



Abstract Submission

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Topic : / EPIC5 / Energy activation

TUNED BIOFUNCTIONAL POLYPHENOL EXTRACTS OBTAINED BY MICROWAVE AND PRESSURE PRETREATMENT

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Submit your abstract below (400 words): Grape pomace, a valueless residue from winery industry, presents a high potential that can contribute to reevaluate and improve the sustainability of the winery process. This residue has a great antioxidant activity due to its large polyphenol concentration. Nowadays, polyphenols are extracted by time-consuming and expensive traditional methods that also compromise their bioactivity. Microwave assisted extraction has been proved to be a better alternative. Their incorporation considerably reduces energy requirements and equipment size. However, microwave implementation at industrial scale is difficult because of the limitations in this technology. For this reason, in this work, microwaves have been used only as a short pretreatment of a conventional extraction process. The objective was to determine the possibility of developing a selective extraction process. An optimization of the microwave pretreatment conditions was accomplished in order to obtain different biofunctional extracts. The evaluation of these extracts was performed by pre-clinical assays; especially their action on gut health, cardiovascular, anti-obesity, anti-diabetes and beauty issues.

Extractions were carried out in two steps. First, a pretreatment with microwave and pressure (up to 4 bar, 120°C) was done. This combination allows to reach high temperatures in a short time, causing a drastic acceleration of the initial extraction rate. Moreover, degradation is prevented by the reduced exposure time to the severe microwave-pressure pretreatment conditions. After a fast cooling, a short conventional solid-liquid extraction process was performed at mild temperature (60°C). Absorbed energy was found to be a crucial parameter. Also, the influence of other variables, like solvent composition and solid-liquid ratio, showed an important effect on the extraction kinetics of the different polyphenol groups.

Thus, extracts with different compositions were obtained. Depending on the final application, pretreatment conditions can be selected to achieve the desired extract properties. For instance, anthocyanins (a group of polyphenols) have a great antioxidant capacity, which can drastically reduce lipid oxidation rate. This latter property is vital if the extract is going to be used in a cosmetic cream to slow down collagen aging or as a nutraceutical cosmetic supplement.

Type of presentation :: Oral

Highlight 1: Different biofunctional extracts were obtained by changing pretreatment conditions.

Highlight 2: A novel and feasible short microwave treatment is proposed for industrial implementation.

Highlight 3: Microwave-pressure combination causes a yield boost while keeping bioactivity.

Keywords: Chemical kinetics, Extraction, Microwave, Process optimization, Waste valorization



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