have central effects.

– *Herbal antitussives with peripheral effects* reduce the sensitivity of cough receptors in the mouth and throat mucous membranes as well as in the esophagus and stomach.

– *Teas against cough* can help to liquefy thick mucous secretions. The secretolytic and expectorant effects of certain essential oils develop more effectively when the preparations are inhaled or taken in extract form. Saponin-containing herbs, on the other hand, should be administered orally since they stimulate the sensitive fibers of stomach mucosa.

The reflex stimulation is then transferred to the bronchial mucosa.

– Some herbal remedies have an additional anti-inflammatory effect (e. g., licorice root and sundew herb) or bronchospasmolytic effect (e. g., sundew herb, peppermint oil, and licorice root).

**Clinical value of herbal medicine**

– Herbal remedies that liquefy the mucus have antitussive efficacy.

– All the specified herbal preparations are used for symptomatic treatment of coughs.

**Herbs to be applied in bronchial Asthma**

**Preliminary remarks**

– The chronic inflammatory process associated with bronchial asthma is controlled by T-helper cells and effector cells involved in the inflammatory response.

Eosinophil granulocytes and other cells are typically found in inflamed bronchial tissues and broncho-alveolar fluids.
The main goals of therapy are to reduce inflammation and eliminate bronchospasms.

**Recommended herbal preparations:**

**Eucalyptus (Eucalyptus viminalis, Eucalyptus globulus, Eucalyptus cinerea)**

Eucalyptus oil’s primary ingredient, cineole has antiseptic properties and is mostly used to alleviate the symptoms of nasopharyngeal infections, to treat cough, asthma or as a decongestant.

– Eucalyptus oil is often used in steam inhalers, or as a rub. Small amounts can be found in cough lozenges or cough syrups.

– Eucalyptus oil is rare available in capsule or tablet form in the United States and is little used in these forms.

– **Clinical value:** For adjunctive treatment. A cortisone-reducing effect has also been reported.

**Warning:** Asthma patients are often allergic to essential oils.

**Khella (Ammi visnaga)**

**Pharmacology.** The active principles are furanocumarins, the most important being khellin, together with visnagin, visnadin and khellol glucoside.

**Pharmacological action.** Visnadin and visnagin are vasodilators, with calcium channel blocking and spasmolytic activity.

Khellin, which is now commercially available in 186 tablets and injection, is a potent coronary vasodilator. It has been employed in the treatment of angina pectoris and bronchial asthma, but its use appears to be limited by undesirable side-reactions.

Allium cepa-Onion fresh extract was used in traditional medicine as an antiasthmatic, antitussive preparation since ancient times. The active principle is thiosulfinate.

### 3.4. Pulmonary tuberculosis

The role of phytomedicines in the treatment of pulmonary tuberculosis is not great. However there are some plants that contain silicic acid and enhance the resistance of human organism against unconvenient conditions. Such kindof plants are Horsetail (Equisetum arvense) and Knotgrass (Polygonum aviculare)

**Sample tests**

Mention the crude drugs, that can be used as demulcents in the treatment of respiratory system diseases.

1. Marshmellow root
2. Flaxseed
3. Coltsfoot leaf
4. Mullein flower

a) 1.3.4.
b) 2.3.4
c) 1.2.4
d) 1.2.3

right answer: a

Mention the plants that can be effective in the treatment of bronchial asthma.

1. Eucalyptus
2. Ephedra
3. Marshmellow
4. Khella
a) 1. 2.4
b) 3.4.
c) 1. 2.3.
d) 1.2.3.4
right answer: a

The oil of Eucalyptus possess following pharmacological effects
1. antitussive
2. antiallergic
3. antiseptic
4. anti-inflammatory
a) 1. 3.
b) 3. 4.
c) 2. 4.
d) 1. 2.
right answer: b

The activities of Echinacea are following.
1. antiviral
2. adaptogenic
3. immunomodulator
4. vasodilator
a) 1. 3. 4.
b) 1. 3.
c) 2. 3.
d) 1. 2. 3.
right answer: b

Mention the plants that are effective against dry cough
1. Thyme
2. Sundew
3. Flaxseed
4. Cascara
a) 1. 2. 3. 4.
b) 2. 3.
c) 1. 3. 4.
d) 1. 2.
right answer: d
CHAPTER 4
4. PHYTOTHERAPY IN URINARY TRACT DISORDERS

4.1. Acute and chronic infectious diseases of urogenital tract

Acute and chronic infections of the urogenital tract and bladder are more common in women than in men due to the differences in the pelvic anatomy. Irritable bladder, increased urinary frequency and painful urination are the typical symptoms.

– Urine tests for bacterial pathogen identification facilitate the differential diagnosis and selection of an appropriate antibiotic.

General and herbal treatment measures
– The adequate intake of fluids (at least 2 liters per day) plays an essential role in the elimination of urinary tract infections.
– Herbal teas are used to dilute the urine. Warm baths and footbaths can enhance the effects of herbal teas.

Warning: Therapy with herbal diuretics (also called aquaretics) is contraindicated in patients with edema due to heart or kidney failure.

Clinical value of herbal medicine
– In urinary tract infection (UTI) without kidney involvement, herbal diuretics are administered for increased urinary excretion of the causative organisms.
– Herbal diuretics help to eliminate water and harmful substances, such as bacteria. Some diuretic herbs have additional spasmolytic and/or analgesic effects.
– UTI with kidney involvement requires primary antibiotic treatment. However, antibiotics are often unable to eliminate the infection completely, and many patients develop recurrences or antibody resistance, resulting in chronic disease. In these cases, herbal diuretics can be a useful adjunctive treatment mean.
– Considering their effectiveness and very low rate of side effects, the administration of diuretic herbs is very helpful in chronic urinary tract infection. We recommend the usage of effective herbs combinations.

Arbutin-containing Herbs

Bearberry leaf (Uvae ursi folium).
– Action: In alkaline urine, arbutin is metabolized into the bacteriostatic substance hydroquinone.
– Indications: For increased urinary excretion in cases of acute urinary tract infection.
– Contraindications
  • Pregnancy and breast feeding. Should not be used by children under 12 years.
  • Arbutin-containing products should not be used for more than 1 week for a course or more than 5 times a year. Hence, they are not suitable for chronic diseases treatment.
– Dosage and administration: Commercial bearberry leaf teas and medicaments should be taken as recommended by the manufacturer, usually 3 to 5 times a day. Tea from bearberry leaves only should be prepared as a cold infusion, in order to minimize the amount of tannins extraction. Due to its strong taste, we recommend combine bearberry leaves with other herbal diuretics.
- **Side effects:** The tannins in bearberry leaf can cause stomach irritation.
- **Interactions:** Bearberry leaf should always be taken with food (tomatoes, potatoes etc.) or chemicals (e.g., sodium bicarbonate) that alkalinize the urine.
- Commercial products are readily available standardized to 20 % arbutin.
- **Tea Rx** for adjunctive treatment of severe inflammations of the lower urinary tract: Species Urologicae DAB 6/NRF: Uvae ursi folium 20 g, Orthosiphonis folium 10 g, Equiseti herba 20 g; Betulae folium 20 g, bean pods 20 g, Mate leaves 10 g. Pour 150 mL of hot water into 1 teaspoon of the herbs, then cover and steep for 5 to 10 minutes. Take 1 cup, 6 times a day.

**Other Herbal Diuretics**

**Birch leaf** (Betulae folium, Two birch species are used in medicine, *Betula pendula* and *Betula pubescens*. Various medicinal preparations are made from the leaves of these two species.

**Pharmacology. Birch leaf (Betulae folium).**
- **Active compounds:** Flavonoids, triterpene saponins, essential oil, and phenylcarboxylic acids.
- **Pharmacological properties:** The chemical substances in birch leaf increase the urine volume and enhance the flow of urine in urinary tract, resulting in the increased elimination of water (aquaresis).

**Indications**
- Used as a diuretic to flush bacteria out of the lower urinary tract and to flush out renal gravel.

**Contraindications:** The drug is not recommended in patients with cardiac or renal edema.
- Steep 1–2 tablespoons of the drug in 150 mL of hot water.
- **Dosage:** One cup, between meals, 3 to 4 times a day. An adequate intake of fluids is essential.

**Side effects:** Side effects in proper administration of drug therapeutic doses are not known.

**Herb–drug interactions:** Not known.

**Common misconceptions:** Birch leaf does not irritate the renal parenchyma.

**Orthosiphon leaf** (Orthosiphonis folium)

**General comments:** Java tea is native to Southeast Asia. The inhabitants of the region have used its leaves as a remedy for bladder and kidney disorders for decades.

**Pharmacology. Java tea leaf (Orthosiphonis folium).** The herb consists of the foliage leaves and stem tips of *Orthosiphon stamineus* (*Orthosiphon stamineus* B.), collected shortly before the time of flowering.
- **Active compounds:** Essential oil (0.02–0.6 %) containing mainly β- caryophyllene, α-humulene, and caryophyllene epoxide. Flavonoids (eupatorin), triterpene saponins (up to 4.5 %), and potassium salts are also present.
- **Pharmacological properties:** The essential oil has antimicrobial and antiphlogistic effects. In animal and human studies, the herb was found to have an aquaretic effect (due to the combined effects of saponins and flavonoids).

**Indications**
- Urinary tract infections
- Renal or urinary calculi
Contraindications: Irrigation therapy is not recommended if cardiac or renal edema is present.

Dosage and usage duration
– Tea: Steep 2 g of the herb in 150 mL of hot water for 15 minutes.
  • Dosage: One cup, several times a day.
– Daily dose: 6–12 g of the herb.
Important: An adequate intake of fluids (at least 2 liters per day) is essential.
Side effects: There are not known side effects in proper administration of the therapeutic doses of the herb.

Herb–drug interactions: Not known.

Stinging nettle herb (Urticae herba)
Pharmacology. Nettle leaf/herb (Urticae folium/herba). The crude drug consists of the fresh or dried aerial parts of Urtica dioica L. collected at flowering period.
– Active compounds: Histamine, serotonin, leukotriene, acetylcholine, formic acid, 0.7–1.8 % flavonoids (rutin, 0.1–0.6 %, isoquercetin, 0.2 %), and silicic acid (1–5 %).
– Pharmacological properties: Nettle leaf/herb is an aquaretic that also promotes the excretion of uric acid. It can reduce edemas when is taken with an ample volume of fluids. Local anesthetic and analgesic effects have been observed in animals by external use of the tincture. The drug inhibits leukotriene and prostaglandin synthesis in vitro. Significant antirheumatic and antiarthritic effects have been observed in studies with large numbers of patients.

Indications
– Urinary tract infections
– Renal or urinary calculi

Contraindications: The drug is not recommended in patients with cardiac or renal edema.

Dosage and usage duration
– Internal use: Daily dose: 4–6 g drug. An adequate intake of fluids (at least 2 liters per day) is essential for aquaresis.
– Tea: Place 1.5 g (2 teaspoons) of the chopped herb in cold water, boil and steep for 10 minutes (1 teaspoon = ca. 0.8 g drug).
  • Dosage: One cup, several times a day.
– External use: Tincture (1:10).
Side effects: Not known.

Herb–drug interactions: Not known

Horsetail herb (Equiseti herba)
Horsetail (field horsetail) is a widespread plant known for its high silicic acid content.

Pharmacology. Horsetail herb (Equiseti herba). The herb consists of the dried, sterile green stems of Equisetum arvense L., collected during the summer months.
– Active compounds: Flavonoids (0.6–0.9 %), caffeic acid esters (1 %), and silicic acid (5–7.7 %).
– Pharmacological properties: Horsetail herb has aquaretic and spasmolytic effects in animals. Its wound-healing properties are probably attributable to its content of flavonoids and silicic acid.
**Indications**
- Urinary tract infections
- Renal or urinary calculi

**Contraindications:** Horsetail should not be used for diuresis in patients with cardiac or renal edema.

**Dosage and usage duration**
- **Internal use:** Boil 2–3 g of the herb in 150–200 mL of water for 5 minutes, then steep for 10 to 15 minutes.
  - **Dosage:** One cup, between meals, several times a day.
  - **Daily dose:** 6 g herb. An adequate intake of fluids is essential (i.e. about two 6-ounce glasses of water).
- **External use:** For compresses, boil 10 g herb in 1 liter of water for 5 minutes, then steep for 10 to 15 minutes.

