National University of Pharmacy

Department of chemistry of natural compound and nutriciology

LECTURE on NUTRICIOLOGY

INGRIDIENTS of DIETARY SUPPLEMENTS

Kharkov 2020

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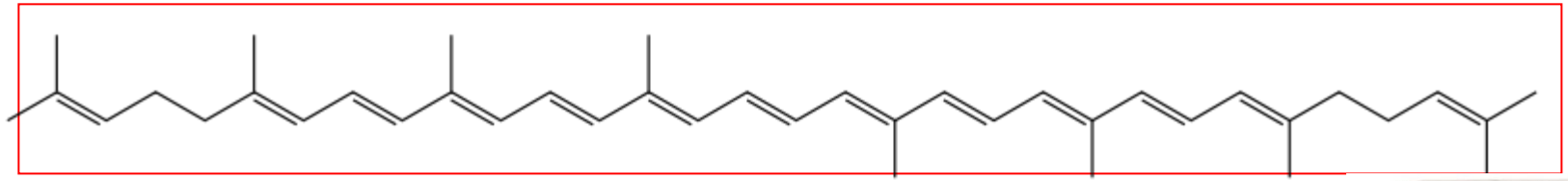
Recommendations to reduce the risks associated with DS

- Encourage the formation of a **critical attitude towards** dietary supplements;
- Inform patients about the possible negative consequences of the use of dietary supplements, drug interactions;
- Warn patients about the possible presence in their structure of **highly active ingredients** in DS;
- Inform patients about the presence of contraindications to the use of dietary supplements;
- Ask patients before prescribing medication, if any they have any particular problems if they do not take dietary supplements.

Lycopene



Lycopene - carotenoid pigment that determines the color of the fruit of some plants, such as tomatoes, guava, watermelon.

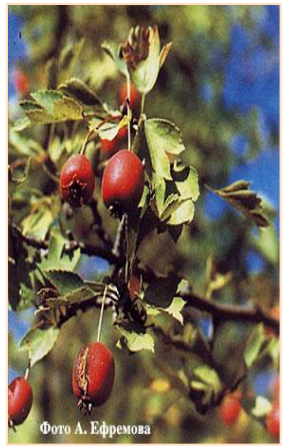
- Insoluble in water.
- Molecular formula: S40N56. - Lycopene is found in many red-orange parts of plants, is the main component that determines the red color of tomatoes.
- **Lycopene is an acyclic isomer of beta-carotene.**

Lycopene belongs to the carotenoids, but it **does not have the A-vitamin activity.**

Lycopene

- The main function of lycopene in the human body -**antioxidant**.
- Reducing oxidative stress slows progression of atherosclerosis,
- and also protects DNA, which may prevent tumorigenesis.
- Lycopene consumption leads to a significant reduction in markers of oxidative stress in humans.
- Lycopene is the most powerful carotenoid - **antioxidant** present in human blood.

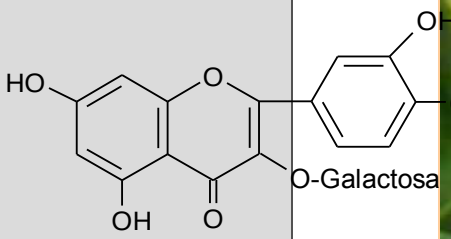
Ingridients of DS and functional foods



Ingridients	sourses	Goal
Flavonoids		
Anthocyans	Fruits	Neutralization of free radicals, reduction of the risk of malignant neoplasms
Cathechins	Tea	
Flavanons	Citrus spp.	
Flavons	Fruits, vegetables	

St. John's wort herb *Herba Hyperici , Hypericum perforatum, family Clusiaceae*

Flavonoids: hyperoside, rutin, quercetin,
antracen-derivatives: hypericin, pseudohypericin,
tannins,
resin
coumarins
essential oil,
carotenoids, ascorbic acid
xanthones



Hyperoside

Indications for use:

- **depression,**
- **psychovegetative disorders (apathy, depression)**
- **anxiety,**
- **irritability, disturbance of emotional state,**
- **arousal and / or nervous tension, asthenoneurotic syndrome.**


