Bioactivity of oils extracted from a mixture of citrus seeds and peels using supercritical carbon dioxide and ethanol as a modifier

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This work aimed to study the bioactivity of oils extracted from a mixture (MX) of citrus seeds (CS) and citrus peels (CP) using supercritical carbon dioxide (SC-CO2) and ethanol as a modifier so that those by-products can be valorized. The extraction conditions were 200 bar and 300 bar at 45 ℃, extraction time of 2 h and CO2 flow rate of 27 g/min for neat SC-CO2 and SC-CO2+ ethanol. The yield showed to increase significantly ($p < 0.05$) by increasing pressure. The total phenolic content was determined by Folin-Ciocalteu method and CP oils showed higher value amongst while CS oils showed highest total flavonoid content. The tocopherols and phytosterols were performed by HPLC and α-tocopherol and sitosterol were respectively the main compounds of the extracted oils. The antioxidant activity was determined by DPPH and ABTS assay and the oils extracted by SC-CO2+ ethanol at 200 bar showed higher activity with IC50 values of 0.52 and 0.53 mg/ml for CP and MX respectively for DPPH assay. For antimicrobial activity, the MX oils showed higher activity for tested bacteria. Overall the MX oil showed good bio-potentiality which reflects how it could be a tailor-made in many applications.