Abstract

Revalorization of non-edible fruit components to take full advantage of their antioxidant and therapeutic benefits is a popularly targeted area in the arena of food science. Extraction, although a primary step to obtain valuable polyphenolic compounds from citrus peels but it alone cannot ensure targeted isolation of any one valuable plant bioactive. Extraction followed by ionic liquid-based purification of hesperidin, the targeted aglycone glycoside from grapefruit peel was planned and executed in this research work. The crude extraction was carried out as a preliminary step in acidified ethanol under the influence of three variable factors namely particle size, solid-to-liquid ratio and incubation temperature when macerated with the solvent. Hesperidin enrichment was achieved through column chromatographic treatment of the crude extract in the presence of three different ionic liquid combinations based on triethylamine and quaternary ammonium as their foundation units. All the three ionic liquids specifically triethylammonium hydrogen sulphate [TEA.H_2SO_4] (which was synthesized in the lab) worked as a mobile phase against silica as the stationary phase support with an enhanced elution potential for targeted isolation and enrichment of hesperidin in the citrus peel extract. Stationary phase modification was then adopted as an alternative approach to mark the retention potency of this particular ionic liquid towards hesperidin in the presence of traditional organic solvents used as mobile phases one at a time. Fourier transform infrared analysis revealed appreciable functional group transformations to mark the success of the modification protocol. Results obtained by UV-VIS spectrophotometric and high-performance liquid chromatographic analysis elucidated hesperidin concentration in the final extract ranging from (0.03-0.51) mg/g extract. Antioxidant assays, DPPH-RSC and FRAP marked appreciable antioxidant potential of the purified extracts with an IC_{50}=393.3μg/mL of purified extract against DPPH and a FRAP value of 0.91 μM ascorbate per g dry extract respectively.