Біокомплекс
Біологічно активна добавка «Еліт»
Антистрес
Сприяє нормалізації функції нервової системи
100% натуральний продукт
50 капсул


RELAX
Johanniskraut - Trockenextrakt
NAHRUNGSERGÄNZUNG
VIVASAN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НЕТРУСТИН®
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425 мг (3,5 – 6,0 : 1)
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Антидепрессивное средство растительного происхождения


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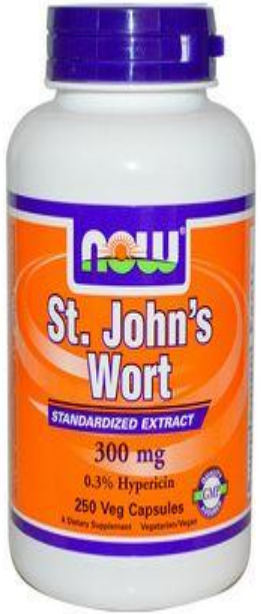
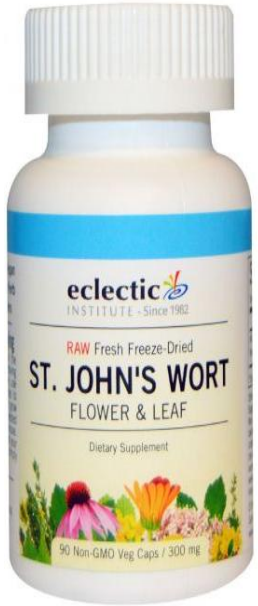
99 ПРОБЛЕМ – ОДНО РЕШЕНИЕ!


Биологически активная добавка к пище
ЗВЕРОБОЙ тонус
30 таблеток по 200 мг
Сила природы против стресса
Amateg


now
St. John's Wort
STANDARDIZED EXTRACT
300 mg
0.3% Hypericin
250 Veg Capsules

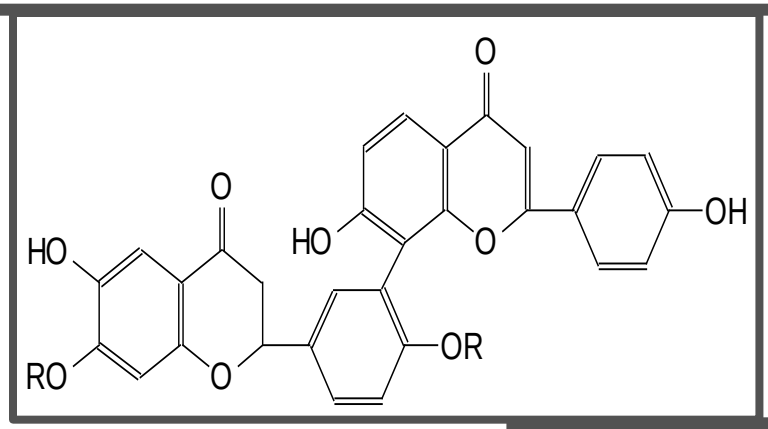

eclectic
INSTITUTE - Since 1962
RAW Fresh Freeze-Dried
ST. JOHN'S WORT
FLOWER & LEAF
Dietary Supplement
90 Non-GMO Veg Caps / 300 mg

Herba Hyperici , Hypericum perforatum, родина Clusiaceae

- St.John's Wort interacts with many types of drugs.
- In most instances, **it speeds up the processes that change the drug into inactive substances**, leading to a decrease in drug levels in your body.
- However, St. John's wort can interact with some drugs, including certain types of **antidepressants**, and can cause **harmful side effects.**