**Side effects:** There are not known side effects in proper administration of the therapeutic doses of the herb.

**Herb–drug interactions:** Not known.

**Parsley root** (Petroselini radix)
Parsley herb and root are widely used in cooking and herbal medicine.

**Pharmacology.** Parsley herb (Petroselini herba). The herb consists of the fresh or dried aerial parts of *Petroselinum crispum* (M.) N. et A. W. H. and preparations of the same.
- **Parsley root** (Petroselini radix). The herb consists of the dried subterranean parts of Petroselinum crispum (M.) N. et A. W. H. and preparations of the same.
  - **Active compounds**
    - **Parsley herb:** Essential oil (0.02–0.3 % in fresh parsley, ca. 1.2 % in dried parsley) and up to 90 % apiol and myristicin, depending on the variety.
    - **Other constituents** include furanocoumarins, flavonoids (1.9–5.6 %), and vitamins, especially vitamin C (up to 165 mg per 100 g fresh herb).
  - **Parsley root:** 0.05–0.12 % essential oil (apiol, myristicin), furanocoumarins, and 0.2–1.3 % flavonoids (apiin).
  - **Pharmacological properties:** The efficacy of parsley in humans has not been clearly demonstrated. Stimulation of the renal parenchyma due to the essential oil is considered to occur.

**Indications**
- Urinary tract infections
- Renal or urinary calculi

**Contraindications:** Known allergy to parsley or apiol; nephritis; pregnancy.
Irrigation therapy is contraindicated in cardiac or renal edema.

**Dosage and usage duration**
- **Tea:** Infuse 2 g in a cup of boiled water for 20 minutes, 2–3 times a day.
- **Daily dose:** 6 g herb.

**Important:** An adequate intake of fluids (at least 2 liters per day) is essential during irrigation therapy.

**Side effects:** There are not known side effects in proper administration of the therapeutic doses of the herb. Contact allergy is a rare side effect.
**Herb–drug interactions:** Not known.

**Dandelion root and herb**
(Taraxaci radix cum herba, Dandelion is a widely spread plant that has many uses in folk medicine. The whole plant is used in medicine.

**Pharmacology.** Dandelion root and herb (Taraxaci radix cum herba). The crude drug consists of whole-plant material from *Taraxacum officinale*, collected at flowering period.

- **Active compounds:** Sesquiterpene lactones (tannins), triterpenes (taraxasterol, γ-sitosterol, taraxerol, taraxol), flavonoids (luteolin-7-O-glucoside), and inulin (2–40 %).

- **Pharmacological properties:** Tannins contained in dandelion root and herb have chologagic and secretagogic action. In animals, dandelion root was found to have a saluretic effect attributable to its high concentrations of minerals.

**Indications**
- Urinary tract infections

**Contraindications:** Biliary tract obstruction, empyema of the gallbladder, and intestinal obstruction. Patients with gallbladder problems should not use dandelion without qualified health care provider instructions because of the risk of colic.

**Dosage and usage duration**
- **Tea:** Add 3–4 g (1 tablespoon) of the chopped herb to 150 mL of water, boil and steep for 15 minutes.
  * **Dosage:** One cup of the tea in the morning and night.
  * **Side effects:** Because dandelion produces secretagogue effect, it can increase stomach juice production. The herb has a weak potential for sensitization.

**Herb–drug interactions:** Not known.

**Juniper berry** (Juniperi fructus. The juniper tree or bush is spread throughout the Northern Hemisphere. Its berrylke fruit (cones) have been used for aquaresis and wound recovery since ancient times.

**Pharmacology.** Juniper berry (Juniperi fructus). The crude drug consists of the ripe, fresh or dried berrylke fruit of *Juniperus communis* L.

- **Active compounds:** Essential oil (0.8–2 %, depending on the site of herb origin), monoterpene hydrocarbons (α-pinenes, terpinen-4-ol), diterpenes, oligomeric proanthocyanidins of the catechin type, monosaccharides (invert sugar, 20–30 %), and flavonoids.

- **Pharmacological properties:** Because of its essential oil (especially terpinen- 4-ol), juniper berry produces an aquaretic effect. In animals, it revealed mild antihypertensive and antiexudative effects.

**Indications**
- **Internal use**
  * For aquaresis in lower urinary tract unspecific inflammations.

**Important:** The cause of urinary tract infection must always be clarified by a physician.

**Contraindications**
- **Internal use:** Pregnancy, inflammatory kidney diseases.

**Dosage and usage duration**
- **Infusion:** Steep 1 teaspoon of crushed, dried juniper berries in 1 cup (150 mL) of boiled water for 10 minutes.
Dosage: One cup, 3 times a day.

Tincture: Steep 20 g of the herb in 80 g of 70% ethanol for 8 days.

Dosage: 20 to 30 drops, 2 to 3 times a day.

Daily dose: 2–10 g (maximum dose) of the herb, corresponding to 20–100 mg of the essential oil.

When used internally, the duration of treatment should be restricted to a maximum of 6 weeks due to the potential for tissue irritation by pinenes.

Side effects: Overdose or long-term internal use can cause kidney irritation and/or damage.

Herb–drug interactions: Not known.

4.2. Urolithiasis

General characteristics
- Urinary stones are classified as oxalate stones, calcium stones, urate stones, cystine stones, and phosphate stones according to the substance contained in them. Making the appropriate dietary changes is generally a sufficient prophylactic mean.
- Around two-third of all urinary stones are small enough to be passed spontaneously.

General and herbal treatment means
- Stone patients should receive diuretics to promote the urinary excretion of substances responsible for urolithiasis.
- A fluid intake of 2–2.5 liters per day is also recommended to dilute the urinary concentration of stone-forming salts.

Warning: Herbal diuretic therapy is contraindicated to patients with edema, which is a result of heart or kidney failure.

Clinical value of herbal medicine
- Herbal diuretics increase the urinary excretion of stone-forming substances.
  Unlike chemical diuretics, they do not attack the renal tubules, but increase the filtration rate and primary urine volume by means of osmosis and circulatory stimulation.
- In times of stone passage, analgesics and spasmolytics are required along with the diuretics.

Warning: The patient should consult a physician at the first signs of blood in the urine or fever and/or if the general symptoms persist despite treatment.

Madder (Rubia tinctorum) also called turkey red, is an old world dye native to south Europe.

Pharmacology. The roots are 20-30cm long up to 12mm thick, reddish-brown from outside and orange-red in the cut.

Active compounds. The roots and rhizomes contain up to 7% hydroxyanthraquinones, alizarin mainly; ruberithrinic acid and other organic acids, pectins.

Pharmacological action. The root is aperient, astringent, cholagogue, diuretic and emmenagogue. It loosens and blasts stones transforming them into the sand, and due to its
spasmolytic and urinative effects, painlessly removes it from kidney and urinary tract. It is so difficult to solve stones, as oxalic and phosphate are loosened.

Indications.
Urolithiasis
Inflammatory diseases of kidneys and urinary tracts
Side effects: It can cause bleeding, if stones are of crystalloid structure.
Interactions with other drugs are not known
Important. The root imparts a red colour to the milk, urine and bones, when is taken internally (especially the bones of young animals, and is used in osteopathic investigations).
Warning. The drug should be used only by physician prescription.

Sample tests

Mention the plant, which can be used for kidney diseases.
- a) Horsetail
- b) Juniper
- c) Java tea
- d) Bearberry
right answer: c

All the following plants are effective in the treatment of urolithiasis except.
- a) Parsley herb
- b) Horstail herb
- c) Bilberry fruits
- d) Madder rhizomes and roots
right answer: c

All following drugs are effective for urinary tract diseases except.
- a) Juniper fruits
- b) Bearberry leaves
- c) Cascara bark
- d) Parsley herb
right answer: c

All the following plants are diuretics except.
- a) Bearberry leaves
- b) Horsetail herb
- c) Bilberry fruits
- d) Juniper fruits
right answer: c

Mention plant, which gradually loosens kidney and bladder stones.
- a) Dandelion roots
- b) Horstail herb
- c) Bilberry fruits
- d) Madder rhizomes and roots
right answer: d
5. PHYTOTHERAPY IN GASTRO-INTESTINAL DISORDERS

5.1. Diseases of the Mouth and Throat

**General characteristics:** Mouth and throat diseases can be caused by bacteria (e.g., *Streptococcus* or *Staphylococcus* species), viruses, mycoses (e.g., *Candida albicans*) and may be a result of allergies, pseudo-allergies and autoimmune diseases.

**Herbal and general treatment means:** Mouth washes and gargles are mechanical means for the mouth cleansing and blood flow increase to the oral mucous membranes. Depending on type of secondary active compounds contained in plant, they can also relieve pain and make the healing process quicker.

**Clinical value of herbal medicine**

- Herbal preparations are effective in counteracting bacterial, viral or nonspecific mouth and throat diseases. They can be used alone or for adjunctive treatment parallel to established synthetic drugs.
- There are not known herbal remedies for fungal diseases of the mouth and throat.

Herbs used for mouth and throat diseases are divided in 4 groups: demulcents (mucilage containing), local anti-inflammatory plants, astringents, tonic plants.

- Astringents help to clear up drug-related oral eruptions, and bitters are used to counteract dryness of the mouth.

**Demulcents**

- **Marshmallow root** (*Althaeae radix*); **ribwort plantain** (*Plantaginis lanceolatae folium*);
- **sageleaf** (*Salviae folium*).
  - **Action:** Antitussive.
  - **Contraindications:** Not known.
  - **Side effects:** Not known.

**Astringents**

- **Dried bilberry** (*Myrtilli fructus*); tormentil root (*Tormentillae rhizoma,*).
  - **Action:** Anti-inflammatory, antimicrobial, promotes wound healing.
  - **Side effects:** Not known.

Local anti-inflammatory plants

- **Chamomile flower** (*Matricariaeflos*), **lemon balm leaf** (*Melissae folium*), Eucalyptus leaf (*Eucalyptus folia*), Arnica flowers (*Arnica flos*).
  - **Action:** Bacteriostatic, bactericidal, virustatic. Some are antiphlogistic.
  - **Contraindications:** Chamomil may lead to allergic reaction.
  - **Side effects:** Not known.

**Bitters**

- **Centaury herb** (*Centaurii herba*); **bogbean leaf** (*Menyanthidis folium*); **gentian root** (*Gentianae radix*), **lemon balm leaf** (*Melissae folium*).
  - **Action:** Increases the flow of saliva by stimulating bitter receptors on the tongue.
Contraindications: Individuals with gastric or duodenal ulcers should not use gentian root.

Side effects: Although rare, headaches are possible.

Acute Stomatitis (with less severe pain)
Marshmallow root and sage leaf, either alone or mixture of their equal parts.
– Dosage and administration: Use as a mouthwash or gargle, 3 to 6 times a day.
– Clinical value: Herbal treatment alone is usually sufficient in mild cases. Otherwise, the herbal remedies can be applied for adjunctive treatment.

Acute Stomatitis (painful)
Chamomile flower and sage leaf (1:1) for infusions.
– Dosage and administration: Place herbs in water, boil, then cover and steep for 14 minutes. Rinse mouth or gargle with 1 tablespoon infusion in a cup of warm milk, 3 to 10 times a day as is needed.
– Clinical value: Can be used alone to treat mild or moderate disorders. Also may be well combined with synthetic drugs and chemical remedies (e.g., lidocaine or tetracaine).

Pharyngitis with Dry Cough and Problems in Swallowing
Sage leaf; marshmallow root.
– Dosage and administration: Prepare an infusion using one or more of these herbs. Gargle with the infusion several times a day.

Other Stomatitis and Aphthous Stomatitis
Dried bilberry.
– Dosage and administration: Steep 1 to 3 tablespoons of dried bilberries in 1 liter of water for around 15 minutes. Gargle with the infusion several times a day.

Angina Tonsillaris
Chamomile tea and extract.
– Dosage and administration
  • Freshly made chamomile infusion from good-quality dried flowers should always be used. Gargle or rinse the mouth at hourly intervals.
  • Chamomile extract: Add 10 drops to a glass of water, or apply directly to the affected sites, 2 to 3 times a day. Also rinse the mouth with an astringent.
  • Chamomile–sage tincture: Add 20 to 30 drops to a glass of water and gargle.
  • Arnica tincture (1:10): Add 1 teaspoon to a glass of water as hot as tolerable, gargle or rinse the mouth at hourly intervals, but do not swallow the preparation.

Important: Arnica flower should not be used by people allergic to the plant. When selecting the remedy, the preferences of the patients should be taken into account.

