

Evaluation of *Crocus sativus* L. stigma phenolic and flavonoid compounds and its antioxidant activity.

ABSTRACT

Saffron (*Crocus sativus* L.) belongs to the Iridaceae family. The stigma of saffron has been widely used as spice, medicinal plant, and food additive in the Mediterranean and Subtropical countries. Recently, attention has been paid to the identification of new sources of safe natural antioxidants for the food industry. The antioxidant activities of spices are mainly attributed to their phenolic and flavonoid compounds. Saffron is one of the spices believed to possess antioxidant properties, but information on its antioxidant activity and phenolic, flavonoids compound are rather limited, therefore this research was carried out to evaluate the antioxidant activity of saffron stigmas extracted with different solvents. The phenolic and flavonoid compounds of saffron were also examined using reversed phase (RP)-HPLC. Results showed that saffron stigma possess antioxidant activity. The free radical scavenging and ferric reducing power activities were higher for the methanolic extract of saffron stigma at a concentration of 300 µg/mL, with values of 68.2% and 78.9%, respectively, as compared to the corresponding boiling water and ethanolic extracts, but the activities were lower than those of antioxidant standards such as BHT and α -tocopherol. The obtained total phenolics value for methanolic saffron extract was 6.54 ± 0.02 mg gallic acid equivalent (GAE)/g dry weight (DW), and for total flavonoids, 5.88 ± 0.12 mg rutin equivalent/g DW, which were also higher than values obtained from the ethanolic and boiling water extracts. In addition, the RP-HPLC analyses indicated the presence of gallic acid and pyrogallol as two bioactive compounds. In summary, saffron stigmas showed antioxidant activity and methanol appeared to be the best solvent to extract the active components, among which the presence of gallic acid and pyrogallol might contribute towards the stigma's antioxidant properties. Hence, saffron stigma could be applied as a natural antioxidant source for industrial purposes.

Keyword: Saffron; DPPH free radical scavenging activity; Ferric reducing antioxidant power; Reversed-phase HPLC; Secondary metabolites.