Ginkgo leaves - *Folium Ginkgo, Ginkgo biloba*
Family Ginkgoaceae

Flavonoids: mono-di-, and tri-esters, glycosides and coumaric kaempferol and quercetin derivatives, glycosides isoramnetin, myricetin and metilmirecenit, non-glycoside bi-flavonoids, catechins and proanthocyanidins, diterpene lactones ginkgolides A, B, C, J and M are sesquiterpene lactone and bilobalide, alkaloids



ginketin R=CH_3,
amentoflavon
R=H

Ginkgo biloba

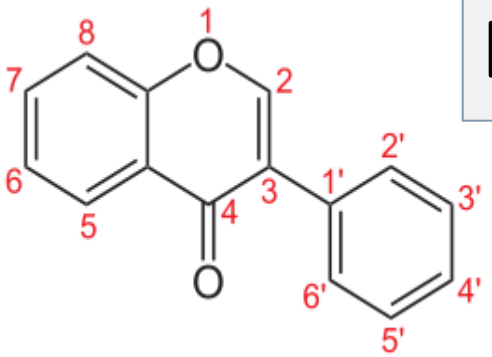
- The active components of Ginkgo biloba produce effects:
- antioxidant,
- vasodilating,
- anti-ischemic,
- anti-oedema
- antiplatelet,
- diuretic and
- neuroprotection,
- and also affect mitochondrial respiration

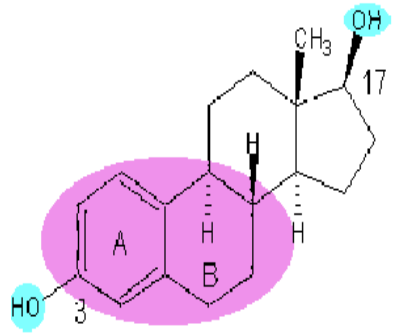
ular tone.

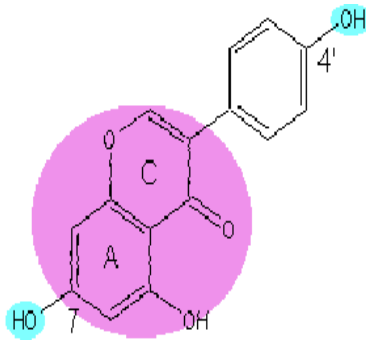
Indications for use:

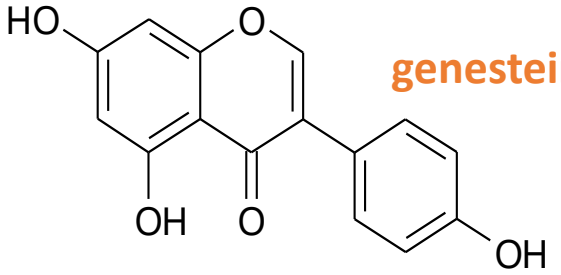
- Discirculatory encephalopathy of various etiologies, and to develop as a result of craniocerebral injury and stroke,
- Memory impairment,
- Decrease in the ability to learn,
- Irrational fear,
- Violations of sleep and wakefulness
- Dementia, including in patients with Alzheimer's disease,
- Asthenic conditions of various etiologies, including neurotic, psychogenic and developed against the backdrop of a traumatic brain injury,
- Diseases associated with impaired microcirculation and peripheral blood, including arteriopathies and Raynaud's lower limbs,
- Therapy for neurosensory disorders, including tinnitus

Isoflavonoids, family Fabaceae

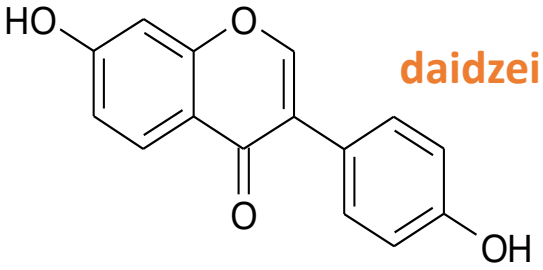








genestein



daidzein

stronger faster higher

soybean — Glýcine máxima (L.) Merr. , G. híspida (Moench) Maxim. або G. soja Sieb. et Zucc. family Fabaceae

Seeds and herb contain flavonoids included: quercitin, campferol and their glycosides - isoquercetrin, astragalin, rutin, campferol-3-O-rutinoside, quercetin-3-O-soforozide; **ISOFLAVONOIDS**: **genistein, formononetin, daidzein and their glycosides - daidzin, genistin, ononin**; kumestans, saponins, coumarins; phenolcarboxylic acids (chlorogenic, neochlorogenic, p-coumaric, ferulic);

SOYBEAN — Glýcine máxima (L.) Merr. , G. híspida (Moench) Maxim. або G. soja Sieb. et Zucc. family Fabaceae

Isoflavones act similarly to female estrogens:
- devoid of the side effects inherent in synthetic; do not stimulate the process of tissue hyperplasia (growth);
- do not lead to the development of estrogen-dependent tumors;
- reduce tides during menopause;
- reduce blood pressure;
- reduce the excitability of the nervous system;
- eliminate osteoporosis of bones;
- normalize lipid metabolism, reducing cholesterol.