Peritonsillar Abscess
Arnica (see above) and chamomile (see Angina Tonsillaris).
– Dosage and administration: Use arnica and chamomile preparations alternately. Gargle intensively, every half hour, with the infusion as hot as tolerable.
– Clinical value: For adjunctive treatment.
Range of Applications in Chronic Mouth and Throat Diseases: Chronic Stomatitis, Chronic Pharyngitis, Smoker’s Catarrh.

We recommend the alternating use of demulcents, astringents and bitters.

– Mucilaginous coverage on the free nerve endings responsible for pain development is best produced by alternately using astringents and demulcents.

The above conditions are characterized by permanent atrophy of most mucous glands. Bitters stimulate the remaining intact of mucous glands.

– Dosage and administration: The patient should intensively rinse the mouth with infusions made from the recommended preparations, alternating between the different types.
  
  • Astringents: 1 to 3 tablespoons of dried bilberry fruit per liter of water.
  
  • Demulcents: Ribwort plantain, marshmallow root. Prepare an infusion using one or more of these herbal remedies.
  
  • Bitters: Centaury herb, bogbean, and gentian root. Prepare an infusion using one or more of these herbs. Add 1 to 2 teaspoons of the tea mixture to 1 liter of water.

The elimination of harmful factors (e. g., cigarette smoking) can greatly improve the symptoms.

Persistent “Lump” in the Throat or Need to Clear the Throat

Centaury herb, bogbean, and gentian root. Prepare an infusion using one or more (equal parts) of these herbal remedies.

1 to 2 teaspoons tea mixture to 1 liter of water. Rinse the mouth or gargle, several times a day.

Herpes Simplex Labialis

Apply externally on the lesions either lemon balm leaf dry extract in creme base, or St. John’s wort oil.

– Dosage and administration
  
  • Apply 10–20 mg of the creme per one square cm of affected skin, 2 to 4 times of day.
  
  • St. John’s wort oil: Apply 1–2 mL of the oil to the affected area, several times daily.

– St. John’s wort oil has demonstrated anti-inflammatory and antiviral properties and may help reduce pain and inflammation.

Note: It is important to start treatment early, as soon as the first signs appear.

5.2. Anorexia

General characteristics

– Appetite is defined as an instinctive desire for food. It has a specific control mechanism that is mainly localized in the hypothalamus and an unspecific control mechanism in the limbic system. Hence, appetite is essentially subjected to emotional control.

– The gustatory nerves (vagus nerve) in the mouth triggeres the production of saliva and gastric juices.

Herbal and general treatment means: Pleasant-tasting bitters can be used to stimulate the appetite and the production of gastrointestinal juices. The patients generally become accustomed to the prescribed herbs or herb preparations within a few weeks, so the herbal remedies soon lose their initial efficacy.
This makes it necessary to periodically switch to different herbal preparations to maintain the treatment efficacy.

**Clinical value of herbal medicine:** Bitters used to stimulate the appetite are a prime example to prove the usefulness of herbal remedies because, in this case, no comparable synthetic alternatives are available.

**Recommended Herbal Remedies (Overview)**

**Classification:** Bitters are divided into the following four groups: **tonic bitters** (tonic substances), **astringent bitters** (tannins), **aromatic bitters** (essential oils), and **acrid bitters** (pungent substances).

- **Tonic bitters** (amara tonica)

  **Centaury leaf** (Centaurii herba, centaurium minor centaury. The dried aerial parts of *Centaurium umbellatum* collected at flowering period are used in medicine.

  **Pharmacology.** Centaury herb (Centaurii herba).
  - **Active compounds:** Iridoids and bitter principles, mainly swertiamarin (75 %), gentiopicrin, and sweroside. – **Pharmacological properties:** Reflex stimulation of saliva and gastric juice secretion.

  The herb also has antiphlogistic and antipyretic action in animals.

  **Indications**
  – Lack of appetite
  – Dyspeptic complaints

  **Contraindications:** Ulcers of the stomach and small intestine.

  **Dosage and duration of use**
  – **Tea:** Steep 2–3 g of the herb in 150 mL of boiled water for 15 minutes. Take 1/2 hour before the meals.
  – **Daily dose:** 6 g dried herb for tea.
  – **1:5 tincture:** 2–5 g per day.

  **Side effects:** There are not known side effects in proper administration of the therapeutic doses of the drug.

  **Herb–drug interactions:** Not known.

- **Artichoke leaf** (Cynarae folium, The dried whole or chopped basal leaves and the fresh or dried herb of *Cynara scolymus* L. are used in medicine.

  **Pharmacology.** Artichoke leaf (Cynarae folium).
  - **Active compounds:** Caffeic acid derivatives, 1 % (chlorogenic acid, neochlorogenic acid, cryptochlorogenic acid, cynarin), flavonoids, 0.5 % (cynaroside, scolymoside, cynarotrioside, luteolin), and sesquiterpene lactones, 4 % (cynaropicrin, 47–83 %, dehydrocynaropicrin, grossheimin, and cynaratriol).
  - **Pharmacological properties:** Sesquiterpene lactones (bitter principles), hydroxycinnamic acid and flavonoids produce choleretic, hepatoprotective, antidispeptic, and antilipemic effects. The herb reduces cholesterol levels in rats (luteolin inhibits cholesterol synthesis), as well as increases choleresis and reduces symptoms of dyspepsia, which is compared with randomized double-blind studies in healthy volunteers.

  In a small trial (*n* = 44), artichoke extract reduced total cholesterol in volunteers with baseline values above 220 mg/dL, compared with controls.

  **Indications**
– Lack of appetite
– Meteorism
– Liver and gallbladder complaints
– Hyperlipoproteinemia (high-dose, standardized extracts)

**Contraindications:** Allergy to plants; biliary tract obstruction; gallstones.

**Dosage and usage duration:** The fresh leaves, plant fresh extracted juice, and dry extracts are used in medicinal preparations.

– *Daily dose:* 6 g drug.

**Side effects:** There are not known side effects in proper administration of the therapeutic doses of the herb.

**Herb–drug interactions:** Not known.

**Cinchona bark:** gentian root (Gentianae radix); **bogbean leaf** (Menyanthidis folium); dandelion root and herb (Taraxaci radix cum herba, see above); **chicory leaf** and **root** (Cichorii herba et radix) also are used for the same purpose.

**Aromatic bitters** (amara aromatica):

**Wormwood herb** (Absinthii herba (shoot tips and foliage leaves) and/or the dried basal foliage leaves of *Artemisia absinthium* L., collected at flowering period.

– *Active compounds:* Essential oil (0.2–1.5 %) containing (+)-thujone, α-bisabolol, and *trans*-sabinyl acetate or chrysanthenyl acetate (content of each over 40 %). Sesquiterpene lactones, including absinthin, artabsin, and matricin, are also present.

– *Pharmacological properties:* The essential oil and bitter substances in wormwood have cholagogue and digestant effects. They also stimulate the appetite and promote wound recovery. Sesquiterpene lactones stimulate the bitter receptors at the base of the tongue, thus triggering a reflector increase of gastric juice secretion. In patients with liver diseases, 20 mg of wormwood extract administered through a gastric tube increased the levels of α-amylase, lipase, bilirubin, and total cholesterol in the duodenal fluid. The essential oil has antimicrobial effects in vitro.

**Indications**

– Lack of appetite
– Dyspeptic complaints
– Biliary dyskinesia

**Contraindications:** Pregnancy, liver disease.

**Dosage and usage duration**

– *Tea:* One cup, 30 minutes before meal, 3 times a day. *Tincture:* 10 to 30 drops in 150 mL of water, 3 times a day (not for long-term use).

– *Daily dose:* 2–3 g herb.

**Side effects:** The concentration of thujone may be high enough to cause vomiting, stomach cramps, enterospasms, headaches, dizziness, and central nervous disorders if alcoholic extract high doses are used internally. Tea preparations contain much less thujone.

**Warning:** Prolonged use (more than 2 weeks) is not recommended; also contraindicated for pregnancy, lactation, and liver disease.

**Herb–drug interactions:** Not known.

**Calamus root** (Calami rhizome)
**General comments:** Calamus is a very common plant, the rhizome of which is used in medicine.

**Pharmacology.** Calamus rhizome (Calami rhizoma). The herb consists of the dried, coarsely chopped (and usually peeled) rhizome of *Acorus calamus* (L.). Calamus oil is distilled from the same plant.

- **Active compounds:** Essential oil (1.7–9.3 %), α- and γ-asarone, β-gurjunene, α-calacorene, and acorone (the content of cis-isosaralone and, especially, β-asarone depends on the degree of ploidy of the plant).

- **Pharmacological properties:** In animal studies, the herb demonstrated spasmolytic and sedative effects. Calamus also has stomachic action due to the presence of bitter principles and the spasmolytic effect of its essential oil. Calamus induces hyperemia when applied externally.

**Indications**
- **Internal use:** Dyspeptic complaints.
- **External use:** To induce local hyperemia and treat exhaustion. Used as a bath additive, it stimulates the circulation in the arms and legs.

**Contraindications:** Should not be used by pregnant or nursing mothers or by children under 6 years.

**Dosage and usage duration**
- **Tea:** Steep 1–1.5 g (ca. 2 teaspoons) of the herb in ca. 150 mL of boiled water for 3 to 5 minutes.

  - **Dosage:** One cup with each meal.
  - **Bath additive:** Use 250–500 g of the herb to prepare an infusion and add to bath water.

**Adverse effects:** There are not known side effects in humans in proper administration of the therapeutic doses of calamus of European origin (the essential oil of the European herb contains 15 % β-asarone). Alcoholic extracts of calamus contain considerably more β-asarone and should not be used for more than a few days.

**Warning:** Long-term use of the herb is not recommended since malignancies were found to develop in rats.

**Herb–drug interactions:** Not known.

Calamus has not been systematically evaluated, and prolonged use of the herb is not recommended.

The use of Indian calamus is not permitted because of its high β-asarone content.

**Yarrow herb and flower (Millefolii herba et flos)**
Yarrow has long been used for its wound-healing properties.

It is now used to relieve gastrointestinal complaints.

**Pharmacology.** Yarrow herb (Millefolii herba). The herb consists of the fresh or dried aerial parts of *Achillea millefolium* L., collected at flowering period.

- **Active compounds:** Essential oil (0.2–1.0 %) containing chamazulene (6–40 % max.), camphor (20 %), β-pinene (23 %), and 1,8-cineole (up to 10 %). Sesquiterpene lactones (mainly guaianolides) and flavonoids (apigenin- 7-O-glucoside and rutin) are also present. Azulenes tend to occur in the tetraploid subspecies growing in meadows, rather than hexaploid subspecies growing in forests.

- **Pharmacological properties:** The bitter principles (guaianolides) have cholagogic effects, whereas the flavonoids are spasmolytic. The interaction of different compounds...
(chamazulene and flavonoids) renders the herb antiedematous, anti-inflammatory, and antibacterial.

**Indications**
- *Internal use*: Lack of appetite, dyspeptic complaints, liver and gallbladder complaints.

**Contraindications**: Allergy to yarrow or other composite plants.

**Dosage and usage duration**
- *Tea*: Pour boiling water into 2–5 g of the chopped herb, cover and steep for 10 to 15 minutes.
  - *Dosage*: One cup, between meals, 3 to 4 times a day.

**Side effects**: There are not known side effects in proper administration of the therapeutic doses of the herb. The herb has a weak to moderate potential for sensitization.

**Herb–drug interactions**: Not known.

Yarrow is a well-known and well-tolerated herbal remedy.

Some species, including most varieties of *A. millefolium*, have little amount of chamazulenes, or no chamazulene at all, which reduces their anti-inflammatory effect. Products from varieties cultivated in Europe, but not North America are required to contain not less than 0.2 % proazulenes).

**Acrid bitters** (amara acria):
- *Cinnamon bark* (Cinnamomi cassiae or ceylanici cortex); *Ginger root* (Zingiberis rhizome) The plant is indigenous to the Southeast Asian region. The rhizome is used in medicine.

**Pharmacology.** Ginger root (Zingiberis rhizoma). The crude drug consists of the peeled fresh or dried rhizomes of *Zingiber officinalis* R. and preparations of the same.

- *Active compounds*: Essential oil (2.5–3.0 %) containing α-zingiberene, ar-curcumene, β-bisabolene, neral, geranial, (E)-α-farnesene, and zingiberol. Gingerols, diarylheptanoids (gingerenones A and B), and starch (50 %) are also present.

