

**HERBAL TEA FOR NORMALIZATION
OF ARTERIAL PRESSURE AND URIC ACID METABOLISM**

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Introduction: Cardiovascular diseases (CVDs) are the most common healthcare problem worldwide being responsible for approximately 30% of all global deaths annually. It is estimated that the mortality rate caused by CVDs will continue to rise, reaching 23 million by 2025. Currently, hyperuricemia (HU), which is an independent CVD factor, attracts the attention of researchers. HU (serum uric acid (UA) level exceeds 360 $\mu\text{mol/L}$ in women and exceeds 420 $\mu\text{mol/L}$ in men) is associated with the development of a number of so-called "diseases of civilization," such as obesity, arterial hypertension, diabetes. A high UA level plays one of the key roles in the processes of inflammation, endothelial dysfunction, insulin resistance, atherogenesis. It was confirmed that HU is detected in a

significant number of patients with arterial hypertension (AH) and serves as a marker of kidney damage and an unfavourable prognosis – increased mortality.

Asymptomatic HU does not require drug treatment. However, the level of uric acid in serum needs correction when hyperuricemia is combined with chronic kidney disease, arterial hypertension and other cardiovascular diseases, metabolic syndrome, and type 2 diabetes mellitus. The use of drugs with uricosuric action (uralit, benzbromaron, probenecid), as well as xanthine oxidase inhibitors (allopurinol) in case of arterial hypertension and metabolic syndrome is limited by their adverse effects, while uricosuric drugs are also characterized by insufficient organ-protective action.

Aim. Thus, the development of the herbal tea that normalizes blood pressure and uric acid metabolism, which can provide additional protective action on endothelium and the ability of arterioles to vasodilation, is relevant.

Materials and methods. For the study, the leaves and flowers of midland hawthorn (*Crataegus laevigata* (Poir.) DC, Rosaceae), cultivated at the experimental garden of NUPh, were collected during the flowering period in May 2019. The leaves of goutweed (*Aegopodium podagraria* L., Apiaceae), a wild plant, were collected in May 2019 in Kharkov region. The raw materials of each plant species were dried by the air-shadow method, crushed to a particle size of 1 mm, and used to prepare a herbal tea from the hawthorn leaves and flowers and the goutweed leaves in the ratio (1:1) and further research.

The content of phenolic compounds was determined by direct spectrophotometry assay at a wavelength of 327. The optical density was registered on a «Specord 200» spectrophotometer. Free radical scavenging activity of samples was estimated by ABTS radical cation assay. All the reagents and chemicals used were of analytical grade. Investigations were carried out on the basis of the Educational and Scientific Training Center of Chemical and Technological Research of NUPh.

Results and discussion. The literature review has shown that hawthorn leaves and flowers contain a range of pharmacologically active substances, the most important being phenolic compounds: oligomeric procyanidins; flavonoids – quercetin, hyperoside, rutin, apigenin, vitexin and its glycosides; hydroxycinnamic acids – caffeic, ferulic, chlorogenic and neochlorogenic. The goutweed leaves contain organic acids – chlorogenic, caffeic, ferulic, vanillic, synapic, α -resorcylic; flavonoids – luteolin, kempferol, trifolin, quercetin, catechin, anthocyanins. The hawthorn leaves and flowers have cardiogenic, hypotensive, antiarrhythmic effects, improve coronary and cerebral circulation, exert hypolipidemic, antioxidant, neuroprotective, hypoglycemic effects, improve the target organ (kidneys, liver) functions in diabetes mellitus. The leaves are traditionally used to treat joints diseases, gout; their antioxidant, anti-inflammatory, hepato- and nephroprotective, hypolipidemic activity, a beneficial effect on glucose and uric acid metabolism have been proven. Therefore, it was rational to combine these two plants in the form of a herbal tea for further study of the possibility of using to correct uric acid metabolism in arterial hypertension.

The total phenolic *content* in the herbal tea was $3.8 \pm 0.1\%$ expressed as chlorogenic acid. This study demonstrated that the herbal tea and its components exhibited a significant antioxidant potential. Antioxidant activity was $19112.12 \mu\text{g/g}$ for the herbal tea, $20862.20 \mu\text{g/g}$ for hawthorn leaves and flowers, $20357.31 \mu\text{g/g}$ for goutweed leaves, expressed as trolox equivalent antioxidant capacity. This *in vitro* assay indicates that investigated herbal drugs are a source of natural antioxidants, which might be helpful in preventing the progress of oxidative stress under various conditions.

Conclusions. The proposed herbal tea contains a significant amount of phenolic compounds and has a high antioxidant activity. And along with this, the hyperuricemic activity of celery leaves has been experimentally proven, the use of hawthorn leaves and flowers as an organ-protective phytopharmaceutical has a long history and clinical evidence. Therefore, this herbal tea can be recommended for further research.