Abstract

A novel, rapid and cost-effective chlorpromazine hydrochloride (CPZH) decolorization assay is described for the screening of antioxidant activity. A chromogenic reaction between CPZH and potassium persulfate at low pH produces a reddish-pink radical cation with maximum absorption at 527 nm in its first-order derivative spectrum. CPZH was dissolved in distilled water to give a 20 mM solution The CPZH radical cation solution was made by reacting 0.5 mL of the solution with $K_2S_2O_8$ (final concentration: 0.1 mM) and diluting to 10 mL with 1.5 M HCl solution. A linear inhibition of color production was observed with linearly increasing amounts of antioxidants, with correlation coefficients (R^2) ranging from 0.999 to 0.982. The antioxidant capacity of standard solutions of an antioxidant was evaluated by comparing with the inhibition curve using Trolox as the standard. Comparison of antioxidant capacity determined with this newly developed CPZH assay and with the well-known 2,2'- azinobis-[3-ethylbenzthiazoline-6-sulfonic acid] (ABTS)-persulfate decolorization assay indicated the efficacy and sensitivity of the procedure. The proposed assay is less expensive (costs about US$5 per 100 assays) and requires only 18 min for preparation of radical cation solution in comparison with ABTS assay, in which almost 12-16 h are required for preparation of a stable ABTS radical cation solution. The present assay has the advantage over ABTS assay that it can be used to measure the antioxidant activity of the samples, which are naturally found at a pH as low as 1, because the radical cation itself has been stabilized at low pH .This method is applied on the apple juices of different brands and on Canola seeds of different cultivars. In this study total antioxidant capacity (TAC) of extracts of Canola seeds of different cultivars Zafar 2000 (Z1,Z2) Bulbul 98 (B1,B2) and Pakola (P1,P2) was investigated. The antioxidant components were initially extracted in methanol and subjected to partitioning in solvents of different polarity. Antioxidant and radical scavenging activity of these extracts were investigated using antioxidant assays such as Chlorpromazine hydrochloride assay, 2,2′-azinobis(3-ethylbenzothiazoline-6-sulpohonic acid) (ABTS) radical cation scavenging, the ferric reducing antioxidant power (FRAP), 2,2′-diphenyl-1-picrylhydrazil (DPPH) scavenging, total phenolic content (TPC), total Flavonoid content (TFC) , total antioxidant activity determination using ferric thiocyanate method, Superoxide anion radical scavenging activity and metal chelating activity. Using $ABTS^{\bullet+}$ decolorization assay and FRAP assay, Canola seed extracts showed a wide range of antioxidant activity.

Trolox equivalent antioxidant capacity (TEAC) values for different fractions ranged from 4.5-8.5 mM Trolox for Z1 and 11.1-38.0 mM Trolox for Z2,10.1-70.9 mM Trolox and 22.4-80.6 mM Trolox for B1 and B2 and 5.8-20.9 mM Trolox and 16.8-75.9 for P_1 and P_2 respectively. FRAP values ranged from 6.5-18.1 mg/l of $FeSO_4$ and 18.9-21.2 mg/l of $FeSO_4$ for Z_1 and Z_2, 9.9-16.2 mg/l of $FeSO_4$ and 19.4-32.1 mg/l of $FeSO_4$ for B_1 and B_2 and 7.5-36.4 mg/l of $FeSO_4$ and 11.4-41.9 mg/l of $FeSO_4$ for P1 and P2 respectively. Total Phenolic contents (TPC) showed the amount of total phenolics for different fractions of Z_1,Z_2,B_1,B_2,P_1,P_2 ranged from 37-120,64-145,41-72,62-193,45-78,53-97 mg/L Gallic acid equivalents respectively. Employing inhibition of lipid peroxidation assay by ferric thiocyanate method, the extracts showed inhibition of lipid peroxidation comparable to Trolox. The Superoxide percentage scavenging activity and total flavonoid contents are also evaluated for different fractions of canola seeds ranged from . Percentage bound iron for metal chelating activity varied from 73%-79%,79%-86%,62%-70%,65%-77%,65%-73% and 72%-80% for Z1,Z2,B1,B2,P1,P2 respectively. On the basis of the results obtained here Canola seeds may be considered as a rich source of antioxidant.