- *Pharmacological properties*: Ginger has antiemetic action, stimulates the flow of saliva and gastric juices, and increases intestinal peristalsis. It also produces antibacterial, antifungal and platelet aggregation inhibiting effects.

**Indications**
- Lack of appetite
- Travel sickness
- Dyspeptic complaints

**Contraindications**
- Morning sickness due to pregnancy

**Dosage and usage duration**
- *Internal use*: Daily dose: 2–4 g dried or fresh rhizome.
  - *Tea*: Simmer 0.5–1 g of the dried or fresh, sliced or coarsely powdered rhizome in a covered pot for 15 minutes, then pass through a tea strainer (1 teaspoon = ca. 3 g drug).
  - *As an antiemetic*: Take 2 g of the freshly powdered dissolved rhizome.
    - One dose is equal to 0.3–1.5 g herb.

**Side effects**: There are not known side effects in proper administration of the therapeutic doses of the herb.
**Warning:** Due to its cholagogic activity, patients with gallstones should not use ginger without qualified health care provider consultation.

**Herb–drug interactions:** Not known.

Bitters initially stimulate the secretion of saliva. Once they reach the stomach, they stimulate the release of gastrin, thus enhancing upper gastrointestinal motility. Bitters also stimulate the bile secretion, pancreatic juice and pepsinogen secretion.

Bitters stimulate appetite in patients with gastric juice insufficiency (achylia) which may be the result of chronic atrophic gastritis.

– Bitters do not stimulate the appetite in healthy people.
– Overdose can lead to a digestion-suppressive effect.
– Usually bitters are not effective in cancer-related anorexia treatment. Nonetheless, one should try various preparations.

**Side effects**
– Although rare, headaches may occur.

**Dosage and administration**
– Bitters should be taken 15 to 30 minutes before at doses large enough, to be effective.
– Bitters should be briefly retained in the mouth before swallowing.

### 5.3. Reflux, Gastritis, Gastroduodenal Ulcers, Dyspepsia

Reflux is characterized by the symptomatic backward flow of the stomach contents (especially gastric acid) into the esophagus due to weakness (insufficiency) of the gastroesophageal sphincter.

– Acute stomach diseases (acute gastritis) can be caused by a variety of factors, such as simple overeating, stress, alcohol, medications, acids, alkaline substances and bacterial infections. Acute stomach diseases can become chronic. The upper layers of the gastric mucosa are being affected.

– **Symptoms:** Upper abdominal pain, anorexia, nausea, vomiting, bleeding.
– **Gastroduodenal ulcers** occur because of imbalance between protective and aggressive factors. On the mucous membrane of the stomach and/or duodenum erosions may be found extending into the deep layers of the stomach wall.

– Functional stomach disorders (diagnosis of exclusion) play a very important role, as they are found in 30–50% of all patients with upper abdominal complaints.

– Nervous disorders are suspected if there are no organic changes. It is difficult to distinguish nervous system related disorders from common upper abdominal complaints after meal (dyspeptic syndrome). The stomach and duodenum (nausea, belching, upper abdominal discomfort) as well as the small and large intestine (flatulence, cramplike abdominal pain, diarrhea) can be involved.

– **Ulcer-like dyspepsia:** Nocturnal pain, episodic pain, pinpoint pain.
– **Dysmotility dyspepsia:** Nausea or vomiting, premature satiation, belching, gas, upper abdominal tension, flatulence.
– **Reflux dyspepsia:** Heartburn.
– **Aerophagia:** Flatulence and belching.
Clinical value of herbal medicine and herbal treatment means

- **Reflux**: Herbal remedies are used for adjunctive treatment only.
- **Gastritis**
  - The effectiveness of herbal remedies for autoimmune gastritis (type A) is still unclear.
  - Treatment of *Helicobacter pylori*-related gastritis (type B) consists of eradicating the pathogen by acid blockade means and antibiotic treatment.
  
  Herbal remedies can be prescribed as auxiliary means.
  - Drug-induced gastritis (type C) caused by salicylates, non-steroidal anti-inflammatory drugs, and other medications responds well to mucoprotective herbal remedies. Their usage is, however, limited for adjunctive therapy only.
- **Ulcers**: Antacids, mucoprotective drugs, and antisecretry drugs (e. g., H2-antagonists and proton pump inhibitors) are normally used. In this case, herbal remedies are limited for adjunctive therapy only.
- **Non-ulcer-related dyspepsia**: A number of herbal remedies are used to treat dyspeptic syndrome.

Antiphlogistics

**Chamomile flower** (Matricariae flos). Chamomile is widely spread throughout Europe.

While collecting chamomile, it is important to remember that the receptacle of true chamomile is hollow and conical. The flower heads are used in medicine.

**Pharmacology.** Chamomile flower (Matricariae flos). The crude drug consists of fresh or dried flower heads of *Matricaria recutita* L., which is also called *Chamomilla recutita* (L.) R.

  - **Active compounds:** Essential oil (0.4–1.5 %) containing mainly α-bisabolol (5–70 %), bisabolol oxides A and B (5–60 %), β-trans-farnesene (7–45 %), and chamazulene (1–35 %) derived from matricin, a nonvolatile proazulene, by steam distillation. Flavonoids and mucilage are also contained.
  - **Pharmacological properties:** The essential oil has antiphlogistic and spasmolytic effects and promotes wound recovery. The compound α-bisabolol inhibits fungal and bacterial growth.

**Indications**

- Gastritis and ulcer
- Inflammations of the mouth and throat
- Mild nervousness or insomnia (not rated by E Commission)

**Contraindications:** Chamomile flower is not recommended for compresses applied in the eye region, not to let pollen and other flower particles got into the eyes.

**Dosage and usage duration**

- **Tea:** Pour 1 tablespoon (3 g) of the herb into 1 cup of hot, cover, and steep for 5 to 10 minutes (1 teaspoon = 1 g herb).
  - **Dosage:** One cup, freshly prepared, between meals, 3 to 4 times a day.
- **Mouthwash and gargle:** Rinse the mouth or gargle with the fresh tea infusion several times a day.

**Side effects:** There are not known side effects in proper administration of the herb therapeutic doses. The herb has a slight potential on sensitization.

**Herb–drug interactions:** Not known.

**Peppermint leaf** (Menthae piperitae folium) see above.

**Indications**
Dyspeptic symptoms
Liver and gallbladder complaints

Contraindications: Not known.

Dosage and usage duration
- Tea: Steep 1 tablespoon (3–6 g) of the herb in 150 mL of boiled water for 10 minutes. Sip slowly while hot.
  - Dosage: One cup 3 to 4 times a day, between meals.
  - Side effects: Due to its cholagogic action, the herb can induce acute abdominal pain in patients with gallstones.

Herb–drug interactions: Not known.
Peppermint leaf combines well with other herbal preparations that induce spasmolysis.

Balm leaf (Melissae folium).
General characteristics: Balm is native to the eastern Mediterranean and Western Asian regions. Lemon balm plants in Central Europe are both cultivated and naturalized. The plant has been used as a medicinal herb since ancient times.

Pharmacology. Lemon balm leaf (Melissae folium). The herb consists of the fresh or dried foliage leaves of Melissa officinalis L.
  - Active compounds: Essential oil (0.02–0.8 %) containing geranial/α-citral and neral/β-citral (40–75 % in total).
  - Pharmacological properties: Lemon balm has antiviral and antioxidant effects in vitro. Choleretic, calming, and carminative effects in animals have been observed.

Indications
- General nervousness and sleeplessness
- Gastritis and ulcer

Contraindications: Not known.

Dosage and usage duration
- Tea: Steep 1.5–4.5 g of the herb in 1 cup of hot water for 10 minutes.
  - Dosage: One cup, several times a day.
  - Daily dose: 1.5–4.5 g of the herb.

Licorice root (Glyzyrrhiza radix) see above.

Indications
- Gastritis
- Ulcer

Contraindications: Chronic liver disease, cholestatic liver diseases, liver cirrhosis, severe renal failure, hypertension, hypokalemia, and pregnancy.

Dosage and usage duration
- Tea: Pour 150 mL of boiled water into 2–4 g (1 teaspoon = ca. 3 g) of the chopped or coarsely powdered herb, or place the herb in cold water and boil. Steep for 10 to 15 minutes, then strain.
  - Dosage: One cup, after meal, 2 to 3 times a day.
  - Succus liquiritiae: 0.5–1 g herb for catarrh of the upper respiratory tract; 1.5–3 g herb for peptic ulcers.
  - Daily dose: 5–15 g herb (equivalent to 200–600 mg glycyrrhizin).
  - Chamomile flower: Chamomile alone is not very effective in ulcer treatment.
Because of its general efficacy and absence of side effects, it is still commonly recommended for adjunctive treatment at the onset and during acute ulcer episodes. The greatest strength of chamomile is to prevent from diseases.

- **Licorice root**: Due to antiphlogistic effect, the herb is mainly prescribed to treat ulcer-related conditions, as well as for gastritis and dyspeptic syndrome.
  - **Contraindications**
    - **Licorice root**: Cholestatic liver diseases, liver cirrhosis, hypertension, hypokalemia, severe liver failure, and pregnancy.
    - **Chamomile flower**: Allergic reactions to chamomile are possible
    - **Peppermint leaf and its preparations**: Reflux.
  - **Dosage and administration**: Licorice preparations should not be used for more than 4–6 weeks for one course unless directed by a physician. Standardized licorice root extracts made with diluted ethanol and containing no less than 4.0 % and no more than 6.0 % glycyrrhizin are preferably used.
    - Deglycyrrhinated licorice extract (DGL) is widely recommended and is available in capsules or tablets in North America. The preparation is almost as effective as whole licorice, but with fewer side effects.
  - **Side effects**: Undesirable mineralocorticoid effects occur after a weekly dose of ≥3.5 g glycyrrhizin (from licorice root). Rare cases of myoglobinuria have also been reported.

**Demulcents**

**Flaxseed** (Lini semen, Flaxseed)

- **General characteristics**: There are many species of flax. Some are used to make fabrics, whereas others are used to produce flaxseed oil, a valuable foodstuff and medicinal product.
- **Pharmacology**: Flaxseed (Lini semen). The crude drug consists of the ripe, dried seeds of *Linum usitatissimum*.
  - **Active compounds**: 3–10 % mucilage (arabinoxylans, galactans, rhamnogalacturonans), cyanogenetic glycosides (0.05–0.1 %), and 10–45 % fatty oil (linolenic acid, 40–70 %; linoleic acid, 10–25 %; oleic acid, 13–30 %).
  - **Pharmacological properties**: Linseed has laxative effect due to its fiber and mucilage components. Linseed lowers the cholesterol concentration in the liver of animals. Prussic acid is not produced from the cyanogenetic acids.

- **Indications**
  - Constipation
  - Gastritis
  - Enteritis

- **Contraindications**: Bowel obstruction, esophageal stenosis or narrowing of the gastrointestinal tract and acute inflammatory diseases of bowels, esophagus.

- **Dosage and usage duration**
  - **Internal use**
    - **Gastritis, enteritis**: Flaxseed gruel is prepared using 2 to 3 tablespoons of ground or chopped flaxseed.

- **Adverse effects**: Bowel obstruction is possible without an adequate intake of fluids as a result of large quantities consumption to treat constipation. The cyanogenetic glycosides do not
pose a health risk. Some commercial flaxseeds were announced to contain cadmium beyond the administrative limit. This should be taken into account during chronic usage of flaxseed.

**Herb–drug interactions:** Flaxseed can impair the absorption of pharmaceutical drugs or herbal preparations containing very potent constituents such as cardiac glycosides (i.e. *Digitalis* spp.) if taken concomitantly.

**Important:** Flaxseed may impair the absorption of other drugs. The patient using flaxseed should drink plenty of fluids, at least 150 mL after the herb administration.

Anticholinergics

**Belladonna** (Atropa belladonna).

- **Action:** Parasympatholytic. Alkaloids of the atropine group inhibit vagus nerve activity, reduce gastric juice secretion, and diminish intestinal motility.

  They are, therefore, used to relieve spasms, gastrointestinal colic, and gallbladder colic.

- **Contraindications:** Narrow-angle glaucoma, mechanical gastrointestinal tract stenosis, benign prostatic hypertrophy with residual urine formation, acute pulmonary edema, and tachycardia.

- **Dosage and administration**
  - *Belladonnae radix:* Single dose 0.05 g; maximum single dose 0.1 g (equivalent to 0.5 mg total alkaloids). Maximum daily dose 0.3 g, equivalent to 1.5 mg total alkaloids calculated as L-hyoscyamin.
  - *Belladonna extract:* Single dose 0.01 g; maximum single dose 0.05 g, equivalent to 0.73 mg total alkaloids calculated as L-hyoscyamin.

