

## High pressure and supercritical fluid extraction of salidroside and rosavin from *Rhodiola rosea* root

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*Rhodiola rosea* is a plant from family Crassulaceae, growing at high altitudes in sandy soil and its roots are one of the most used adaptogens due to its specific chemical composition. Some of the compounds contained (salidroside, rosavin, tyrosol, rosarian) have a beneficial effect on brain activity, they are able to increase the level of serotonin and improve mental health.<sup>1</sup> Salidroside is able to upsurge resistance against cardiovascular diseases, may have a neuroprotective and antioxidant properties. Rosavin is a glycoside providing stimulating, antidepressant and anxiolytic properties along with salidroside. Due to a polar character of these compounds, they can be obtained by various extraction methods using solvents with high polarity index.<sup>2</sup>

The objective of this study is to obtain high yields of salidroside and rosavin using high pressure extraction methods, which are economical, ecological and fast. Pressurized liquid extraction (PLE) is a method working with superheated solvents, using elevated temperatures and pressures. Supercritical fluid extraction (SFE) is a technique based on extraction with a solvent (usually CO<sub>2</sub>) in supercritical state, where lower temperatures can be used, which makes it more suitable for sensitive bioactive compounds. High pressure methods were compared with conventional techniques of extraction (Soxhlet extraction, maceration and leaching) in terms of solvent consumption and yields of studied compounds.

The effect of temperature (80-120 °C), solvent (ethanol, methanol, water) and extraction time (5-15 min) on yields of salidroside and rosavin was investigated within PLE at 10 MPa. Every experiment was performed in 3 subsequent cycles. SFE experiments were carried out using CO<sub>2</sub>, which was modified by different polar solvents (ethanol, methanol, water) to increase the solubility of active substances. Extracts were analyzed by means of HPLC-MS and HPLC-UV for determination of the content of salidroside and rosavin.

PLE appears to be the most appropriate method for extraction of salidroside and rosavin based on low solvent consumption, high yields of the target compounds and short extraction time. Yields of the salidroside seems to grow with increasing temperature, compared with rosavin, whose yields decrease, probably due to its degradation under the elevated temperature.

### References:

<sup>1</sup> Grech-Baran M., et al. *Ann Agric Environ Med*, 2015, 22, 281-285

<sup>2</sup> Concerto C. et al. *Complement ther med* 2018, 41, 141

Acknowledgements. The financial support of the Ministry of industry and trade (project no. FV 30300) is gratefully acknowledged.