

(H5N3) and A/FPV/Rostock/34 (H7N1)) was carried out. According to results the extract suppressed 50% of the reproduction of 100 infectious doses of the virus regardless of the antigenic structure in doses of 0.04-0.07 mg per chicken embryos. Moreover, the extract at a dose of 1 mg per chicken embryo is capable of influence the infectivity of the influenza virus more than by 3lg.

A significant inhibitory effect of aqueous ethanol extract and four fractions from the polyphenolic mixture of *E. hirsutum* on the reproduction of influenza A viruses (A/PR/8/34 (H1N1) and A/Hong Kong/1/68 (H3N2)) *in vitro*, *in ovo*, and *in vivo* was confirmed. Applied 1 h before or simultaneously with the viral infection, the extract reduced the infectious titer of H1N1 strain with 2 - 2.5 lg and the titer of H3N2 strain with 1.66 - 3.0 lg *in ovo*. The protective effect was 69.23 percent for H1N1 and 71.59 percent for H3N2 strains when the extract was applied simultaneously with the virus. In the course of experimental influenza infection in mice with H1N1, the extract in doses of 35 and 70 mg/kg applied simultaneously with the virus inhibited its reproduction, reduced the lung infectious titer with 1.3 - 2.5 lg, and increased the number of survivors. The antiviral effect of the fractions from *E. hirsutum* was studied in the course of an experimental influenza infection in mice with virus H3N2. All fractions significantly inhibited the reproduction of virus H3N2; the infectious titer in the lungs of treated animals was reduced with 1.5 - 4.5 lg. The mortality rate was decreased in all experimental groups. The number of surviving animals was also increased in the groups of mice treated with one of the fractions in the course of an experimental infection with virus H1N1. The most of researchers considered the tannins to be the active principle constituents of the antiviral activity of an extract from *E. hirsutum*. The total polyphenolic mixture used in the experiments was free of tannins. Authors of this study claimed that the inhibitory activity of the extract from *E. hirsutum* and the fractions on the reproduction of influenza virus *in vitro*, *in ovo*, and *in vivo* could be related to the presence of other polyphenolic substances, mainly flavonols.

Furthermore, oenothien B, the main elagitannin of these genera, were investigated for its antiviral action on herpes simplex virus (HSV-1, strain HF)-infected African green monkey kidney cells and human adenocarcinoma cells, using a plaque formation assay. The inhibition by compound was very potent ( $ED_{50} = 0.036 \mu\text{g/ml}$ ), at the same time, 50% effective dose was 2 orders of magnitude lower than its respective 50% cytotoxic doses ( $CD_{50} = >30 \mu\text{g/ml}$ ).

**Conclusions.** To conclude, several studies of the antiviral activity of extracts of *Ch. angustifolium*, *E. hirsutum* and oenothien B reported ability of this substances to This data confirm the prospects for further study of antiviral activity of plants of genera *Epilobium* and *Chamaenerion* on a wider range of virus strains and development of medical substances for the prevention and treatment of viral diseases from their raw materials.

## RESEARCH OF BIOLOGICALLY ACTIVE SUBSTANCES OF COFFEE ON THE MARKET OF UKRAINE

Ochkur O. V., Revenko R. M., Zaika O. V.

Scientific supervisor: prof. Kovaleva A. M.

National University of Pharmacy, Kharkiv, Ukraine

alex.o4kur@gmail.com

**Introduction.** The coffee tree (*Coffea* L.) is a genus of evergreen plants in the *Rubiaceae* family. The genus includes 125 species. The two most popular are *Coffea arabica* (commonly known simply as “Arabica”), which accounts for 69% of the world's coffee production, and *Coffea canephora* (known as “Robusta”), which accounts for about 29%. Robusta is generally considered a less refined coffee beans in terms of aroma, however it contains more caffeine and is also often used

in espresso blends. Other types of coffee, such as liberica, arabusta and excelsa, have little industrial value. The chemical composition of coffee beans is represented by alkaloids, proteins, phenolic compounds, mono- and disaccharides, lipids, organic acids, amino acids, and mineral elements. Typical representatives of coffee alkaloids are methylated purine derivatives: caffeine, theobromine, theophylline, and trigonelline. Phenolic compounds are represented by chlorogenic acids and tannins.

**Aim.** The aim of our study was to determine the qualitative and quantitative composition of alkaloids and phenolic compounds in different varieties of coffee, both whole grain and ground, presented on the Ukrainian market.

**Materials and methods.** The objects of study were Arabica coffee beans “Mr. Rich Rostkaffee Cafe Creme Torino” (sample 1) and ground coffee “De Luxe Foods & Goods Selected” (sample 2). Phenolic compounds and alkaloids of coffee were investigated by thin layer chromatography method in solvent systems: ethyl acetate - anhydrous formic acid - water (10:2:3) and chloroform - methanol - acetone - ammonia (85:14:1:1). Quantitative determination of alkaloids and hydroxycinnamic acids was performed by spectrophotometry methods in terms of caffeine and chlorogenic acid, respectively.

**Results and discussion.** The alkaloids trigonelline, caffeine, theophylline and theobromine, as well as hydroxycinnamic acids – p-coumaric, ferulic, caffeic and chlorogenic, were identified in both samples by thin layer chromatography. It was determined that the content of alkaloids in the sample 1 is  $0,81 \pm 0,03\%$ , in the sample 2 –  $0,71 \pm 0,02\%$ ; content of hydroxycinnamic acids in the sample 1 is  $3,72 \pm 0,08\%$ , in the sample 2 –  $3,15 \pm 0,06\%$ .

**Conclusions.** In both studied coffee samples, alkaloids and hydroxycinnamic acids were identified. Using spectrophotometric methods, the content of these groups of biologically active substances was determined.

## THE ELEMENTAL COMPOSITION OF *DASIPHORA FRUTICOSA* (L.) VAR. ‘ELIZABETH’

Odohovska S. Yu.

Scientific supervisors: Goryacha O. V., Ilina T. V.

National University of Pharmacy, Kharkiv, Ukraine

helgagnosy@gmail.com

**Introduction.** Shrubby Cinquefoil (*Dasiphora fruticosa* (L.) Rydb.; syn. *Potentilla fruticosa* L., family *Rosaceae* L.) is a deciduous shrub common to Northern Hemisphere’s temperate regions. Major and trace elements, unsaturated fatty acids, pectin substances, tannins, hydrocinnamic acids, flavonoids, saponins were reported in *D. fruticosa* herb. Leaves of *D. fruticosa* are used as a tea substitute; in the folk medicine, it is used as an anti-inflammatory and hemostatic agent; an *in vitro* antioxidant activity was reported. Nowadays, *D. fruticosa* is a well-known ornamental plant; depending on the flowers’ size and colour, more than 130 varieties are available. There is no information on the chemical profile of *D. fruticosa* varieties available in the public domain. *D. fruticosa* ‘Elizabeth’ is a bushy shrub of about 1 m in height and it spreads up to 1.5 m; with canary yellow flowers up to 3.5 cm diameter in cymes of 3. *The plant is an* attractant for bees due to flowers rich in nectar and pollen.

**Aim.** The aim of the present research was to study the elemental composition of aerial part of yellow flowering variety of *D. fruticosa* ‘Elizabeth’ cultivated in Ukraine.