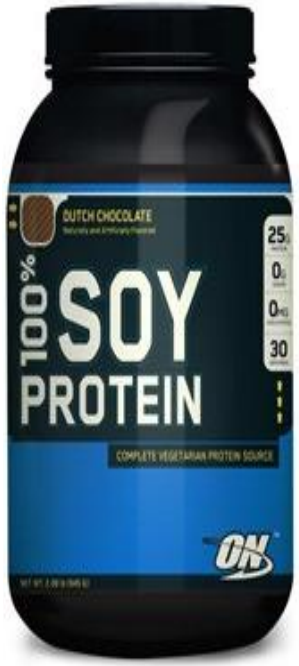
Isoflavones have antiandrogenic activity:
- blocking the enzyme 5 alpha reductase; reduce the concentration of the hormone dehydrotestosterone;
- reduce the production of sebum;
- have anti-seborrheic effect;
- eliminate acne;
- prevent atrophy of hair follicles and hair loss.

SOYBEAN — Glýcine máxima (L.) Merr. , G. híspida (Moench) Maxim. або G. soja Sieb. et Zucc. family Fabaceae

Indications for use of "Soy isoflavone":

climax;
- menstrual disorders;
- premenstrual syndrome;
- precancerous diseases of the female genital area;
- prevention of breast cancer;
- varicose veins of the lower extremities;
- acne;
- seborrhea;
- hair loss in men;
- osteoporosis of bones;
- hypertension;
- atherosclerosis and its complications, coronary heart disea
etc .;
- high cholesterol;
- allergy;
- liver and kidney diseases;
- diseases of the endocrine organs;
- prevention and auxiliary treatment of malignant tumors.

soybean — Glýcine máxima (L.) Merr. , G. híspida (Moench) Maxim. або G. soja Sieb. et Zucc. family Fabaceae



RED CLOVER
Trifolium pratense, Fabaceae

- **Menoflavone** is a dietary supplement that supports women before, during and after menopause.
- Clinically proven DS containing isoflavones derived from red clover,
- which is one of the world's richest natural sources of four important isoflavonoids:
- genistein, daidzein, biokhanin and formononetin.


Maintenance
Promensil
MENOPAUSE
Original Formula
40
RED CLOVER ISOFLAVONES
30
Tablets


добавка дієтична
20 таблеток
АМІНОФЛОР


EurasiaPro™
Red Clover Pro
Trifolium pratense
1500mg HPE*
DIETARY SUPPLEMENT
30 capsules


NATURE'S SUNSHINE
QUALITY, SERVICE, INTEGRITY
RED CLOVER
Червона Конюшина
Біологічно активна добавка до їжі
320 мг 100 капсул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Omne nimium nocet
DIETARY SUPPLEMENT
Red Clover Forte
60 CAPSULES


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NATURE'S SUNSHINE
Красный Клевер
Red Clover
100 капсул по 490 мг

CRANBERRY (Vaccinium macrocarpon) - evergreen creeping shrub of the family Vacciniaceae.

Of the acids in the berries, citric acid is predominant, and also benzoic, quinine, ursolic, chlorogenic, malic, oleanolic, γ-oxy-α-ketomass, α-ketoglutaric. Of the polysaccharide group the greatest practical importance are contained in a considerable amount in the berries of cranberry pectin. Cranberry fruits are rich in vitamin C, in this equating to oranges, lemons, grapefruit, garden strawberries. Other vitamins contain B1, B2, B5, B6, PP. Cranberries are a valuable source of vitamin K1 (phyloquinone), not inferior to cabbage and strawberries. Other substances in the composition of the fruit can be traced to betaine and bioflavonoids: anthocyanins, leukoanthocyanins, catechins, flavonols and phenolic acids, as well as macro- and trace elements: a significant amount of potassium, less phosphorus and calcium.

