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Molecular-scale biophysics research
infrastructure for European life
science research

3rd MOSBRI Scientific Conference
10th - 13th June 2024, Ljubljana, Slovenia

Programme & Abstracts



NATIONAL INSTITUTE
OF CHEMISTRY

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SESSION TOPICS

The topics of the sessions at the conference are:

Macromolecular interactions, kinetics and dynamics

Emerging approaches in biophysics – co-organised by the Association of Resources for Biophysical Research in Europe, ARBRE

Integrative structural biology – organised by Instruct Eric

Computational biophysics and artificial intelligence applications

Molecular bioimaging – organised by the Slovenian Biophysical Society

Macromolecular design, stability and quality control

PRIZES

At the **MOSBRI** 2024 conference, prizes will be awarded for the three best posters and the three best oral presentations, as well as two prizes for the best presentation of research conducted as part of **MOSBRI** TNA.

Each prize is endowed with €200 and are supported by ARBRE, Applied Photophysics, PicoQuant and MOSBRI. The prizes awarded by ARBRE also include an annual ARBRE membership for the year 2024.



AppliedPhotophysics



The antioxidant activity of the *Calluna vulgaris* (L.) Hull. extracts obtained by supercritical CO₂ extraction

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Calluna vulgaris (L.) Hull. is an evergreen perennial plant of the *Ericaceae* family possesses noteworthy pharmacological properties and has long been used in traditional medicine for addressing many medical conditions [1]. A plethora of bioactive compounds have been discovered in *C. vulgaris*, with phenolics being the primary source of its diverse health benefits, including antioxidant, anti-inflammatory, and antimicrobial properties, among others [2, 3]. However, a detailed study of its antiradical activity has not been conducted before. Herein, the supercritical CO₂ extraction of *C. vulgaris* branches wild pomegranate peel has been employed to obtain an extract rich in polyphenolic compounds. Supercritical CO₂ extraction, a green technology method, replaces classical solvent-based extraction, enabling the isolation of plant compounds in their purest form without degradation of the sample [4]. Owing to its high sensitivity and specificity, Electron paramagnetic resonance (EPR) spectroscopy has been utilized to access the extract's scavenging activity against free radical species (DPPH and hydroxyl radicals). The spin-trapping technique was employed to detect activity against short-lived hydroxyl radicals.

The results demonstrate that the *C. vulgaris* brunch extract is a significant free-radical scavenger. It exhibited remarkable selectivity in eliminating hydroxyl radicals (68.5% compared to 21.7% for DPPH), which is particularly noteworthy as hydroxyl radicals are considered the most reactive oxygen radical species, biologically relevant, and responsible for a number of pathologies. These findings underscore the therapeutic potential of *C. vulgaris* brunch extract in combating oxidative stress-related medical conditions but also suggest possibilities for further investigation into its mechanism of action and formulation into pharmaceutical or nutraceutical products.

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- [4] Villanueva-Bermejo D. et al., Simultaneous Supercritical Fluid Extraction of Heather (*Calluna vulgaris* L.) and Marigold (*Calendula officinalis* L.) and Anti-Inflammatory Activity of the Extracts, *Applied Sciences*, 9(11):2245, 2019