

Optimization of glucosinolates ultrasound-assisted extraction from *Camelina sativa* L. by-products and their effects on cancer cells

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Brassicaceae are plants with interesting human health effects¹ due to the content of several metabolites like glucosinolates (GLSs). Different studies have shown the effect of GLSs for example against cancer, neurodegenerative, and heart diseases². One of the Brassicaceae containing GLSs is *Camelina sativa* (L.) Crants, cultivated for its fatty acid-rich seed oil³. After pressing the seeds, a by-product rich in other molecules such as fiber, protein, and secondary metabolites including GLS remains. The aim of the work was to optimize an environmentally sustainable extraction method for the recovery of GLSs from the by-product of *C. sativa*.

The first phase of the work involved the identification of compounds present in *C. sativa* seeds pressed-cake, obtained following the ISO method⁴ by mass spectrometry analysis using UPLC-DAD-ESI-QTOF-MS. The analysis identified 11 phytochemical compounds and the main analytes are three glucosinolates: glucoarabinin (GLS9), glucocamelinin (GLS10), and homoglucoamelinin (GLS11). Given the interesting GLSs content in *C. sativa* seeds pressed-cake, a green extraction method based on ultrasound-assisted extraction (USAE) was optimized through an experimental design. The optimized extraction improved the recovery of GLS9, GLS10, and GLS11 by 501%, 878%, and 234%, respectively, compared with the conventional ISO method. Finally, the optimized extract was purified by solid phase extraction to concentrate GLSs and tested on healthy and cancerous human colon cells. The results on cells showed interesting antiproliferative activity increasing antioxidative metabolism in cells without toxic effects on healthy lines.

In conclusion, the study allowed the development and optimization of a green extraction method for the recovery of GLSs from the by-product of *Camelina sativa*, underlining its use as a possible source of active molecules and a possibility used in nutraceutical products against oxidative stress for the prevention of cancer forms.

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