Comparative study of the antioxidant activities of some lipase-catayzed alkyl dihydrocaffeates synthesized in ionic liquid

ABSTRACT

The solubility limitations of phenolic acids in many lipidic environments are now greatly improved by their enzymatic esterification in ionic liquids (ILs). Herein, four different ILs were tested for the esterification of dihydrocaffeic acid with hexanol and the best IL was selected for the synthesis of four other n-alkyl esters with different chain-lengths. The effect of alkyl chain length on the anti-oxidative properties of the resulted purified esters was investigated using β-carotene bleaching (BCB) and free radical scavenging method DPPH and compared with butylated hydroxytoluene (BHT) as reference compound. All four esters (methyl, hexyl, dodecyl and octadecyl dihydrocaffeates) exhibited relatively strong radical scavenging abilities. The scavenging activity of the test compounds was in the following order: methyl ester>hexyl ester⩾dodecyl ester>octadecyl ester>BHT while the order for the BCB anti-oxidative activity was; BHT>octadecyl ester>dodecyl ester>hexyl ester>methyl ester.

Keyword: Enzymatic esterification; Candida antarctica lipase (Novozyme 435); Ionic liquid; Dihydrocaffeic acid; Antioxidant activity