PERSPECTIVES OF APPLICATION OF MEDICINAL PLANTS RAW MATERIALS CONTAINING CAROTENOIDS FOR PREVENTION AND TREATMENT OF ONCOLOGICAL DISEASES

Bondar V.V.
Scientific supervisor: associate professor Filatova O.V.
National University of Pharmacy, Kharkiv, Ukraine
bondar.victoria.1707@gmail.com

Introduction. Carotenoids is a large group of biologically active compounds, that are characterized by a wide spectrum of pharmacological action. These natural pigments have antioxidant, immunostimulating, antimutagenic, proliferative, regenerative, antixerophthalmic effects. Due to some aspects of pharmacodynamics of medicinal plants raw materials, which contain such substances, it can actively use for prevention and treatment oncological diseases as evidenced by researches of scientists from different countries of the world. In industry, ß-carotene, one of the most important representatives of this group in addition to synthetic methods, are obtained from medicinal plants. Obtaining of carotenoids from natural sources has several advantages, that actualizes their cultivation.

Aim. To carry out an analysis of researches on different mechanisms of influence of carotenoids on the development of oncological diseases and their effectiveness, to outline the benefits of carotenoid extraction from natural raw materials, to determine the relevance of in-depth study of Ukrainian medicinal plants species as sources of industrial receiving these compounds.

Materials and methods. Information search and data analysis of foreign and national literature on the study of carotenoids.

Results and discussion. There are about 500 carotenoids, which are contained in different parts of medicinal plants. The well-known and the most common is ß-carotene (provitamin of retinol). Carotenoids can have an effect on the prevention of development of cancer and inhibition of carcinogenesis directly or through metabolite – vitamin A. Due to the presense of unsaturated chemical bonds they easily interact with free radicals of various types, with oxygen, detecting antioxidant effect. Because of provitamin activity, ß-carotene provides and regulates expression of pharmacodynamics effects by antixerophthalmic vitamin. He controls the synthesis of proteins of the cytoskeleton, the decomposition and synthesis reactions of glycoproteins, it reduces damaging effect on cells. This compounds can enhance bone regeneration, epithelium and mucous membranes restoration. Reparative and proliferative activity of vitamin A is connected with it. Also this substance forms in cells specific complex with cytoplasmic receptors, that regulate gene activity of kernel. Therefore, carotenoids is one of the components of antimutagenic protection of the body. Participation in the synthesis of interferon, in activation of lysosomal enzymes provides their immunostimulatory effect. All these pharmacodynamic effects contribute to a reduction in carcinogenic effects of various factors on the body.

Scientists from many countries are conducting researches on this issue. In 2014, scientists from Poland, Joanna Fiedor and Kvetoslava Burda, have shown, that ß-carotene is an important factor in the prevention of oral cavity cancer, oncological diseases of pharynx and larynx. The risk of developing these diseases in its application is reduced by about 50%. Researcher Dagfinn Aune from Great Britain and his colleagues in 2013 concluded, that the increase in the concentration of carotenoids due to the adjustment of the diet contributes to the decrease the risk of developing breast cancer by 20-30%. Detailed analysis of blood parameters indicated, that the concentration of these substances in plasma is inversely proportional to the number of relapses and lethal consequences. In 2015, American scientists William G. Gutheil, Gregory Reed, Amitabha Ray, and Animesh Dhar have investigated the impact of carotenoids from Saffron Crocus (*Crocus sativus* L.), in particular, crocetin, on treatment skin cancer and had come to the positive conclusion. The analysis of the results showed, that this natural pigment, inducing RNA polymerase II, suppresses the transcription process and further formation of proteins. The active work of world scientists on the search of promising methods for the prevention and treatment of oncological diseases with using of biological active substances of natural origin contributes to improving the efficiency of counteraction these diseases.

There are a large variety of medicinal plants with a high content of carotenoids contained in plastids in Ukraine. It is such species as English marigold (*Calendula officinalis* L.), sea buckthorn (*Hippophae rhamnoides* L.), mountain ash *(Sorbus aucuparia* L.), cinnamon rose (*Rosa majalis* Herrm.), spinach (*Spinacia oleracea* L.), horse sorrel (*Rumex confertus* Willd.), coltsfoot (*Arctium lappa* L.), common hop (*Humulus lupulus* L.) and others. Carrot (*Daucus sativus* Hoffm.) and pumpkin (*Cucurbita pepo* L.) belong to the main industrial sources of receiving of ß-carotene, although the current successes in biotechnology allow mostly to solve the questions of getting carotenoids from other sources (unicellular algae, filamentous fungi, bacteria). The content of ß-carotene in root crops of carrot and fruits with seeds of pumpkin is 0.036 and 0.012 g per 100 g respectively, although the conditions of cultivation play an important role for the accumulation of provitamin A. For example, on the southern slopes, the quantity of carotene in one of the same species of plants is greater, than in the north. It is connected with shorter duration of day, reducing of daylight amount and lower temperatures.

Carotenoids can be isolated by extraction from plants raw materials with solvents, that do not contain peroxides with further saponification and chromatographic separation. Their getting by means of chemical synthesis is much more complicated. It is connected with the nature of technological processes. The use in the therapy of artificial ß-carotene can cause more side reactions through the formation of related products in the process of synthesis, which can sometimes remain even after thorough cleaning. It is confirmed by the words of a famous allergist Geron P. Randolph: «A synthetic substance can cause a reaction in people, which have sensitivity to the action of chemical compounds, at the same time, as a identical substance of natural origin is well tolerated, although its chemical structure is identical». Carotenoids reveal significantly higher lability in medicinal plants raw materials compared to artificial analogues, that contributes to their involvement into the large number of biochemical processes in the body. It determines the manifestation of many pharmacological effects of carotenoids on the prevention and treatment of oncological diseases. According to the WHO(World Health Organization), about 80% of the population of our planet still prefers drugs, which are derived from natural plants raw materials.

Conclusions. The conducted analysis shows, that carotenoids through various mechanisms can effect the prevention and treatment of oncological diseases, and the use of natural raw materials of many Ukrainian medicinal plants in modern conditions can be relevant and perspective.

MINERAL COMPOSITION OF CELERY LEAVES

Boumanzah Imane
Scientific supervisor: ass. prof. Stepanova S. I.
National University of Pharmacy, Kharkiv, Ukraine
nutriciologiastepanova@gmail.com

Introduction. Minerals play an important role in the human organism: they form body structure and support a wide variety of vital functions. Micro- and macroelements are an essential component of food, and their long-term deficiency or excess in nutrition leads to metabolic disorders and even diseases. The study of the mineral composition of plants is also important for the standardization of medicinal plants and medicinal preparations created on its basis.

Aim. The aim of this study is to determine mineral composition of Celery leaves.

Materials and methods. Celery is a two-year vegetable plant, in the first year it forms a leaf rosette. First year leaves of *Apium graveolens* L. *var. rapaceum* were cultivated at the experimental area in Kharkiv and harvested in August 2017. Investigation of mineral composition was carried out on the basis of the Scientific-technological complex «Institute of Moncrystals» of the NAS of Ukraine by the method of atomic emission spectrophotometry. The method is based on the evaporation of the ash of the investigated sample in the arc discharge, the photographic registration of the decomposed radiation into the spectrum, the study of the intensity of the spectral lines of the individual elements on the DFS-8 spectrograph and their comparison with standard mixtures of mineral substances. The investigated samples were treated with sulfuric acid and burned in a muffle furnace at a temperature of 500° C for 5 hours. Evaporation of samples was carried out from the craters of graphite electrodes in the discharge arc