There is relatively much iron, there is also manganese, molybdenum, and copper. These include iodine, magnesium, barium, boron, cobalt, nickel, tin, lead, silver, titanium, chromium, zinc, aluminum and more.

CRANBERRY (Vaccinium macrocarpon) - evergreen creeping shrub of the family Vacciniaceae.

- **Functional action:**
- **- Has diuretic and antimicrobial properties. It acidifies urine and prevents bacteria from entering the urethra into the bladder. -**
- **Increases secretion of gastric and pancreatic juice.**
- **- Reduces blood sugar.**
- **- Improves vision.**
- **- Helps with diarrhea, vomiting.**

GARDEN GARLIC (Allium sativum). Popular medicinal and vegetable culture in many peoples of the world. - herbaceous bulbous plant of the onion family (Alliaceae).

The plant is appreciated for the presence in its chemical composition of **thioethers** (organic sulfides, or **sulfur-containing compounds**), which give it a *pungent taste and a specific pungent odor.* Bulbs contain glycoside **aliin** and other biologically active sulfur-containing substances (S-methyl, S-ethyl, S-butyl, S-alkylcysteine sulfoxides, S-methylcysteine, etc.), essential oil (0.4%), phytosterols, vitamins (C - 10 mg /%, B1 - 0.08 mg /%, B2 - 0.08 mg /%, B6 - 0.60 mg /%, nicotinic acid - 1.2 mg /%), organic acids, carbohydrates, polysaccharide inulin, fatty oil (traces), macro- and trace elements (potassium, calcium, sodium, magnesium, phosphorus, iron, zinc, iodine, copper).

In countries where garlic is systematically consumed, the incidence of cancer is relatively low.

GARDEN GARLIC -Allium sativum, Alliaceae

- Functional actions:
- - **Reduces cholesterol** and triglycerides in the blood.
- - Improves **fluid properties of the blood,** preventing the formation of clots and blockage of blood vessels, prevents the development of atherosclerosis. - Normalizes blood pressure.
- - **Has antiviral, antibacterial and antifungal action**.
- - **Promotes immunity.**
- Components of garlic significantly increase the activity of phagocytes, T-lymphocytes, macrophages and killer cells.
- - Has antioxidant effect.
- - Garlic has antiviral, antifungal properties, is a natural antibiotic.
- - Promotes the release of the respiratory tract, cleansing the bronchi from mucus, has antispasmodic effect.
- **Indications for use**
- - Cardiovascular diseases.
- - Increased blood pressure.
- - Increased cholesterol.

GARDEN GARLIC -Allium sativum, Alliaceae

A variety of herbs, including concentrated **garlic** extracts, can ***thin the blood in a manner similar to aspirin***, which may be a problem during or after surgery.

