

## The optimization of aqueous extraction of antioxidants from different kind of teas and investigation their antioxidant activity

S. Abbasian<sup>\*</sup>, M. Ahosseini, F. Karimi, H. Moloudian, M. Khoshayand

*Department of Drug and Food Control, Faculty of Pharmacy, Tehran University of Medical Sciences, Tehran, Iran*

**Background and Aims:** Black tea is important sources of natural antioxidant in the world. The aim of this performed study was to determine optimized aqueous extract antioxidant properties of 13 types of tea.

**Methods:** 13 different brands of teas were purchased from local stores in Tehran. Antioxidant extraction process was achieved by response surface methodology (RSM) to fit the experimental data to the model. Independent variable including, water temperature (0-100°C), stirring rate during extract (0-1400 rpm) and holding time of extraction (1-120 min). The analysis of the data through regression model and plotting the response surface graph were achieved. Total polyphenolic content and antioxidant activity of aqueous extract of teas were determined by FRAP, DPPH and Folin-Ciocalteu assays, respectively.

**Results:** Box-Behken design was applied to find optimal level of independent variable. Numerical solution of the data showed the optimum values for variables to maximize extraction efficiency were time 28 min, temperature 74°C and stir rate 530 rpm. By these conditions, the total antioxidant power of teas have been in the range of 117.06 to 854.68  $\mu\text{mol FeSO}_4/\text{L}$ . Their IC<sub>50</sub> values for DPPH radicals were from 0.9 to 6.2 mg/ml. Total phenolic content varied from 15.57 to 98.05 mg GAE/L. A significant correlation was also found between FRAP assay and Folin-Ciocalteu method.

**Conclusions:** Black tea is the most popular worldwide beverage and it has useful effects on cancer prevention. Using experimental design methods. Optimum conditions for antioxidant aqueous extraction can successfully be used for investigating the antioxidant properties of different kinds of tea. The results show that Liptone has the highest antioxidant activity in FRAP, DPPH and Folin-Ciocalteu assay. Oghab and Bamdad were found to have the lowest antioxidant activity in all measurements.

**Keywords:** Black teas; Flavonoids; Experimental design; Box-Behken