

# Extracts of *Anthyllis polyphylla*, *Centaurium erythraea* and other Ukrainian medical plants as new sources of biologically active compounds

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## Abstract

In this study, we determined total content of polyphenols, flavonoids, tannins, and triterpenoid glycosides in the extracts of *Anthyllis polyphylla*, *Centaurium erythraea*, *Lycopus europaeus*, *Primula veris*, *Agrimonia procera*, *Agrimonia eupatoria* L. For example, infraspecific chemical investigation of populations of *Anthyllis polyphylla* showed the presence of about 30 glycosides: quercetin 3-*O*-glucoside, kaempferol 3-*O*-galactoside, 3-*O*-arabinoside, isorhamnetin 3-*O*-galactoside and 3-*O*-arabinoside, etc. Other polyphenol compounds are presently under investigation.

**Keywords:** *Anthyllis polyphylla*, polyphenols, triterpenoid glycosides.

## Introduction

The research of healing properties of herbs has become very popular nowadays. Scientists develop new methods of extraction of various substances from plants for further research of their pharmacological properties. In particular, a great deal of studies of foreign scientists is devoted to the research of properties of plants that grow in India and Southern America, whereas the healing properties of some herbs, growing on Ukrainian lands, are poorly studied, in particular, some surviving and endemic species of plants that are unique and grow only on the territory of Ukraine.

Heart disease (HD), cancer, diabetes mellitus (T2DM), liver diseases are known as a top killer for decades. In Ukrainian folk medicine use regional plants for treatment these diseases: *primula veris* (HD, tuberculosis), *agrimonia procera* and *A. eupatoria* (cancer); *Anthyllis polyphylla* (T2DM), *agrimonia* + *lycopus europaeus* and *centaurium erythraea* (liver diseases). The synergistic effect of combining these plants for treatment is peculiar interest for future researches.

We described the molecular structures of representative biologically active compounds and general methods for their extraction, separation, and structural elucidation based on HPLC, NMR, UV, IR and Raman spectra, fluorescent X-ray spectrometric analysis.

## Experimental

UV spectra were recorded in MeOH; IR spectra as nujol mulls. The solvent signals were used in NMR as reference ( $\delta$  2.49 for  $^1\text{H}$  and  $\delta$  39.5 for  $^{13}\text{C}$ ). COSY spectra were measured with Bruker standard software. Air-dried powdered aerial parts of medical plants were extracted in a Soxhlet with n-hexane,  $\text{CHCl}_3$  and  $\text{CHCl}_3$ -MeOH (9:1) [1-2]. Some amount of the dried herbs (different parts of it) was burnt and made an analysis of the remainder on trace elements content (Cu, Zn, Se, Mg, Fe, Mn etc.) and calculated their content in the dried parts (fluorescent X-ray spectrometric analysis).

**Plant material.** *Primula veris* was collected in May 2016, *Anthyllis polyphylla*, *Agrimonia procera*, *Agrimonia eupatoria* L. were collected from their native state in July – August 2017 (Kyiv's region, Ukraine). Samples of aerial parts of *Centaureum erythraea* and *Lycopus europaeus* were purchased from commercial manufacturers in Ukraine.

## Results and discussion

Because of its widespread use in Ukrainian folk medicine, these medical plants (*Anthyllis polyphylla*, *Centaureum erythraea*, *Lycopus europaeus*, *Primula veris*, *Agrimonia procera*, *Agrimonia eupatoria* L.) provoke a great scientific interest. A growing body of evidence suggests some extracts – for example, *Comarum palustre* [3 - 4], and especially polyphenolic compounds, have potent activity against  $\alpha$ -glucosidase. But *Anthyllis polyphylla* and its compounds weren't investigated for  $\alpha$ -glucosidase inhibitory potential yet. Triterpenoid glycosides (like Gymnemic acid I) has high anti-sweet activity. On the other hand, anti-oxidation therapy may be efficient and Ukrainian herbal medicine has been shown great potential of *Primula veris* in prevention and treatment of HD (and even tuberculosis) as an effective antioxidant in experimental studies.

That's why need to continue researches of new sources of biologically active compounds – especially *Anthyllis polyphylla*, *Centaureum erythraea*, *Lycopus europaeus* and *Primula veris* .

## References

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