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PLENARY LECTURES

Phytotherapy – past and present review

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Phytotherapy in its different forms has always been an important part of the culture and the living of the people. Usage of medicine herbs origins from the dawn of the human history and develops through the early civilizations of Assyrio- Babylon, Egypt, Greece, Rome, The Arabs and Renaissance to become part of the present pharmacotherapeutic methods and means. Many of the important names in the medicine like Hippocrates, Dioscorid, Clavdii Galen, Avicenna, Paracels and others have left their substantial part in the phytotherapy, describing and applying medicinal plants in their practice.

It is assumed, that around 300 000 to 500 000 different plant types exist on earth. Almost 10 percent of that is used as food and less- around 5% is studied for the presence of pharmacologically active substances (1). According to different authors, currently from 25 to 30% of all the medications are acquired from plant origin, 55–60% are synthetically synthesized, and the rest are from microbial (12%), mineral (7%), animal or biotechnological origin. However medicines from plants are extracted from around 0.1% from the known plant types, which shows that there is a vast area for research work in this field. According to information from WHO 75% of the world population depends on medicines produced from plants, due to cultural, economical, and other reasons (3). Bulgaria is a country with a great variety of plant types, from which 650 are medicinal (6). The pharmacological action of many of them are studied and applied and the chemical composition established (2). Because of the great variety of soils and climate conditions, the Bulgarian medicinal plants contain high percentage biologically active substances, including alkaloids, glycosides, tannins, saponins, polishesarides, flavonoids, essential oils, and may others. The rich experience of the Bulgarian traditional medicine has often been used for the revealing of the full potential of action of the medicinal plants. The treatment of Parkinson disease offered by the healer Ivan Raev in the beginning of the last century, based on the tropan alkaloids in *Atropa Belladonna* L., has become world known. Also, the background of the Bulgarian traditional medicine gave a clue for the antiholin esterase effect of one of the types of snowdrop (*Galantus nivalis* L.), which is currently used in treatment of poliomyelitis, neuritis, radiculitis, and in poisoning with curare as the drug Nivalin.

Phytotherapy is a science and method for treatment of different by using of chemically non-treated extracts of plant, known as Galenic preparates. Pure phytochemical components of the plants prepared as a medical products are not included into the term phytotherapeutic medicines (5). This is the reason why these medicines are infusions, teas, decocts or total extracts or plant drugs. In some cases is possible to use the plant parts in their native condition, mechanically treated only. Plants through the process of photosynthesis from water, CO₂, minerals and solar energy synthesize organic substances (primary and secondary organic compounds), and secure oxygen for existence of other living organisms, including humans. During the phylogenesis, plants have formed some biologically active substances that help them to adapt to the environment and protect from their enemies, like bacteria, viruses, pathogenic fungi and others.

Polysaccharides and proteins are related to the primary organic compounds (2). Polysaccharides are macromolecules constructed of monosaccharide units. They are intrinsic for the high plants, algae and lichens. They are divided into homopolysaccharides (cellulose, amylopectin, glycogen, inolin and others) and heteropolysaccharides (pectin, rubbers, mucous substances, starch and others) and are localized mainly in the roots and the seeds of the plants (*Radix Altheae*, *Semen Lini*, *Radix Glycyrrhiciae*, *Semen Cydoniae*). They are used as softening means in acute or chronic inflammatory diseases of the respiratory and digestive system, as emulsifiers, and binding substances in the production of drugs and others. Proteins as simple or compound peptides are mainly used for food, and as a source for a certain substances as glutamine acid, methionine and others.

The secondary natural biologically active compounds include alkaloids, glycosides, saponins, tannins, iridoids, essential oils, vitamins and others (2). Most of them have well expressed pharmacological action and are used for the treatment of different diseases.

Alkaloids are compounds with alkali reaction, containing nitrogen in its molecule. Most of them have strong action and toxicity and only very small doses are used. They are mostly used as substrates for production of drugs, and rarely as medicinal plants for direct application. The main groups of alkaloids are: derived from the opium poppy (*Papaver somniferum*) (fenantren- morphine, codeine, tebain; and isochinolinic – papaverin, narcotin and narceine), which have strong analgesic action and are used as spasmolytics; N-cholinolytic (tubocurarine – peripheral myorelaxant of concurrent type); non direct adrenomimetic (ephedrine- alkaloid from the plant *Ephedra officinalis*, with psycho stimulating and bronchodilatating action); M-cholinomimetic with direct and indirect action (pilocarpine, galanthamine, physostigmine, muscarin and others); tropan alkaloids (M-cholinolytic - atropine, scopolamine, hyoscyamine); alkaloids with local anaesthetic action (cocaine, derivate from the plant *Erythroxilon coca*); chinoline alkaloids, extracted from the cortex of the quinine tree - quinine, quinidine, etc.

Glycosides are compounds with variable structure and wide spreading in the plants. Depending of the structure of their aglycon part of the molecule they are divided into phenolic glycosides, flavonoid glycosides, cyanogenic glycosides, anthraquinone glycosides, coumarin glycosides and cardiac glycosides. Cardiac glycosides are called cerdenolides (digoxin, digitoxin, convalarotoxin and other). They have cardio stimulating effect in the chronic heart failure. Flavonoid glycosides (flavonic, flavanolic, isoflavonic) are biologically active substances with a wide pharmacological application with antihemorrhagic, spasmolytic, capillary protective, antioxidant, diuretic, and anti-inflammatory, anti microbial and antiviral activity. Rutin, hesperidin, naringin, quercitrin and other are included in this group. Their application is as phytotherapeutic preparations of drugs in early stages of atherosclerosis, frequent haemorrhages, hearth neurosis, dermatitis, vitamin PP insufficiency and other.