  **Note:** Belladonna is dispensed on prescription only.

- **Side effects:** Dose-dependent side effects, such as dryness of the mouth, blurred of vision, micturition disorders, headaches, and stupor.

### 5.4. Dyspeptic syndrome

- **Dyspeptic syndrome** is the generic term for all types of upper abdominal and retrosternal pain, abdominal discomfort, heartburn, nausea, vomiting, and other gastrointestinal symptoms.

- It is characterized by prolonged upper abdominal problems due to underlying functional disorder with or without additional psychovegetative component. The symptoms occur in the intestinal lumen without significant intestinal wall involvement. The following types can be distinguished:

  - Epigastric meteorism with distended abdomen (most common type):
    - The stomach and intestines are often jointly involved.
  
  - Arteriosclerosis of gastrointestinal arteries: Characterized by deficient absorption of intestinal gases and flatulence.

  - Cholecystopathies (latent or manifest), food intolerance, the characteristic symptoms of distension are in the stomach with bloating and belching.

  - Dysoptility type: Abdominal distension and bloating, premature feeling of satiation, diffuse abdominal pain during daytime only, nausea, food intolerance, vomiting, aversion to food, and constant discomfort.
**Herbal treatment means**
- Herbal remedies can be used for trial treatment (for 14 days) or symptomatic treatment.

- **Symptomatic herbal therapy**
  - **Dyspepsia with motor disorders:** Bitters can be used to counteract motor disorders of the upper gastrointestinal tract, e.g., a large flaccid stomach or motor disorders related to bile and pancreatic juice secretion. If the problem is already long-standing, treatment must usually be continued for several weeks before the preparations become effective. A high-fiber diet is also recommended.
  - **Meteorism:** Carminatives are used to treat meteorism. They are sometimes combined with bitters, antiphlogistics, and/or tannin-containing herbs, depending on the symptoms involved.

**Clinical value of herbal medicine**
- Herbal remedies permit differentiated treatment according to the type and severity of the predominant symptoms.
- Synthetic drugs and chemical remedies (e.g., prokinetic drugs) are used when there is positive evidence of organic disease or if the patient fails to respond to trial herbal therapy.

**Carminatives**
**Caraway seed** (Carvi fructus, Caraway fruit (Carvi fructus)). The crude drug consists of the ripe, dried, seedlike fruit of *Carum carvi* L.
  - **Active compounds:** Essential oil (3–7 %), fatty oil (10–18 %) containing petroselinic acid (40–50 %), oleic acid (29–30 %), and polysaccharides (13 %).
  - **Pharmacological properties:** carminative.

**Indications:** Dyspeptic symptoms.

**Contraindications:** Not known.

**Dosage and usage duration**
- **Tea:** Steep 1 to 2 teaspoons (ca. 1.5 g) of the herb, crushed immediately before the usage, in 150 mL of hot water for 10 to 15 minutes in a covered vessel.
  - One dose equals 1–5 g herb.
- **Daily dose:** 1.5–6 g herb.

**Side effects:** There are not known side effects in proper administration of the herb therapeutic doses. Long-term, high-dose administration of caraway oil (e.g., in caraway liqueur) can cause kidney and liver damage.

**Herb–drug interactions:** Not known.

**Fennel seed** (Foeniculi fructus) > The oil and seedlike fruit of *Foenicum vulgare* are used in medicine. See above.

**Indications**
- Dyspeptic symptoms

**Dosage and usage duration**
- **Fennel honey** (contains 0.5 g fennel oil per kg) or fennel syrup:
  - **Daily dose:** 10–20 g. The sugar content must be taken into account when used by diabetic patients.
- **Fennel oil**
Dosage: 2–5 drops, diluted in water or chamomile tea, after each meal.

Daily dose: 0.1–0.6 mL. Should not be used for more than 2 weeks.

Fennel seed tea: Steep 2–5 g of the herb, crushed or ground immediately before the usage, in 150 mL of boiled water for 10 to 15 minutes.

Dosage: One cup between meals, 2 to 4 times a day.

Daily dose: 5–7 g crushed fruits.

Fennel syrup: Fennel tincture: 0.8 mL (30 drops) to 2 mL, 3 times a day.

Daily dose: 10–20 g. Should not be used for more than 2 weeks without experienced practitioner consultation.

Aniseed (Anisi fructus)
The essential oil extracted from the mature and dried fruit is used in medicine.

Indications
– Dyspeptic symptoms
– Lack of appetite

Dosage and usage duration
– Internal administration

Daily dose:
3 g dried seeds.

Tea:
One cup in the morning and/or evening (expectorant). For gastrointestinal symptoms: 1 tablespoon daily (adults), 1 teaspoon in bottle (infants).

As a liniment, should be applied every 30 to 60 minutes

(acute) or 1 to 3 times a day (chronic).

When taken orally, carminatives induce a feeling of warmth and facilitate eructation and permeability of gas after meals. They contain essential oils that induce spasmolysis or promote bowel motility and probably have antibacterial effects. They are not as potent as specific antibiotics or antispasmodics. The most potent carminative is caraway, followed by fennel and aniseed.

Contraindications: Patients with gallstones should not use carminatives unless are directed by a physician.

Side effects: Carminatives reduce the pressure in the esophageal sphincter and can therefore cause heartburn.

5.5. Chronic Hepatitis and Cirrhosis of the Liver

– Chronic viral hepatitis is caused by infection with hepatitis B, C, or D viruses.
– Toxic liver damage is caused by alcohol, drugs, or chemicals.

Herbal and general treatment means
– Artichoke leaf extracts have antioxidant effects and stimulate choleresis.

Clinical studies on the efficacy of artichoke leaf extract in hepatitis or liver cirrhosis are not available.

– Commercial milk thistle fruit products are used to treat toxic liver damage and chronic hepatitis. They are also used for liver cirrhosis adjunctive treatment.
Only standardized products that do not contain alcohol should be used. The efficacy of many pharmaceutical combinations containing milk thistle is rather controversial.

**Clinical value of herbal medicine**
- Despite the considerable research effort, synthetic remedies for viral hepatitis and toxic liver disease often do not achieve satisfactory results.
- Herbal remedies also cannot be expected to achieve curative results.
- Studies on the use of herbal remedies for chronic autoimmune hepatitis, primary biliary cirrhosis, and metabolic diseases treatment exist but are not very conclusive in their efficacy.

**Milk thistle fruit** (Cardui mariae fructus)
The milk thistle is a native European medicinal plant that has been used since ancient times. It has striking deep green leaves with white spots along the veins.

**Pharmacology.** Milk thistle fruit (Cardui mariae herba). The crude drug consists of the pappus-free, ripe fruit of *Silybum marianum* (L.) G.
- **Active compounds:** Silymarin (flavonolignan mixture, 1.5–3%), primary components silybin A and B (combination of the two is called silibinin), isosilybin A, isosilybin B, silychristin, silydianin, flavonoids (apigenin, chrysoeriol, eriodictyol, naringenin, quercetin, taxifolin), and fatty oil (20–30%).
- **Pharmacological properties:** Silymarin and silibinin were found to have hepatoprotective effects in studies on liver damage. Silymarin stimulates RNA polymerase I in the nucleus of hepatocytes. This, in turn, increases the rate of ribosomal protein synthesis and enhances the regenerative capacity of the liver. Silymarin is an effective antidote for *Amanita* mushroom poisoning because it antagonizes the inhibition of RNA polymerase I by α-amanitine. The herb also has weak cholagogic properties.

**Indications**
- Dyspeptic symptoms
- Liver and gallbladder complaints

**Contraindications:** Not known.

**Dosage and usage duration**
- **Daily dose:** 200–400 mg silymarin based on the silibinin content (usually 80 %) in a divided dose, around mealtimes.

**Side effects:** Not known.

**Herb–drug interactions:** Not known.

**Artichoke leaf** (Cynarae folium). The dried whole or chopped basal leaves and the fresh or dried herb of *Cynara scolymus* L. are used in medicine. See above.

**Indications**
- Lack of appetite
- Meteorism
- Liver and gallbladder complaints
- Hyperlipoproteinemia (high-dose, standardized extracts)

**Dosage and usage duration:** The fresh leaves, fresh juice, and dry extracts are used in medicinal preparations.
- **Daily dose:** 6 g drug.
- **Artichoke leaf:** Has membrane-protective and antioxidant effects.
Milk thistle fruit: The herb and silymarin, a compound in it, are reported to have hepatoprotective, antioxidant, and proregenerative effects when administered by the oral route. A cholangogue effect has also been revealed.

Standardized milk thistle extracts: The silymarin content comprises no less than 30% silybinin, the actual active constituent. Commercial products usually contain up to 80% total silybinin and related compounds. Silybinin stimulates the entire process of cellular protein synthesis, resulting in regenerative effects. Its primary target organ is the liver, where silybinin is primarily accumulated due to its marked enterohepatic circulation.

Side effects: All of these preparations have a mild laxative effect.

5.6. Diseases of the Gallbladder and Biliary Tract

General characteristics
- So-called functional disorders such as gallbladder dyskinesia and postcholecystectomy syndrome are often seen in general practice.
- The symptoms include indefinite complaints in the right upper quadrant that radiate to the back or to the right shoulder. This may progress to mild colic.
- These symptoms are sometimes associated with irritable colon. The etiology is still unclear.

Herbal treatment means
- Cholegogues are remedies with biliary-stimulating action. They are commonly used in the above indications. Pungent herbs remedies such as caraway, pepper, and ginger root as well as bitters and antispasmodics are also commonly used. Since most of these patients suffer from constipation, herbal laxatives are often helpful.
- Commercial products, that contain no more than six different herbal components should be selected. Teas and tinctures with a strong aroma are preferable to use.
- Fixed combinations of laxatives should be avoided.
- All gallbladder teas can be sweetened with sugar, honey, or artificial sweeteners.

Clinical value of herbal medicine: Cholagogues are not suitable for cholelithiasis, cholangitis, or intrahepatic cholestasis treatment. In many cases, they are even contraindicated.

Choleretics

Milk thistle fruit (Cardui mariae fructus), artichoke leaf (Cynarae folium) yarrow herb and flower (Millefolii herba et flos), Everlasting flower (Helichrysum arenarium), dandelion root and herb (Taraxaci radix et herba).
- **Action:** Stimulate the flow of bile and induce spasmolysis.
- **Contraindications**
  - **Artichoke, dandelion:** Liver disease. Should not be used concomitantly with hepatotoxic medications.
  - **Yarrow:** Hypersensitivity to yarrow and other composite plants.
- **Side effects**
  - **Dandelion:** Can upset the stomach by causing hyperacidity.

Cholegogues

Peppermint oil (Menthae piperitae aetheroleum); peppermint
leaf (Menthae piperitae folium); dandelion herb (Taraxaci herba).

*Action*: These herbal remedies have specific antispasmodic effect and stimulate exocrine pancreatic juice secretion. They are variably effective in secretion increase and bile release (choleresis).

- **Contraindications**
  - Peppermint oil: Biliary tract obstruction and jaundice. Should be used with caution by patients with gallstones.

- **Side effects**
  - Peppermint oil: Stomach problems. Gastroesophageal reflux.

### 5.7. Acute and Chronic Diarrhea

**General characteristics**
- Diarrhea is defined as a passage of pasty or watery stool more than 3 times a day.
- It is a cardinal symptom of infectious disease and viral enteritis.
- Other causes of diarrhea include functional bowel disorders with hypermotility and hypersecretion (especially, in the small intestine), allergic enteropathy, ulcerative colitis, hyperthyroidism, and chronic alcoholism.

**Herbal treatment means**: White oak bark tea (1 to 4 g/day), bilberry standardized extract (25% anthocyanidins) in capsules or tablets (80 mg, 3 times aday).

- Bilberry is especially suitable for pediatric use. Astringent teas and tinctures contain tannins that seal the surface of the intestinal mucosa, thereby reducing the penetration of fluids.

**Clinical value of herbal medicine**
- Herbal antidiarrheal agents can be used as a part of dietary therapy or for symptomatic treatment. They are especially useful in cases where synthetic drugs cannot or should not be used. Hence, the herbs are used in subacute cases of enteritis and enterocolitis as well as in summer diarrhea and, with certain restrictions, functional diarrhea.
- Antibiotics are the first-line drugs for severe bacterial enterocolitis treatment.