Milk Thistle – Silybum marianum (L.) Gaerth., Family- Asteraceae

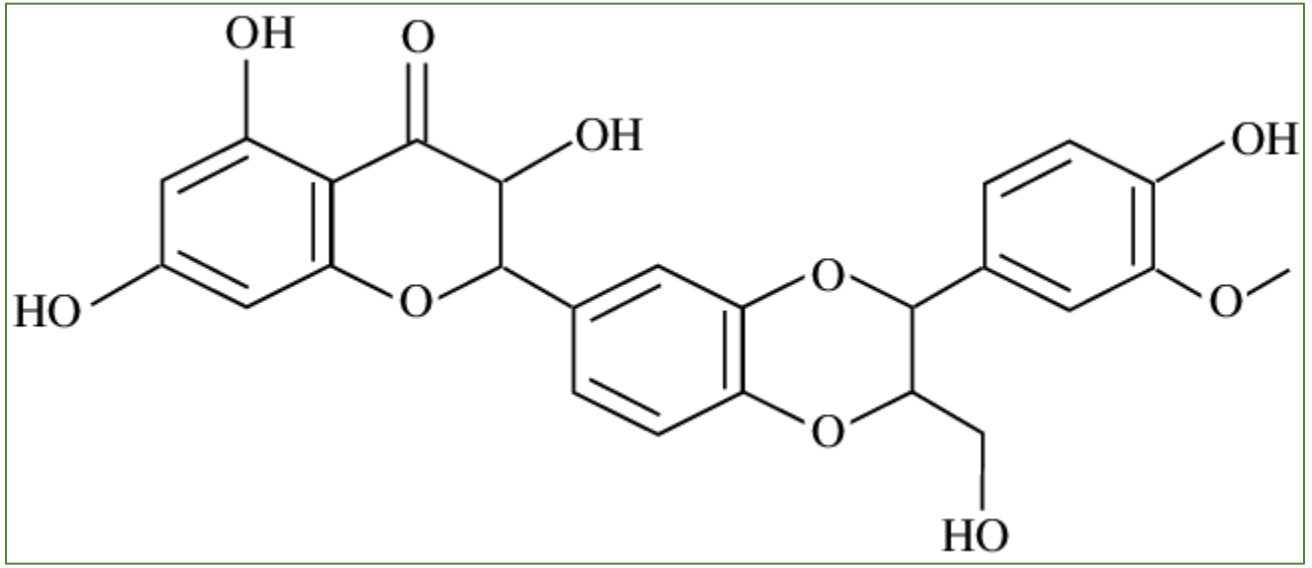
Chemical composition: fruits contain flavolignans, the total of which is called **silymarin** (2,8 3,8%), contained in the mixture - silybin, silidianin, silihristin, silidianin, tocopherol (0.038%), sterols (0.63%) - campesterol, stigmasterol, sitosterol, mucus, biogenic amines. Taxifolin or 2,3-dihydroflavonol is related compound in the synthesis of lignans and silimarins specific compounds for thistle seeds. In fruit, in addition, contains a fatty oil (25-33%); protein (13-17%); cellulose (20-26%);

Milk Thistle

Use: The sum flavolignans (legalon, Karsil, Silibor, Silimar et al.) produce **antihepatotoxic action.**

These substances **stabilize the membrane** of liver cells, affect lipid metabolism, improve cell metabolism, thereby increasing the mitotic activity of the cells, stimulated the production of proteins needed to restore normal liver function.

They exhibit antioxidant and radioprotective properties, enhance detoxifying and exocrine functions of the liver, has antispasmodic and anti-inflammatory effect.



Sabal, *Saw palmetto.* – Serenoa repens (Bartel.) Small (syn. Serenoa serrulatum Schultes, Sabal serrulata Hook.). *Distribution: Southeast US, Central America, the Bahamas, Bermuda and the Netherlands Antilles, Colombia. Venezuela.*

Chemical Composition: fruits andseeds contain carbohydrates, invert sugar (28.8%), mannitol, high molecular weight polysaccharide which hydrolysis to form galactose, arabinose and uronic acids; fatty oil (26.7%) - oleic acid, caprylic acid, capric, lauric, myristic, palmitic and stearic acids and their esters; steroids: β-sitosterol, stigmasterol and daukosterol, flavonoids, resins, tannins, essential oil (1.5%). Fruits and seeds are rich in triacylglycerols.

SABAL

Application: saw palmetto preparations used to treat **benign prostatic hyperplasia (adenoma)** first stage and in the early stages of treatment, the second stage. Sabal extract causes a decrease in protein synthesis, anti-inflammatory, anti-androgenic, anabolic, immunostimulant and antispasmodic action. In homeopathy medicines saw palmetto fruit used in combination with drugs goldenrod and echinacea, as well as in combination with drugs pumpkin seeds and roots of nettles.

ECHINACEA angustifolia DC (Brauneria angustifolia); E. purpurea (L.) Moench, E. pallida (Nutt.)Britt. (Brauneria pallida Nutt.)
Family Asteraceae

Chemical composition: herbal drug contains caffeic acid derivatives, which are represented by esters of caffeic acid with sugars, tartaric acid and quinic: echinacoside content of which is 0,3-1,3% in roots and 0.1-1.0% in the leaves and flowers of Echinacea species, found 6-O-cofeilechinacoside, verbaskoside, desramnosilverbaskoside. Conjugates also identified caffeic acid, quinic acid, such as tsinarin (or 1,5-dicofeilchinic acid) caftaric and cichoric acid.

