

THE QUANTITATIVE DETERMINATION OF CATECHINS IN ANISE FRUITS

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Introduction. Centuries ago, Hippocrates remarked: “Let food be your medicine, and medicine your food”. From the very beginning of civilization, by trial and error, people experimented with higher plants, trying to find medicines against various diseases and illnesses, and found the healing properties of seeds, bark and roots of some plants. Despite the emergence of modern high-performance methods for detection and screening of drugs the traditional knowledge of the system still gave the key to the discovery of valuable drugs.

Pimpinella anisum L., also known as «aniseed», is an annual herb belonging to the *Apiaceae* family and native to the eastern Mediterranean area and southwestern Asia.

Anise contains:

- 1-4% volatile oil;
- coumarins: bergapten, umbelliprenine, umbelliferone, scopoletin;
- ca. 8-16% lipids, including fatty acids: 50-70% petroselinic acid (C18:1), 22-28% oleic acid (C18:1), 5-9% linoleic acid (C18:2) and 5-10% saturated fatty acids mostly palmitic acid (C16:0);
- β -amyrin, and stigmasterol and its salts (palmitate and stearate);
- flavonoid glycosides: quercetin-3-glucuronide, rutin, luteolin-7-glucoside, isoorientin, isovitexin, apigenin-7-glucoside (apigenin), etc;
- myristicin;
- ca. 18% protein;
- ca. 50% carbohydrate and others.

The pharmaceutical data mentioned in the literature mainly refer to anise oil and anethole. Anethole is structurally related to catecholamines adrenaline, noradrenaline and dopamine. Anise oil and anethole have a number of functional properties:

- antibacterial
- antifungal
- antioxidant
- stimulant, carminative and expectorant.

Aim. The aim of this study was the quantitative determination of such a group of biologically active substances as catechins in anise fruits.

Materials and method. The objects of the study were extracts obtained from anise fruits purchased in 2018 at the market of Alma-Ata.

To obtain liquid extracts place 10.0 g of the crushed raw material in a flask, add 100 ml of the extractant (alcohol-water mixtures of different concentrations) and heat with a reflux on a boiling water bath for 30 min. After cooling filter the contents of the flask, and measure the volume of the resulting solution. Repeat the procedure twice under the same conditions. Combine the filtrates and concentrate under vacuum on a vacuum-rotary evaporator to the ratio of the raw material – finished product of 1: 1.

Take 3 ml of alcohol extracts and transfer to 25 ml volumetric flasks, add 6 ml of distilled water, then 1 ml of 5% sodium nitrite solution, mix the contents of the flasks. In 6 min add 1 ml of 10% solution of aluminum chloride, stir, leave for 6 min. Add 10 ml of 4% sodium hydroxide and dilute to the volume with distilled water.

In similar conditions, a standard solution of rutin was prepared. The optical density of the test solutions and the reference solution was measured on a Hewlett Packard 8453 spectrophotometer at a wavelength of 510 nm, the thickness of the cell layer was 10 mm.

Result and discussion. The maximum content of catechins in anise fruits was observed when using 96% ethyl alcohol as an extractant – 1.54%. As the alcohol concentration decreased, the content of

catechins in the extract also reduced. This group of compounds is of interest for pharmacy and medicine as substances with powerful antioxidant properties that take part in the plant metabolism.

Conclusions. The results obtained indicate the prospects for further in-depth study of the chemical composition and biological activity of extracts from anise fruit with the aim of creating drugs that increase immunity, strengthen the walls of blood vessels and capillaries, reduce cholesterol and accelerate metabolism on their basis.

PROSPECTS OF STUDYING FLOWERS OF COMMON BORAGE VARIETY 'ALBA'

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Introduction. Medicinal properties of common borage (*Borago officinalis* L.) of borage family Boraginaceae Juss. known since ancient times: the warriors took the wine with leaves and flowers before the battle to raise morale, doctors recommended herbal infusion to get rid of melancholy and sadness, as the vitamin and tonic in early spring added young leaves of the rosette to salads, soups, sauces. As a diuretic herb is effective in diseases of the heart, kidneys, urinary tract, ascites. Decoctions and infusions also have blood purifying properties, positively affect the state of the capillaries, metabolism. Some authors recommend using the aboveground part for gargling in case of sore throat, glossitis, ulcerative lesions of the gums and the oral cavity. The flowers are used to treat diseases of the nervous system, especially in cases of hormonal disorders. The most widely used in folk medicine there is borage with blue flowers. Also known are two varieties of this species with white flowers 'Alba' and with spotty leaves 'Variegata'. To expand the resource base, we continued to study of borage varieties 'Alba'.

Aim. The aim of our work was to study the chemical composition of the flowers of the common borage variety 'Alba'.

Materials and methods. The raw materials were flowers, which were harvested in the Kharkiv region in June 2018 during the period of mass flowering. The raw materials were dried by the air - shadow method, crushed on a CO 124A dismembrator grinder and sieved. The raw materials were extracted with various solvents and examined for the presence of biologically active substances using qualitative reactions, chromatography on paper and in a thin layer of sorbent in various solvent systems.

The quantitative content of ascorbic acid and the total of organic acids (in equivalent to malic acid) were determined by the method of the State Pharmacopoeia, edition XI. Determination of quantitative content of total oxidative phenols in flowers were carried out by the method of permanganometry, phenolic compounds by the method of spectrophotometry: the total of hydroxycinnamic acids at a wavelength of 327 nm in equivalent to chlorogenic acid, flavonoids at a wavelength of 417 nm in equivalent to rutin.

Results and discussion. During the study of the chemical composition it was found that the investigated raw material contains aminoacids, organic acids, polysaccharides, phenolcarboxylic acids, coumarins, flavonoids, tannins.

The quantitative content of organic acids in borage flowers of the variety 'Alba' was $0.316 \pm 0.007\%$; vitamin C – $13.1 \pm 1.2\text{mg}\%$; the total of phenolic compounds - $3.89 \pm 0.14\%$; the total of hydroxycinnamic acids is $1.29 \pm 0.01\%$; flavonoids - $0.013 \pm 0.001\%$.

Conclusions. The obtained results of studying the qualitative and quantitative content of biologically active substances in borage flowers of the 'Alba' variety indicate the prospect of further study of the raw material of this variety and will be used in further research.