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Greener approach to the extraction of bioactive compounds from ginger (*Zingiber officinale)* herbal dust

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In the recent years, the usage of non-conventional extraction techniques, in order to obtain the highly valuable products that would be used in the various branches of industry, is expanding. Besides, in the line with improving sustainability, the intensive studies have been undertaken to convert various by-products and wastes into the highly valuable products. Therefore, this research integrates several different advanced eco-friendly extraction techniques (Supercritical CO_2 extraction, Ultrasound-assisted extraction, and Subcritical water extraction) with aim to utilize ginger (*Zingiber officinale*) herbal dust which represents by-product of the filter tea factory.

The ginger herbal dust is produced in the filter factory sites during the processing (grinding and fractionating) of the raw material, and it is generated on the level up to 20%. Ginger is highly valuated medical plant as it possesses several strong health beneficial effects such are antioxidant, anticancer, and anti-inflammatory. Gingerols, shogaols, and essential oil are the main responsible bioactive compounds enabling these effects.

Thus, the study evaluated the perspective of extraction process integration, as the efficient way for maximal isolation and exploitation of the ginger bioactives. The integration enabled the extraction of non-polar and low polar ginger bioactives in the first utilization phase, while second process stage is focused on the polar constituent's isolation. This way several different high quality products could be obtained, enabling maximal utilization of the starting material. The study evaluates the effect of process parameters on the each bioactive isolation. Chemical characterization of isolated compounds and extracts is investigated using HPLC and GCMS techniques.