**Astringents**

Bilberry fruit (Myrtilli fructus); tormentill (Potentilla tormentilla L.) oak bark (Quercus cortex). The common or pedunculate oak (Quercus robur) is distinct from the sessile or durmast oak (Quercus petraea). There are no significant differences in the concentrations of active substances in the bark of the two species. The tree is common to Europe, Asia, and Caucasus. Bark from a number of oak species is collected in North America, especially from Quercus alba, white oak.

**Pharmacology.** Oak bark (Quercus cortex), consists of the dried bark harvested from young branches and twigs of Quercus robur L. and/or Quercus petraea (M.) L. in spring.

- **Active compounds**: Tannins (12–16 %), including catechins, oligomeric proanthocyanidins, and gallotannins.
- **Pharmacological properties**: Tannins have astringent, anti-inflammatory, antiviral, and anthelmintic effects.

**Indications:**
- Internal use: for unspecific acute diarrhea.

**Warning**: Physician consultation is needed, if diarrhea persists for more than 3 to 4 days.
**Contraindications:** External use: extensive skin damage.

**Dosage and usage duration**
- **Internal use:** Tea: Add 1 g chopped or coarsely powdered dried bark to cold water, boil and steep (1 teaspoon = ca. 3 g drug).
- **Daily dose:** 3 g dried bark.
- **External use**
  - **Gargles and compresses:** Boil 2 tablespoons of the cut dried bark in 3 cups of water. For mouth and throat inflammation, gargle with the solution several times a day.
  - **For hydrotherapy:** Boil 5 g of the dried bark in 1 liter water. Use the infusion to prepare a full or partial bath. The patient should bathe for 20 minutes at 32–37 °C once a week initially, then 2 to 3 times a week thereafter.

**Side effects:** Not known. When used internally, the secretion inhibiting effects of the drug can cause indigestion. Tannins can cause bowel irritation in some individuals, when taken on an empty stomach.

**Herb–drug interactions:** Oak bark interferes with the absorption of alkaloids and other alkaline drugs.

Tormentil root (Tormentillae rhizoma) Tormentil is a plant native to the entire European continent. It has been revered for its astringent effects for a long time. The rhizome is used in medicine.

**Pharmacology.** Tormentil rhizome (Tormentillae rhizoma). The herb consists of the rootless dried rhizomes of *Potentilla erecta* (L.) R. (syn. *Potentilla tormentilla* N.).
- **Active compounds:** Tannins (17–22 %), tannins of the catechin type (15–20 %), gallotannins (ca. 3.5 %), flavonoids, and triterpenes (tormentoside, tormentillic acid glucoside).
- **Pharmacological properties:** Tannins in tormentil have astringent, antibacterial, and styptic effects. Clinical studies are not yet available.

**Indications**
- Diarrhea
- Inflammations of the mouth and throat

**Contraindications:** Not known.

**Dosage and usage duration**
- **Tea:** Steep 3–4 g herb in 150 mL of hot water. For diarrhea: One cup, between meals, 2 to 3 times a day.
- **Daily dose:** 4–6 g herb.

**Side effects:** Tormentil can cause nausea or vomiting in sensitive individuals, especially on an empty stomach.

**Herb–drug interactions:** Not known.

Tormentil is a useful tannin-bearing herb that is suitable for unrestricted over-the-counter use.
- **Action of astringents:** Occludes the surfaces of the intestinal mucosa.
- **Contraindications:** Not known.
- **Side effects:** Oak bark and tormentil root may upset the stomach in sensitive individuals.
5.8. Constipation and Colonic Diverticulosis

**General characteristics**
- Acute constipation usually has an identifiable organic cause.
- Chronic constipation is due to functional causes in 80–90 % of cases. Lack of exercise, unhealthy eating habits, suppression of the urge to defecate, and pseudoconstipation play an important role.
- Acquired diverticulosis is characterized by the presence of multiple pseudodiverticula (circumscribed mucosal protrusions through gaps in the muscle layer). They develop when the intraluminal pressure becomes abnormally elevated due to a low-fiber diet, chronic constipation, and weakness of the muscle and fibrous tissue in the intestinal wall (sigmoid colon in two-thirds of all cases).

**Herbal and general treatment means**: The primary goal of treatment is to eliminate the functional causes of constipation or colonic diverticulosis. Herbal laxatives should primarily be used for supportive treatment.

**Clinical value of herbal medicine**
- Bulk laxatives have a very low incidence of side effects and are therefore an excellent choice for long-term treatment, especially in patients with chronic constipation.
- Stimulant laxatives should not be employed before all other means have failed. They should not be used for more than 1 to 2 weeks without medical supervision. Stimulant laxatives can be used in combination with bulk laxatives in transitional period.

Antiabsorptive and Hydragogue Laxatives (Anthranoid Drugs)
- **Rhubarb root** (Rhei rhizoma);
- **Senna leaf and fruit** (Sennae folium et fructus);
- **Frangula bark** (Frangulae cortex)

**Pharmacology**
- **Herb**: Frangula bark (Frangulae cortex). The herb consists of the dried bark of branches and twigs of *Rhamnus frangula* L. (*Frangula alnus* Miller)
- **Important**: Since fresh Frangula bark can induce nausea, the drug must be stored for one year before use.
- **Active compounds**: Anthraquinone derivatives (4–6 %), including anthranoids, glucofrangulin A and B, and frangulins A, B and C.
- **Pharmacological properties**: Anthraquinones promote the active secretion of electrolytes and water into the intestinal lumen, simultaneously inhibiting their absorption from the intestine. The liquefaction of the bowel contents leads to an increase in intestinal filling pressure. Stimulation of intestinal peristalsis also occurs.

**Indications**: For short term treatment of occasional constipation.

**Contraindications**: Bowel obstruction, acute inflammation of the bowels, appendicitis. Frangula bark should not be given to us children under 10 years and is not recommended during pregnancy or breast-feeding.

**Dosage and usage duration**
- **Tea**: Steep 2 g of the finely chopped dried bark in 150 mL of boiled water for 15 minutes.
Dosage: One cup in the morning and evening. Sweeten with honey and add orange peel to change the taste if needed.

- An aqueous suspension containing 0.6 g of the powdered drug normally produces a bowel movement within 6 to 24 hours.
- *Daily dose of glucofrangulins:* 20–30 mg, calculated based on the content of glucofrangulin A.
- It is recommended to use smaller dose for soft stools.
- *Duration of treatment:* Not more than 1 to 2 weeks.

**Side effects:** Vomiting and gastrointestinal cramps.

**Warning:** Prolonged use leads to the loss of electrolytes, especially potassium ions, which can result in hyperaldosteronism, inhibition of intestinal motility and, in rare cases may cause cardiac arrhythmia, nephropathy, muscle weakness, edema and accelerated bone degeneration.

**Herb–drug interactions:** Because of the loss of calcium, drug can increase the effects of cardiac glycosides if taken concurrently.

**Buckthorn fruit** (Rhamni cathartici fructus) The buckthorn bush is widely distributed throughout Europe. Its fruit is used as a laxative.

**Pharmacology.** Buckthorn fruit (Rhamni cathartici fructus). The crude drug consists of the fresh or dried ripe drupes of *Rhamnus cathartica* L.

- *Active compounds:* Anthracene derivatives (2–7 %) (anthranoids), tannins (3–4 %), and flavonoids (1–2 %).
- *Pharmacological properties:* Anthracenes are anti-absorptive and hydragogue laxatives. Hence, the herb softens the stools and increases the volume of the bowel contents.

**Indications:** Constipation.

**Contraindications:** Bowel obstruction, acute intestinal inflammations, appendicitis, abdominal pain of unknown origin. Use during pregnancy and lactation only by medicinal advice. Usage is contraindicated to children under 12 years old.

**Dosage and usage duration**

- *Tea:* Steep 4 g (ca. 1 teaspoon) of chopped herb in 1 cup of boiled water for 10 to 15 minutes. Alternatively, place the herb in cold water, boil for 2 to 3 minutes, then strain immediately.

- *Dosage:* One cup in the morning and at night.
- *Daily dose:* 2–5 g.

- As a rule, the individual correct dosage is the lowest that is necessary to obtain soft stool, and this plant is used for short term therapy (only few days).

**Side effects:** The laxative effect of the herb can lead to gastrointestinal cramps. Long-term use can result in the loss of electrolytes, particularly potassium ions, thereby leading to such problems as hyperaldosteronism and decreased bowel motility. Arrhythmias, nephropathies, edemas, and accelerated bone degeneration are rare side effects. Consumption of large quantities of buckthorn fruit can lead to diarrhea with vomiting and kidney irritation.

**Herb–drug interactions:** Due to its laxative effect, buckthorn fruit can impair the absorption of pharmaceutical drugs or herbal preparations containing potentially toxic or life-sparing constituents such as cardiac glycosides (i.e., *Digitalis* spp.) if taken concomitantly.

**Warning:** Chronic use or abuse of the herb can increase the potency of cardiac glycosides and diuretics due to the potassium deficiency.
Almost all herbal stimulant laxatives are anthracene derivatives.

They develop therapeutic action by stimulating local receptors after coming into contact with the intestinal mucosa. They increase propulsion and decrease intestinal passage time. The impairment of ion pumps leads to a loss of water and electrolytes in the intestinal lumen and impedes absorption, hydrating the fecal mass. The bacterial flora in the colon releases anthrones, the actual active principles, from the pharmacologically inert anthranoid drugs.

- **Contraindications:** Pregnancy (may induce abortion), appendicitis, gastrointestinal bleeding or stenosis, bowel obstruction, acute inflammatory diseases of the bowel, severe water and mineral imbalances. Should not be given to children under 12. Should not be used in lactation period by nursing mothers unless the expected benefits clearly outweigh the potential risks.

- **Side effects**
  - Excessive use can sometimes provoke diarrheal stools, often in combination with abdominal pain. Cramplike gastrointestinal pain can occasionally occur. In this case the use of herbal remedies should be discontinued.
  - Triggers an increase in blood flow in the abdominal arteries, especially in the uterus and adnexa.
  - Long-term use can affect the water and mineral balance, leading to potassium deficiencies, especially when taken together with diuretics or adrenal steroids. These laxatives can therefore amplify the effects of cardiac glycosides.
  - May cause reversible pigmentation of the intestinal mucosa and reddish-brown discoloration of the urine.
  - When administered intermittently and at low doses, side effects such as hypokalemia, damage of the renal tubules, and worsening of constipation are not expected.

Bulk Laxatives

**Psyllium seed and husk** (Plantaginis Psyllium semen)

**Pharmacology.** Psyllium (Psyllii semen). The crude drug consists of the dried mature seeds of *Plantago psyllium* L. The swelling index of the preparations used in medicine should be not less than 10.

- **Active compounds:** 10–12% mucilage (arabinoxylans) in the seed coat and iridoid glycosides (ca. 0.14% aucubin).
- **Pharmacological properties:** Regulates the bowels due to the swelling capacity of its mucilages. The stool volume increases, the transit time decreases (a desirable effect in constipation), and intestinal peristalsis is stimulated. When used to treat diarrhea, the herb leads to fluid binding, thereby normalizing the transit time.

**Indications**
- Irritable bowel syndrome, chronic constipation
- Intestinal diseases in which stool softening is needed to facilitate defecation

**Contraindications:** Gastrointestinal tract stenosis, inflammation of the gastrointestinal tract (risk of irritation and spasm), imminent or existent bowel obstruction.

**Dosage and usage duration**
- **Daily dose:** 12–40 g seeds. Leave whole or coarsely crushed seeds to swell in water, then take with plenty of water (150 mL for each 5 g of the drug). Psyllium is best taken on an empty stomach in the morning.
Onset of effect after a single dose occurs within 12 to 24 hours. The maximum effect can be observed within 2 to 3 days. Consult a physician in any case diarrhea lasts for more than 3 to 4 days.

**Side effects:** Hypersensitivity reactions (rhinitis, conjunctivitis, asthma, rash) have been reported in isolated cases. There can be a blockage of the esophagus or intestine and choking attacks, if patient, especially an elderly one, does not take plenty of water. Drinking two 8-ounce glasses of water is recommended to prevent this effect.

**Herb–drug interactions:** The herb can delay the absorption of other drugs if used concomitantly. Psyllium polysaccharides can increase the effects of insulin or oral antidiabetic drugs.

**Flaxseed** (Lini semen, Flaxseed) There are many species of flax. Some are used to make fabrics, whereas others are used to produce flaxseed oil, a valuable foodstuff and medicinal product. See above.

