

COMPARATIVE PHYTOCHEMICAL RESEARCH OF *GALIUM VERUM* L. AND *G. MOLLUGO* L.

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Abstract. A comparative qualitative and quantitative analysis of flavonoids from aerial parts (herba) of *Galium verum* L. and *Galium molugo* L. (*Rubiaceae*) was conducted. The qualitative analysis of flavonoids conducted by TLC shows significant differences between the two species, the single common flavonoid being the rutoside. The total content of flavonoids is three times higher in *G. verum* (2.24%) than in *G. molugo* (0.72).

Key words: Flavonoids, *Galium verum*, *Galium molugo*.

INTRODUCTION

The species of *Galium* (*Rubiaceae*) are herbaceous, annual or perennial species with thin rhizome and cylinder-form stem with four prominent longitudinal lines. The leaves are in verticil but just two of these are genuine leaves, the other being stipules. The flowers are of four types in ended panicles and the fruits twin nucules (Flora R.P. Romana, 1961).

In the Romanian flora, there are between 28 (Flora R.P. Romana, 1961)-35 (Ciocarlan V., 2000) species quoted, most with white flowers and six with yellow flowers.

The aerial parts are gathered for medicinal purposes in the blossoming period (*Galium verum herba*) of *G. verum* - ‘Lady’s bedstraw’, with golden yellow flowers (Chevallier, 1996; Crăciun et al., 1997; Grigorescu et al., 1986).

Galium verum herba contains flavonoids, phenyl-propanoids compounds and iridoids. They are used as diuretic, depurative light sedative, spasmolytic in kidney stones, and externally for injuries and skin damages as wound healing, psoriasis treatment and rheumatism. In some countries, the drug is still used as a dye including the milk industries (Chevallier, 1996; Grigorescu et al., 1986; Wichtl and Bisset, 1994).

Generally, the species of *Galium* have not been studied chemical or pharmacologically (Bruneton, 1993).

In the same places with *Galium verum*, vegetates *Galium molugo*, with white flowers, which is considered an adulteration for ‘Lady’s bedstraw’ (Crăciun et al., 1997; Wichtl and Bisset, 1994).

For these reasons, the flavonoids of these two species were studied comparatively.

MATERIALS AND METHODS

The flowers were picked from the wild flora of Cluj County, in July 2006, dried in the shade and then grounded into fine powder (Sieve VI by Rom. Ph. IX).(10)

For qualitative TLC analysis of flavonoids, we used methanolic 5% extract samples in the following conditions (6.8):

- Stationary phase: Kieselgel GF254 (Merk) of 7.5 x 10 cm
- Mobile phase: ethyl acetate-water-formic acid-acetic acid (72:14:7:7)
- Standard solution: rutoside, hyperoside, quercitroside, clorogenic acid, cafeic acid 0.1% in methanol.
- Quantities applied: 20 µl of samples and 10µl of standard solutions in 1 cm broad
- Distance and time: 7.5 cm in about 60 min.
- Identification: Neu Reagent, PEG Reagent in UV light 365 nm. (8)

The quantitative determination of flavonoids was made by the officinal method in R.Ph. X like in *Cynarae folium* monograph with AlCl₃ as color reagent and the content is expressed in rutoside. (10)

RESULTS AND DISCUSSIONS

From the analysis of the chromatogram (Figure 1) it was established that every species contains 5 flavonoids with yellow-orange fluorescence and two phenyl-propanoid compounds with blue fluorescence. From these four compounds, common are: rutoside (Rf. 0.28), hyperoside (Rf. 0.60), clorogenic acid (Rf. 0.45) and cafeic acid (Rf. 0.92).

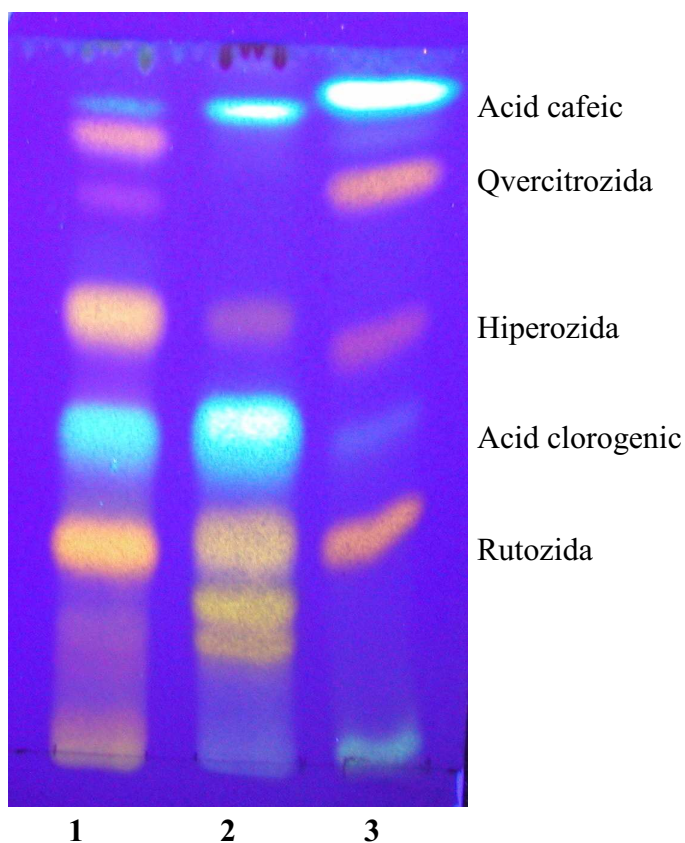


Figure 1. TL Chromatogram between *Galium verum* (1), *Galium molugo* (2) and standards substance (3)

Other compounds are typical for *Galium verum*: quercitroside (0.80) and other (unidentified) at Rf 0.85.

For *Galium molugo* two flavonoids heterosides are typical at Rf. 0.15 and Rf. 0.20 with orange fluorescence, which lack in *Galium verum*.

As a result, between the two species, there are resemblances but also differences. For instance, it was noticed that in *Galium verum* the hyperoside is significant, whereas in *Galium molugo* the hyperoside is only in traces, the main flavonoid being the rutoside and the other two just below rutoside.

The total content of flavonoids is over three times higher in *Galium verum* (2.24%) compared to *Galium molugo* (0.72%).

CONCLUSIONS

We performed a qualitative and quantitative analysis of flavonoids of two indigenous species of *Galium* from the wild flora of Cluj County (Romania): *Galium verum* with yellow flowers and *Galium molugo* with white flowers.

Between the two species there are qualitative differences in the flavonoid fractions. The content of the flavonoids is about three times higher in *Galium verum* than in *Galium molugo*.

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REZUMAT

STUDIUL FITOCHIMIC COMPARATIV LA SPECIILE *GALIUM VERUM* L. ȘI *G. MOLLUGO* L.

S-a efectuat o analiză comparativă, calitativă și cantitativă a flavonoidelor din partea aeriană (herba) a speciilor *Galium verum* L. (sânziene galbene) și *Galium mollugo* L. (sânziene albe), specii aparținând familiei *Rubiaceae*. Analiza calitativă realizată prin CCS a evidențiat existența unor deosebiri semnificative între cele două specii, singura flavonoidă comună calitativ și cantitativ fiind rutozida. Conținutul de flavonoide totale a fost de trei ori mai ridicat la *Galium verum* (2,24%) decât la *Galium molugo* (0,72%).