The first research results on polyphenols in *Ruta graveolens* herb of Ukrainian origin

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Introduction. *Ruta graveolens* is well known as an ornamental and medicinal plant [1]. It is a promising plant of traditional Ukrainian folk medicine for study.

The plant comes from the Mediterranean [2]. In Ukraine, it used to grow only on the Crimean peninsula, on dry stony and gravelly slopes. Currently, the growth is also in a wild form in the southwestern part, as well as in the Ivano-Frankivsk, Lviv, Zakarpattia regions. It is actively cultivated in botanical gardens.

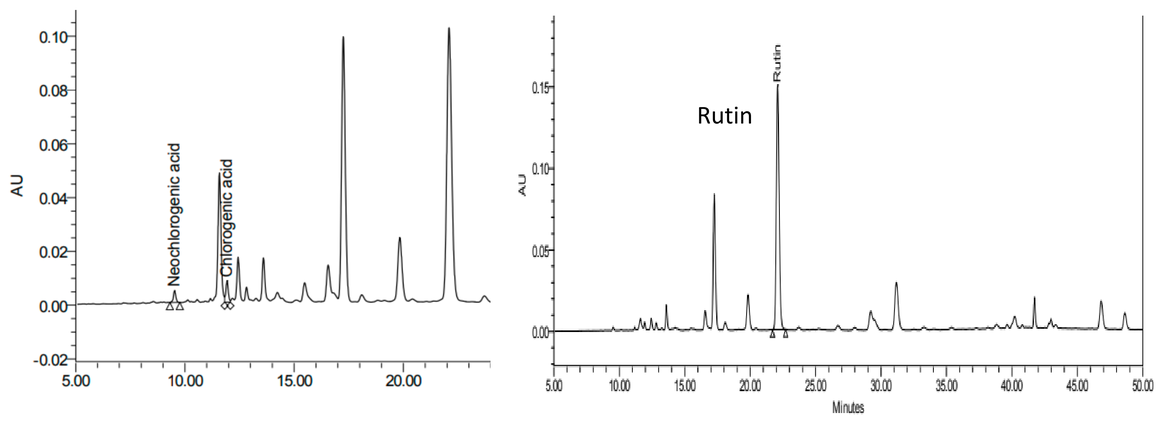
In Ukrainian folk medicine, the plant is used for urolithiasis, women's diseases, gastritis, nervous diseases, against convulsions, as an appetite stimulant [5]. Also, rue has an effect on smooth muscles, the nervous system, and the structure of blood vessels. It is used for bruises, bruises, bedsores, bruises and wounds, applying a cold infusion of the plant externally. Folk reference books state that rue cannot be used during pregnancy, as it acts as an abortifacient [1].

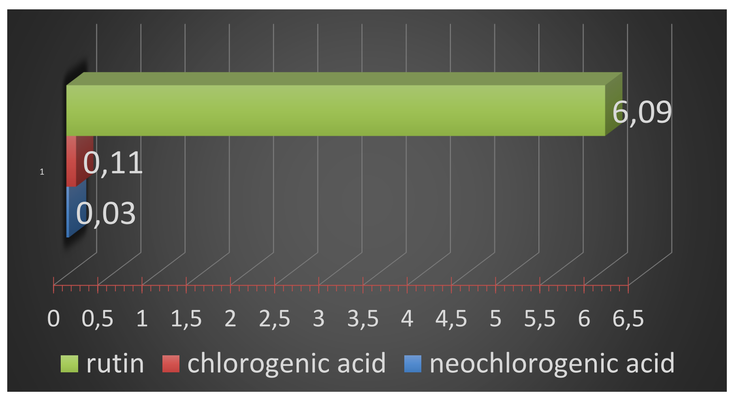
Ruta herb is included in the French and Indian pharmacopoeias, as well as into the British herbal pharmacopoeia [3,4]. This shows its value. The plant is not included in the State Pharmacopoeia of Ukraine, and therefore requires detailed phytochemical analysis. The plant is a potential for the SFU of Ukraine, as it can be easily cultivated in natural and climatic conditions throughout the country. A feature is the simultaneous combination of alkaloids and essential oil, which makes the plant poisonous and fragrant, which is rarely found in nature.

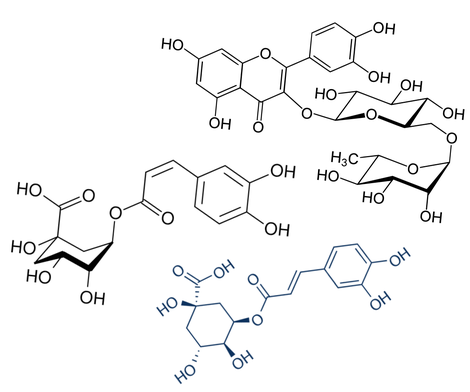
Aim. The aim of our study was to identify the dominant marker compounds, which can be used to further standardization of herbal raw materials.

*Ruta graveolens (*Rutaceae family*)* flowers were collected from the plantation in the Ivan Franko National University of Lviv Botanical Garden (Ukraine) at July 2022. The raw material was collected and verified by Dr. Skybitska (Botanical Garden of the Lviv National Ivan Franko University, Lviv, Ukraine). A specimen was deposited at the same university. The herb were dried for 2–3 hours at 50 °C under forced air and stored in dark place.

Discussion. The plant powder (0.1 g) was extracted in 10 mL of 50% methanol in an ultrasonic bath (20 min) and then filtered. HPLC analysis of polypenolics was carry outed on Waters preparative HPLC Purification System with a Symmetry Prep C 18 (300×19mm×7µm) column, using the mobile phase composition of a mixture of 0.1% (v/v) trifluoroacetic acid in pure water (A) and acetonitrile (B) solvents. As a result, were determined neochlorogenic acid (0,03±0,01 mg/g), chlorogenic acid (0,11±0,01 mg/g), and rutin (6,09±0,25 mg/g). The research is still ongoing.







Conclusion. The established composition indicates the prospects for further study and standardization of rue grass. In addition, the presence of these substances confirms some types of actions of *Ruta graveolens*. The plant needs further study and thorough research. Further experiments can potentially open up new opportunities for the use of plant raw materials in medicine and pharmacy and provide new active ingredients.

References

1. Colucci-D'Amato L, Cimaglia G. Ruta graveolens as a potential source of neuroactive compounds to promote and restore neural functions. J Tradit Complement Med. 2020;10(3):309-314.
2. Ríos, J.-L., Andújar, I. (2020). Apoptotic activities of Mediterranean plants. The Mediterranean Diet, 565–578. doi:10.1016/b978-0-12-818649-7.00049-7
3. Ruta graveolens // Brazilian Homeopathic Pharmacopoeia / -2011 / - P. 259-260.
4. Ruta graveolens // Homeopathic Pharmacopoeia of India / -2016 / -P.283.
5. Kozlowska W, Wagner C, Moore EM, Matkowski A, Komarnytsky S. Botanical Provenance of Traditional Medicines From Carpathian Mountains at the Ukrainian-Polish Border. Front Pharmacol. 2018 ;9:295.