**Indications**
- Constipation
- Enteritis

**Dosage and usage duration**
- **Internal use**
  - *Constipation:* One tablespoon of whole or crushed flaxseed, 2 to 3 times a day, in two 6-ounce glasses of water (at least 150 mL).
  - *Gastritis, enteritis:* Flaxseed gruel prepared using 2 to 3 tablespoons of ground or chopped flaxseed.

*Is effective* for mild laxative and mechanical stimulatory action. Bulk-forming agents absorb large quantities of fluids, thereby increasing the volume of the feces. This results in enlargement of the colon (stretch reflex) and increased intestinal peristalsis.

- **Contraindications:** Esophageal stenosis, gastrointestinal stenosis, imminent or existing bowel obstruction, refractory diabetes mellitus.
- **Side effects:** Hypersensitivity reactions have been reported in isolated cases.
- **Interactions**
  - May delay the absorption of concomitant medications. Other medications should therefore be taken no sooner than 30 to 60 minutes after the laxative.
  - It may be necessary to reduce the insulin dose in insulin-dependent diabetics.

**Sample tests**

Mention the carminative plants.
1. Caraway
2. Hawthorn
3. Fennel
4. Aniseed
a) 1.3.4
b) 1.2.4
c) 2.3.4
d) 1.2.3.4.
All the following plants are effective against constipation except.
a) Cascara bark  
b) Senna leaf  
c) Senna fruits  
d) Bilberry fruits  
right answer: d

Mention drugs that can be used for acute and chronic diarrhea:
1. Tormentil rhizome  
2. Elecampane roots  
3. Bilberry fruits  
4. Cascara bark  
a) 1.2.4  
b) 2.3.4  
c) 1.3  
d) 1.3.4  
right answer: c

Mention the plants that enhance bile secretion:
1. Hawthorn  
2. Milk thistle  
3. Yarrow  
4. Dandelion  
a) 2.3.4  
b) 2.3  
c) 1.2.3  
d) 3.4  
right answer: a

Mention the plants that are beneficial during liver damages:
1. Milk Thistle  
2. Chamomile  
3. Artichoke  
4. Yarrow  
a) 1.2.3  
b) 2.3.4  
c) 2.3  
d) 1.3.4  
right answer: d
CHAPTER 6
6. ANIMAL ORIGIN PRODUCTS
6.1. Bee vital activity products

6.1.1. Bee venom

Bee venom is made by bees. Due to the poison bee’s sting is so painful. Most people associate bees with honey or pollen. However another bee product i.e.—bee venom—may be valuable in treating certain illnesses.

We all know about the medicinal effects of the bee honey. Indeed, tea with honey has long been a remedy of choice for sore throats. And some nutritionists consider bee pollen to be a near perfect source of protein.

Bee venom, however, is looked upon with some trepidation. This is not surprising, as most people’s only experience is via a painful bee sting. For thousands of years, though, the medicinal benefits of bee venom have been touted throughout the world. And while these medicinal effects have yet to be scientifically proven, in recent years, the use of bee venom to treat various ailments (apitherapy) is actively being studied.

In recent years, however—with the increasing advent and acceptance of natural medicines—the interest in the therapeutic value of bee venom has grown. However, there are no double-blind, placebo-controlled studies validating its effectiveness. A randomized trial done in 2005 did not show any effectiveness of the bee venom in the treatment of multiple sclerosis; however, another study done the same year did show that the bee venom may be effective in treating arthritis.

Scientists do not definitively understand how bee venom, which is a complex mixture of numerous compounds, acts on the human body. However, a number of components of bee venom that have been identified and studied, include the following:

Mellitin –The most prevalent substance in bee venom. It is hypothesized to help induce healing through anti-inflammatory effects.

Adolapin-This may have both anti-inflammatory and analgesic (pain-blocking)effects.

Apamin-This substance may improve nerve transmission.

More likely than any of the effects produced by these substances, however, is the possibility that the body has an immune reaction to bee venom that proves beneficial in certain circumstances

Before the invention of the syringe, bee venom was always administered—believe it or not—directly from bees. Today, in some cases, it is still administered in the same way. The live bee is held (with tweezers or some other small instrument) by the person administering the bee venom, who then places the bee on the part of the patient's body to be treated, at which point the bee reflexively stings. Depending on the condition, treatment can include anywhere from two to three stings over a course of five or so sessions, to five stings up to three times per week over the course of a number of months.

There are a few medical doctors who use bee venom therapy to treat some conditions—most commonly, arthritis. Most of these doctors inject bee venom via the less painful method of
a syringe, using bee venom "harvested" from bees. The harvesting is done via electrified
collection boxes that stimulate bees to release their venom. The boxes are placed over the
entrance to beehives. Most of the harvested bee venom comes from the apiaries of Charles
Mraz, a Vermont beekeeper who has been in the forefront of the popularization of bee venom
therapy over the past 50 years.

The greatest risk of bee venom therapy is the risk of an anaphylactic allergic reaction,
including anaphylactic shock, which can cause a person to stop breathing. If not treated
immediately, anaphylactic shock can result in death. Though only a small percentage of the
population is allergic to bee venom, it is nevertheless imperative—whether receiving
apitherapy from live bees or via a syringe—that the person administering the venom has a bee
sting kit on site and knows how to use it.

While anecdotal, there have been reports that the use of nonsteroidal anti-inflammatory
drugs, such as ibuprofen, can compromise the supposed effectiveness of bee venom therapy.

If you’re considering bee venom therapy, you must recognize that such therapy is a
natural treatment for which, to date, there is no rigorous scientific evidence definitively
proving its medicinal effectiveness. Before trying this therapy, consult with your physician, and
remember that this therapy should be used in addition to, not instead of, other treatments
prescribed by your doctor. And never have bee venom injections without a bee sting kit (and
someone who knows how to use it) readily available. Bee venom is given as a shot
for rheumatoid arthritis, nerve pain (neuralgia), multiple sclerosis (MS), reducing the reaction to
bee stings in people who are allergic (desensitization) to them (venom immunotherapy), and
muscle conditions such as fibromyositis and enthesitis. The famous drug of bee venom is
Apitoxin.

6.1.2. Propolis

Propolis is a resinous mixture that honey bees collect from tree buds, sap flows, or
other botanical sources. It is used as a sealant for unwanted open spaces in the hive.

The composition of propolis varies from hive to hive, from district to district, and from
season to season. Normally it is dark brown in color, but it can be found in green, red, black,
and white hues, depending on the sources of resinfound in the particular hive area. Honey bees
are opportunists, gathering what they need from available sources, and detailed analyses show
that the chemical composition of propolis varies considerably from region to region, along with
the vegetation.

As an antimicrobial

Preliminary scientific studies show some types of propolis have \textit{in vitro} antibacterial
and antifungal activity (with active constituents including flavonoids like galangin and
hydroxy cinnamic acids like caffeic acid.

As an emollient

Preliminary \textit{in vivo} studies with rats suggest propolis may be effective in treating the
inflammatory component of skin burns. Also, a clinical trial has shown Brazilian propolis skin
cream to be superior to silver sulfadiazine for the treatment of partial thickness burn
wounds. Recent studies have raised concerns about the efficacy of silver sulfadiazine however,
with suggestions it may actually delay wound healing. Further clinical research is in need.
As an immunomodulator
Propolis has been reported to exhibit both immunosuppressive and immunostimulant effects. Further research is needed to establish if there is a practical application for these seemingly opposing pharmacological effects.

As a treatment for allergies
Though claims have been made for the use of propolis in treating allergies, propolis can itself cause severe allergic reactions if the user is sensitive to bees or bee products.

As an oral hygiene product
Propolis has been the subject of recent dentistry research, and there is some *in vivo* and clinical evidence that propolis might protect against dental caries and other forms of oral disease, due to its antimicrobial properties. Propolis is also being investigated for its efficacy in the treatment of cancer sores and in reducing the inflammation associated with canal debridement and endodontic procedures. As an antioxidant
One *in vivo* study has shown that propolis reduced the chances of cataracts in rat pups. However, in the absence of any clinical studies, it is not clear if this activity has any therapeutic relevance.

In cancer treatment and cancer prevention *in vitro* tests, propolis induces cell cycle arrest, apoptosis and reduces the expression of growth and transcription factors.

6.1.3. Royal jelly

*Royal jelly* is a honey bee secretion that is used in the nutrition of larvae, as well as adult queens. It is secreted from the glands, in the hypopharynx of worker bees, and fed to all larvae in the colony, regardless of sex or caste. Royal jelly is a milky secretion produced by worker honey bees. It typically contains about 60% to 70% water, 12% to 15% proteins, 10% to 16% sugar, 3% to 6% fats, and 2% to 3% vitamins (vitamin B₅, B₆), and trace amounts of vitamin C, but none of the fat-soluble vitamins), salts, amino acids. Its composition varies depending on geography and climate. This product gets its name from the fact that bees use it for the development and nurturing of queen bees. Royal jelly is collected and sold as a dietary supplement for humans, claiming various health benefits because of components such as B-complex vitamins.

It is also used as a component in some skin care and natural beauty products. In holistic healing circles and popular alternative medicine folklore, royal jelly is believed to have anti-aging properties. Some alternative medicine practitioners attribute this to its amino acid content and broad spectrum of vitamins and minerals. It is also used as a general health tonic, for fighting the effects of aging, and for boosting the immune system. Some people apply royal jelly directly to the skin as a tonic or to the scalp to encourage hair growth. Drug called Apilac contains royal jelly. It can be met in the form of tablets and creams.

6.2. Snake vital activity products
6.2.1. Snake venom
Snake venom is produced in modified parotid glands normally responsible for secreting saliva. It is stored in structures called alveoli behind the animal's eyes, and ejected voluntarily through its hollow tubular fangs. Venom is composed of hundreds to thousands of different proteins and enzymes, all serving a variety of purposes, such as interfering with a prey's cardiac system or increasing tissue permeability so that venom is absorbed faster.

Venom in many snakes, such as pitvipers, affects virtually every organ system in the human body and can be a combination of many toxins, including cytotoxins, hemotoxins, neurotoxins and myotoxins, allowing for an enormous variety of symptoms. Earlier, the venom of a particular snake was considered to be one kind only i.e. either hemotoxic or neurotoxic, and this erroneous belief may still persist wherever the updated literature is hard to access. Although there is much known about the protein compositions of venoms from Asian and American snakes, comparatively Australian snakes venom is known a little. The old way of categorizing venom indicated that some snakes have a neurotoxic venom (affecting the nervous system) and others have a haemotoxic venom (affecting tissue and blood).

The elapines, short front fangs (Proteroglyphs) snakes, which include the cobra, mamba, and coral snakes, their venom is neurotoxic (nerve toxins) and paralyses the respiratory centre. Animals that survive these bites seldom have any sequelae (aftereffects of the snake bite such as tissue damage). There are two families of vipers, the true vipers (e.g., puff adder, Russell's viper, and common European adder the only venomous snake in the UK) and the pit vipers (e.g., rattlesnakes, copperhead, and fer-de-lance). Viperine snakes have long, hinged, hollow fangs (Solenoglyph); they strike, inject venom (a voluntary action), and withdraw. Many bites by vipers reportedly do not result in injection of substantial quantities of venom. Viperine venom is typically haemotoxic (blood toxins), necrotising (death of tissue), and anticoagulant (preventing the blood from clotting), although a neurotoxic component is present in the venom of some species, e.g., the Mojave rattlesnake.

There are actually far more than two types of toxins, and countless combinations of these - myotoxins, cardiotoxins, haemotoxins, and neurotoxins, to name just a few.

No snake venom contains only one type of toxin – most snakes have a combination of toxins, and it’s this variable combination that makes reactions to snake bites from each species so different.

Toxicity is traditionally determined by how much venom it takes to kill a test animal. It is tested via the "Lethal Dose for 50%" (LD50) method - how much venom it takes to kill 50% of the test animals (usually mice).

The dangerous effect of snake venom on humans is well known, but there are also many medicinal uses of snake venom.

Venoms contain more than 20 different compounds, mostly proteins and polypeptides. A complex mixture of proteins, enzymes, and various other substances with toxic and lethal properties serves to immobilize the prey animal, enzymes play an important role in the digestion of prey, and various other substances are responsible for important but non-lethal biological effects. Some of the proteins in snake venom have very specific effects on various biological functions including blood coagulation, blood pressure regulation, transmission of the nervous or muscular impulse and have been developed for use as pharmacological or diagnostic tools or even useful drugs.
For instance, Phospholipases type A2 (PLA2s) from the Tunisian vipers Cerastes cerastes and Macrovipera lebetina has been found to have anti-tumor activity. Anti-cancer activity has also been reported for other compounds in snake venom.