Among the flavonoids found apigenin glycosides, luteolin, kaempferol, quercetin, isorhamnetin, quertsetagetin. Flavonoid content in leaves is based on quercetin 0.38 - 0.48%. Rutin is present in all three types of echinacea.

ECHINACEA

Application: Echinacea preparations produce antiseptic, antiviral effect, expand the peripheral vessels. Traditionally, they are used in the treatment of boils, septicemia (blood poisoning), pyorrhea (pus), tonsillitis, and especially for the treatment of boils, carbuncles and abscesses. Echinacea preparations have **immunostimulatory, antibacterial and antiviral properties.**

Ginseng Panax ginseng, Araliaceae

- **CHEMICAL COMPOSITION OF ROOTS:**
- ginseng saponins have steroid aglycone (**panaxtriol and panaxdiol**) and spiroketal group of seven carbon atoms, they are similar in structure to the damaran type. Saponins - panaxosides (in Chinese medicine are called ginsenosides) A, B, C, D, E, F, G contain from 3 to 6 sugar residues. In the hydrolysis products saponin glycosides found oleanolic acid, protopanaxdiol, panaxdiol, panaxtriol. In the foreign literature major players ginseng saponins called **ginsekosides** Rgi, Re, Rd, Rbi, Rbi, and Rbo.
- Therapeutic activity of ginseng root and give high molecular polysaccharides (glycans) - panaxans who set hypoglycemic activity. It is now established that the roots of the ginseng contain a mixture of triterpene glycosides. Furthermore saponins in the root identified pectin, starch, sucrose, vitamins C, B group, D, sterols and lipolytic agents.

Ginseng Panax ginseng, Araliaceae

Application: ginseng effective

- with **physical and mental fatigue**,
- reduced efficiency especially after a long illness,
- Diabetis
- chronic gastritis hypo -and- antacid case,
- increase the overall resistance to diseases and adverse environmental effects.
- **Contraindications**: hypertension, ginseng contraindicated in acute cases of disease, especially when gemmoragiyah during acute coronary thrombosis.
- Not recommended drugs with **mobile nervous system**, manic disorders and schizophrenia.
- After 40 years should be reduced dosages of ginseng.
- It is not recommended very prolonged use of ginseng, as it often leads to inflammation of the nerves, often the sciatic nerve, which results in muscle spasms affected areas.

Cimicifuga Cimicifuga racemosa L., Family Ranunculaceae

The chemical composition of the roots and rhizomes of: phenolic compounds:

- Tannins,
- Alkaloids,
- Triterpene glycosides (2%: aktein, tsimitsifugoside)
- Isoflavone – formononetin,
- Gum
- Aromatic acids (salicylic and isoferulic)
- Saponins,
- Essential oil
- 15-20% cimicifugin (a mixture of resins and bitters)
- Organic acid
- Phytoestrogens
- Phytosterol
- Tannins,
- Sucrose
- Starch
- Vitamins: carotene
- Macro- and trace elements iron, calcium, magnesium, selenium

Cimicifuga racemosa

Modern science has recognized the **estrogenic effect** of the herbal drug and DS: BAC cimicifiga able to normalize the balance of estrogen by stimulating their production;
DS have a mild sedative, relaxing and antispasmodic effect; significantly reduces the severity of "tide", suppressing the production of luteinizing hormone (LH);
effective for inflammation of the genital organs;
relieves depression associated with **menopause**.

In the female body luteinizing hormone stimulates the secretion of estrogen by the ovaries, and in the male - cells that produce testosterone.
Black cohosh hormonal action due to the presence of formononetin, has weak estrogenic activity.

Indications for use:
in the menstrual cycle disoders;
migraine, hysteria and nervous tension;
at menopause and tides;
in rheumatoid arthritis:
to improve metabolism;
to lower cholesterol;
to lower blood pressure;
sinusitis;
asthma;
rheumatism.

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