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Applicability of hydroalcoholic extracts *of Alchemilla Vulgaris* in development of high added-value pharmaceutical products

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INTRODUCTION

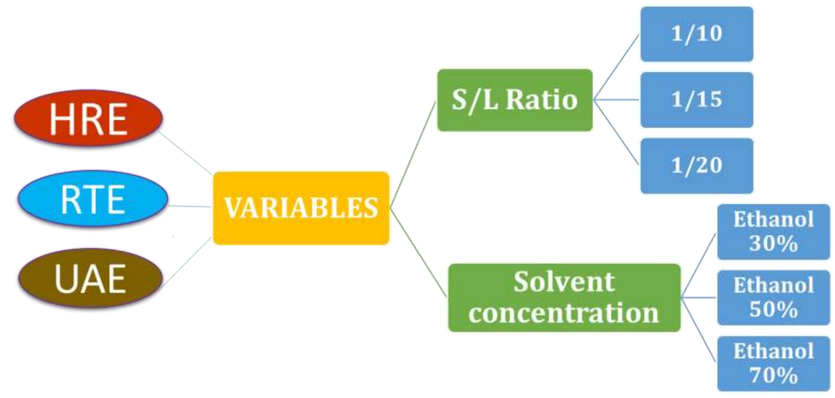
Nowaday's attention is focused on the study of plants, their secondary metabolites as important sources of biologically active compounds (terpenes, phenolic compounds, nitrogen compounds) with applicability in the food, cosmetics and pharmaceutical industries. Our research focused on Alchemilla vulgaris, an European native an unusual herbaceous member of the rose family (Rosaceae) rich in flavonoid compounds. *Alchemilla vulgaris* (Lion's foot or Lady's mantle) is an uncommon herbaceous member of the rose family *(Rosaceae),* native to Europe and are rich in flavonoids compounds. Flavonoids are among the most important groups of natural products used to reduce capillary permeability and fragility. Also, in vitro experiments with *Alchemilla vulgaris* demonstrate antibacterial, astringent, antioxidant, anti-inflammatory and wound healing properties.

The processing of the aerial parts of Alchemilla vulgaris aimed at obtaining plant extracts loaded with n biologically active compounds using different liquid-solid extraction methods: heat reflux extraction (HRE), room temperature extraction (maceration) (M), as conventional techniques and ultrasound assisted extraction (UAE) as an unconventional "green" method.

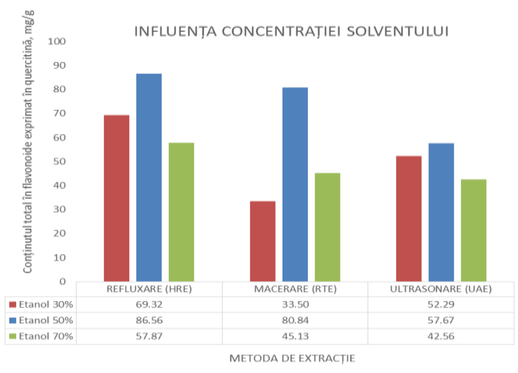
The yield was determined as a measure of extraction efficiency and it was calculated according to the following parameters: solvent concentration (hydroethanolic solvents% v / v), solid / liquid ratio (m / v) and extraction time. The quantitative characterization of the extracts obtained was done by evaluating the total flavonoid content (TFC) expressed in mg equivalent to quercetin (QE) per gram of extract.

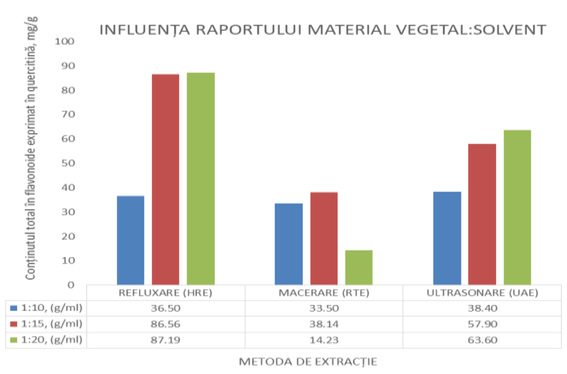
MATERIALS AND METHOD

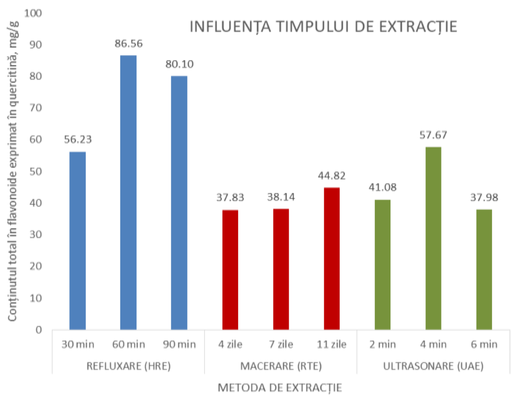
Total flavonoids* (TFC) *content - determined according to spectrophotometer-based method using a solution of $AlCl_3$ 2% in the presence of methanol The results were expressed in mg QE/g, considering the quercitin (QE)-based reference calibration curve.



RESULTS AND DISCUTION







- All the extracts of *Alchemilla vulgaris* presented flavonoids compounds.
- It can be observed that for all extraction methods the solvent concentration is the main parameter that influenced the TFC values.
- *The flavonoid content found in ethanolic extract of Alchemillia vulgaris were 36.50 and 86.55 respectively (mg quercitin equivalent/g of extract). High level of total content of flavonoids (86.55 mg quercitin equivalent/g of extract) were found using heat reflux extraction (HRE) – (time extraction – 60 minutes, hydroethanolic solvents 50 %v/v, 1:15 solid to liquid ratio).*
- The increase of solid to liquid ratio determined the decrease of the phytocompounds yields, therefore the 1:15 ratio assures the higher concentrations for the TFC for the applied techniques.

Applicability of vegetal extract in vaginal suppositories

Evaporation of *Alchemilla vulgaris* hydroalcoholic extract on the water bath

The mass of vaginal suppositories was formed in the shape of a scroll (magdaleon)

vaginal suppositories

CONCLUSIONS

- ✓ Conventional methods (HRE and RTE) require a high consumption of solvents and long extraction times. UAE is a modern and green method that improve the penetration of the solvent and the release of phytocompounds. UAE can allow shorter extraction times and a lower energy cost compared to conventional methods.
- ✓ This work demonstrated that TFC are influenced by the applied extraction techniques. The results assessed that *Alchemilla vulgaris aerian part* can be processed to obtain high yields of phytochemicals (TFC) opening new possibilities to become a valuable source of actives with applications in the pharmaceutical and dermatocosmetic industries.
- ✓ Preliminary results lead to the idea of deepening the study of the extraction process by reflux (HRE) and ultrasound (UAE) to obtain hydroalcoholic extracts of *Alchemilla vulgaris*.
- ✓ The results assessed that *Alchemilla vulgaris* plant can be processed to obtain high yields of phytochemicals opening new possibilities to become a valuable source of actives with applications in the pharmaceuticals like vaginal suppositories.