Phospholipases A2 hydrolyze phospholipids and thus could act on bacterial cell surfaces, providing novel antimicrobial (antibiotic) activities.

The analgesic (pain-killing) activity of many snake venom proteins has been long known. Drugs containing snake venom can be used in the treatment of arthritis, myositis, neuralgias. The mechanism of their action is not fully developed. They may be injected (Vipraxinum, Viperalinum) or used topical as creams (Vipratoxum, Viprosalum).

6.3. Medical leeches - Hirudo medicinalis

Medical leeches are any of several species of leeches, but most commonly Hirudo medicinalis.

Their range extends over almost the whole of Europe and Asia as far as Kazakhstan and Uzbekistan. The preferred habitat for this species is muddy freshwater pools and ditches with plentiful weed growth in temperate climates.

The general morphology of medicinal leeches follows that of most other leeches. Fully mature adults can be up to 20 cm in length, and are green, brown, or greenish-brown with a darker tone on the dorsal side and a lighter ventral side. The dorsal side also has a thin red stripe.

Medicinal leeches have three jaws (tripartite) that look like little saws, and on them are about 100 sharp teeth used to incise the host. The incision leaves a mark that is an inverted Y inside of a circle. After piercing the skin and injecting anticoagulants (hirudin) and anesthetic, they suck out blood. Large adults can consume up to ten times their body weight in a single meal, with 5-15 mL being the average volume taken. These leeches can live for up to a year between feeding.

Medicinal leeches have been found to secrete saliva containing about 60 different proteins. These achieve a wide variety of goals useful to the leech as it feeds, helping to keep the blood in liquid form and increasing blood flow in the affected area. Several of these secreted proteins serve as anticoagulants (such as hrudin), platelet aggregation inhibitors (most notably apyrase, collagenase, and calin), vasodilators, and proteinase inhibitors. It is also thought that the saliva contains an anesthetic as leech bites are generally not painful.

Medicinal leech therapy made an international comeback in the 1970s in microsurgery used to stimulate circulation to salvage skin grafts and other tissue threatened by postoperative venous congestion, particularly in finger reattachment and reconstructive surgery of the ear, nose, lip, and eyelid. Other clinical applications of medicinal leech therapy include varicose veins, muscle cramps, thrombophlebitis, and osteoarthritis, among many varied conditions. The therapeutic effect is not from the blood taken in the meal, but from the continued and steady bleeding from the wound left after the leech has detached, as well as the anesthetizing, anti-inflammatory, and vasodilating properties of the secreted leech saliva. The most common complication from leech treatment is prolonged bleeding, which can easily be treated, although allergic reactions and bacterial infections may also occur.
Thus the minuscule amounts of hirudin are present in leeches, it is impractical to harvest the substance for widespread medical use. Hirudin (and related substances) are synthesized using recombinant techniques. Devices called "mechanical leeches" that dispense heparin and perform the same function as medicinal leeches have been developed, but they are not yet commercially available.
**LATIN-ENGLISH INDEX**

| A | Achillea millefolium - Yarrow  |
| A | Acorus calamus - Calamus         |
| A | Adonis vernalis - Spring pheasant's eye |
| A | Aesculus hippocastanum - Horse chestnut |
| A | Allium cepa - Onion              |
| A | Allium sativum - Garlic          |
| A | Althea armeniaca - Marshmallow   |
| A | officinalis                      |
| A | Ammi visnaga - Khella            |
| A | Anisum vulgare - Aniseed         |
| A | Aralia mandshurica - Aralia      |
| A | Arctostaphylos uva-ursi - Baerberry |
| A | Artemisia absinthium - Wormwood  |
| A | Atropa belladonna - Belladonna   |

| B | Betula pendula - Birch           |
| B | pubescens                        |

| C | Cardui mariae - Milk thistle     |
| C | Carum carvi - Caraway            |
| C | Cassia (Senna) acutifolia - Senna |
| C | angustifolia                      |
| C | Centaurium erythrea - Centaury   |
| C | minor                            |
| C | umbellatum                       |

| C | Cichorium intybus - Chichory     |
| C | Cinchona - Cinchona              |
| C | Cinnamomum camphorae - Cinnamon  |
| C | cassia                           |
| C | Convallaria majalis - Lily-of-the-valley |
| C | Crataegus oxycantha - Hawthorn   |
| C | sanguinea                        |
| C | Cynara scolymus - Artichoke      |

| D | Digitalis lanata - Foxglove      |
| D | purpurea                         |
| D | Dioscorea nipponica - Dioscorae  |
Drosera rotundifola - Sundew

**E**
Echinacea purpurea - Echinacea
Eleutherococcus senticoccus -Eleutherococcus
Equisetum arvense - Horsetail
Eucalyptus cinerea - Eucalyptus
globulus
viminalis

**F**
Foeniculum vulgare – Sweet fennel
Frangula alnus - Cascara

**G**
Gentiana lutea - Gentian
Ginkgo biloba - Ginkgo
Glyzyrrhiza glabra - Liquirice

**H**
Helichrysum arenarium – Everlasting flower

**J**
Juniperus communis - Juniper

**L**
Linum usitatissimum - Flaxseed

**M**
Matricaria chamomilla - Chamomile
Mellissa officinalis - Balm
Mentha piperita - Peppermint
Melilotus officinalis – Sweet clover (Melilot)
Menyanthes trifoliata - Bogbean

**O**
Orthosiphon stamineus - Java tea

**P**
Panax ginseng - Ginseng
Pinus silvestris - Pine
Plantago lanceolata - Plantain
    major
    media
psyllium - Psyllium
Petroselinum crispum - Parsley
Polygonum aviculare - Knotgrass
Primula veris - Primrose
Potentilla erecta - Tormentilla
tormentilla

Q
Quercus robur - Oak tree

R
Rauwolfia serpentina - Rauwolfia
Rhamnus cathartica - Buckthorn
Rheum palmatum - Rhubarb
Ribes nigrum - Blackcurrant
Rosa canina - Rose hips
cinnamomea
Rosmarinus officinalis - Rosemarine
Rubia tinctorum - Madder

S
Sambucus nigra - Elder flower
Schizandra chinensis - Schizandra
Sinapis nigrum - Mustard
Silybum marianum - Milk thistle

T
Taraxacum officinale - Dandelion
Thymus serpyllum - Thyme crawling
vulgaris - Thyme ordinary
Tilia cordata - Linden flower
platyphyllos
Tussilago farfara - Coltsfoot

U
Urtica dioica - Stinging nettle

V
Vaccinium myrtillus - Bilberry
Verbascum densiflorum - Mullein
Viscum album - Mistletoe

Z
Zea mays - Sweet corn
Zingiber officinale-Ginger
INDEX (ENGLISH)

A
Adonis
Anise
Aralia
Artichoke

B
Balm lemon
Bearberry
Belladonna
Bilberry
Birch
Black currant
Bogbean
Buckthorn

C
Calamus
Chamomile
Camphor tree
Caraway
Cascara
Cassia
Centaury
Chicory
Cinnamon tree
Coltsfoot

D
Dandelion

E
Echinacea
Elder flower
Eucalyptus

F
Fennel
Foxglove
Flax

G
Garlic
Gentian
Ginger
Ginkgo
Ginseng

H
Hawthorn
Horse chestnut
Horsetail

J
Java tea (ortosiphon)
Juniper

K
Khella
Knotgrass

L
Licorice
Lily of the valley
Linden flower

M
Madder
Marshmallow
Milk thistle
Mistletoe
Mullein
Mustard

O
Oak tree
Onion

P
Parsley
Peppermint
Plantain
Pine
Primula
Psyllium
Rauwolfia
Rhubarb
Ribwort plantain
Rose hip
Rosemary

S
Schisandra
Stinging nettle
Sundew
Sweet clover

T
Thyme
Tormentil

W
Wormwood

Y
Yarrow
ABBREVIATIONS

AMP-Adenosine monophosphate
CNS-Central nervous system
DHA-Docosahexaenoic acid
EPA-Eicosapentaenoic acid
HDL-High density lipoproteins
LDL-Low density lipoproteins
MPD-Minimum phototoxic dose
MS-Multiple sclerosis
NYHA-New York Heart Association
PAS-pharmacologically active compounds
PVD-Peripheral vascular disease
UTI-Urinary tract infection
WHO-World Health Organization
REFERENCES

CHAPTER 1

1. MODERN TREATMENT AND THEORETICAL RATIONALE OF PHYTOTHERAPY. OPPORTUNITIES, LIMITATIONS AND CONTRAINDICATIONS OF PHYTOTHERAPY ............. 5

1.1. Definition and classification of herbal medicine ................................................................. 5

1.2. Advantages ............................................................................................................................. 5

2. MODERN PHYTOTHERAPY. PHYTOPREPARATIONS IN MODERN MEDICINE. STANDARDIZATION OF NATURAL ORIGIN DRUGS ACCORDING TO WHO DEMANDS. PRECLINICAL AND CLINICAL TESTING SYSTEM OF NATURAL ORIGIN DRUGS .................. 6

3. BIOLOGICALLY ACTIVE COMPOUNDS ................................................................................. 8

4. COLLECTIONS (COMBINED FORMS) AND TEAS .................................................................. 8

5. PHYTOTHERAPY IN PEDIATRICS. THE MAIN PRINCIPLES OF PHYTOMEDICINES PRESCRIPTION ......................................................................................... 10

6. PHYTOTHERAPY IN GERIATRICS. THE MAIN PRINCIPLES OF PHYTOMEDICINES PRESCRIPTION ......................................................................................... 11

CHAPTER 2 .................................................................................................................................. 14

2. PHYTOTHERAPY IN CARDIOVASCULAR DISEASES .......................................................... 14

2.1. Heart failure ......................................................................................................................... 14

2.2. Atherosclerosis ................................................................................................................... 16

2.3. Hypertension ....................................................................................................................... 18

2.4. Hypotension ........................................................................................................................ 20

2.5. Circulatory Disorders ......................................................................................................... 21

2.6. Chronic Venous Insufficiency (Varicose Veins) ............................................................... 23

CHAPTER 3 .................................................................................................................................. 26

3. PHYTOTHERAPY IN RESPIRATORY SYSTEM DISORDERS ............................................... 26

3.1. Cold and flu ......................................................................................................................... 26

3.2. Bronchitis ............................................................................................................................ 29

3.3. Symptomatic cough ............................................................................................................ 38

3.4. Pulmonary tuberculosis ...................................................................................................... 39

CHAPTER 4 .................................................................................................................................. 41

4. PHYTOTHERAPY IN URINARY TRACT DISORDERS ......................................................... 41

4.1. Acute and chronic infectious diseases of urogenital tract .................................................. 41

4.2. Urolithiasis .......................................................................................................................... 46
CHAPTER 5 ................................................................................................................................. 48
5. PHYTOTHERAPY IN GASTRO-INTESTINAL DISORDERS ............................................. 48
   5.1. Diseases of the Mouth and Throat .................................................................................. 48
   5.2. Anorexia ......................................................................................................................... 50
   5.3. Reflux, Gastritis, Gastroduodenal Ulcers, Dyspepsia .................................................. 55
   5.4. Dyspeptic syndrome ....................................................................................................... 59
   5.5. Chronic Hepatitis and Cirrhosis of the Liver ............................................................... 61
   5.6. Diseases of the Gallbladder and Biliary Tract ............................................................. 63
   5.7. Acute and Chronic Diarrhea .......................................................................................... 64
   5.8. Constipation and Colonic Diverticulosis .................................................................... 66
CHAPTER 6 ................................................................................................................................. 71
6. ANIMAL ORIGIN PRODUCTS ......................................................................................... 71
   6.1. Bee vital activity products ............................................................................................. 71
       6.1.1. Bee venom .............................................................................................................. 71
       6.1.2. Propolis ................................................................................................................. 72
       6.1.3. Royal jelly .............................................................................................................. 73
   6.2. Snake vital activity products .......................................................................................... 73
       6.2.1. Snake venom ......................................................................................................... 73
   6.3. Medical leeches - Hirudo medicinalis ......................................................................... 75
INDEX (LATIN-ENGLISH) ......................................................................................................... 77
INDEX (ENGLISH) ...................................................................................................................... 81
REFERENCES ............................................................................................................................. 84