Effects of spinach leave extract on the stability of sunflower oil

Abstract

Edible oil stabilization is an important area of research in modern day food biotechnology to promote human friendly and safe uses during frying. Plant extracts have been observed to be beneficial for stabilization of edible oils. In this study, spinach extract was added to sunflower oil in different ratio to assess its suitability during thermal stress. The fortified sunflower oils were thermally oxidized along with their control. Fortified sunflower oils were characterized for peroxide Value (PV), p-anisidine Value(AV), thiobarbituric acid (TBARS), total phenolic and flavonoids contents as well as radical scavenging activity (RSA). Polyphenols in the oil samples were extracted and identified using reversed phased high performance liquid chromatography with diode array detection system (HPLC-DAD). Results revealed separation and identification of 14 & 22 polyphenolic compounds in control and fortified oil samples. The major phenolic compounds were p-hydroxybenzoic acid, p-coumaric acid, isorhamnetin-3-(hydroxyferuloyl-glucoside)-7-glucoside, apigenin, kaempferol-3-(p-coumaroyl-diglucoside)-7-glucoside, apigenin-2-O-pentoxide-8-hexoside, quercetin-3-(sinapoyl-diglucoside)-7-glucoside and kaempferol-3-(sinapoyl-diglucoside)-7-glucoside. Significant variations were observed in the composition of these phenolic compounds during heating. Remarkable changes were also observed in the characteristics of the oils during thermal treatment. The fortification of spinach extract induced primary lipid oxidation but inhibit secondary oxidation by further addition of the extract.