Cyanogenic glycosides have a similar activity to the flavonoid ones. They have anti inflammatory activity; reduce the capillary permeability and increase the vision sharpness (Cyanogenic glycosides in the fruits of the blackberry – *Vaccinium myrtillus*). Anthraquinone glycosides are knows as laxatives for the treatment of chronic constipation. They are contained in the roots of *Rheum palmatum L.* (*Radix Rhei*), cortex of glossy buckthorn (*Cortex Frangulae*), fruits and leaves of senna (*Cassia senna*) and other. Phenolic glycosides, containing as aglycon phenols or phenolic acids are widely spread amongst the Willow family (*Silicaceae*) and *Erica herbacea* (*Fricaceae/Ericaceae*). In this group are the glycosides arbutin and methylarbutin. They are contained in the leaves of the bearberry (*Arctostaphylos uva ursi*) and the lingonberry (*Vaccinium vitis-idaea*) and have strong disinfective action on the urogenital system. Coumarin glycosides are expressed in the Rutaceae and Apiaceae/Umbelliferae family and have photo protective, diuretic, spasmolytic and anticoagulant activity.

Tannins are polymeric phenolic compounds, widely distributed in the plant world. Drugs from the cortex of oak (*Cortex Querci*), leaves from smoke bush (*Rhus cotinus*), blades of common agrimony (*Agrimonia eupatoria*) are the most often used. Because of containing of katehins, galotannins, galic and elagalic acids, tannins have coagulating effect on the skin and mucosa as well as astringent, haemostatic, adsorbing an anti-inflammatory activity.

Essential oils contain mono- and hexaterpens, alcohols, aldehydes, ketones, acids and phenols. They are typical for the Pinus, Cupressaceae, Lauraceae, Apiaceae families and others. They have wide spectrum of pharmacological activities. Oils containing azulene possess antiinflammatory action (*Matricaria chamomilla*), oil from yarrow (*Achillea millefolium*) and the rest oils from anise - *Oleum Anisi* (*Pimpinella anisum*), thyme – *Oleum Thymi* (*Thymus vulgaris*), eucalypt oil are known for their action as expectorants. However, essential oils possess diuretic, spasmolytic, antiseptic, improving the bile circulation, antihelminthic, hyperaemic and heating action.

Medicinal plants contain other biologically active substances like saponins, iridoids, mucous substances and other.

Modern phytotherapy has the following options:

- to be applied simultaneously with synthetic medicines in the subacute or chronic phase of the diseases
- it has milder, longer and with less side effects action
- it is cheaper and accessible

- many years of practical experience, shows better therapeutic effect of the total extract of the medicinal plants, compared to the purified extracts and chemically treated plant product
- Phytotherapy not only treats, but has a stimulating effect for the defence systems in the body, improves functional condition of the organs and the physiological systems and optimizes the metabolism. Herbs and medicinal plants could be used in many different conditions, but especially in the internal medicine.

A renaissance in the phytotherapy has been observed in the last few decades, despite the achievements of modern chemistry and application of synthetic drugs. However, scepticism about the rationality and the capabilities of the phytotherapy is present in some of the physicians and medical staff. It is necessary to mention, that herbalism is not very appropriate for some disease, the healing effect is unsure and individual, it is not always possible to supply herbs with the same concentration of biologically active substances resulting in inaccuracy in dosage.

One of the modern forms of the phytotherapy is food supplements. They are newly appeared products on the food and pharmaceutical market, with a beginning in the 80th of the last century. The theoretical base for the appearing, production and application of food supplements are the principals of orthomolecular medicine and valeology -health science. According to the founder of the orthomolecular medicine Linus Pauling its main principle is the 'containing of good health and healing of the diseases by altering the concentrations of the substances in the human body, which are normally present and necessary for its good health condition' (4). The concept of the valeology is the same and learns that health is a condition of optimal proportion of the ingredients of the human body.

In about 80% of the food supplements medicinal plants have been included as extracts or in natural form. Directive 2002/46/EC of the European Union, food supplements are determined as 'all the essential nutritive substances, that are or not normal ingredients of the foods, which aim to preserve from or correct a demonstrated deficit of one or more nutrition substances in the society or in some specific groups'. It is obvious, that the food supplements, containing only or mainly medicinal plants are out of the meaning of this directive. Our and European current legislation is not precise enough in respect to food supplements containing medicinal plants or other biologically active substances. On some experts opinion they should be separated in a new group- 'parapharmaceutical products' with a different regiment of production and application compared to the foods.

The modern pharmacotherapy is too much leaning towards the chemistry. It is necessary a new evaluation of some therapeutic methods to understanding the risks of polypharmacy and drug dependence, which could lead to unwanted results. Phytotherapy is an alternative of the synthetic drugs and more and more people wishing the lead close to nature way of life are choosing it (5).

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