

## Free radical scavenging activities of four *Salvia* species

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**Background and Aims:** Free radicals play an important role in the development of molecular damage, cell injury and pathological events. Currently, there is an increasing interest in the antioxidant activities of natural compounds. *Salvia* species are rich in constituents that are known to be effective radical scavengers. The aim of the study was to evaluate the in-vitro antioxidant and free radical scavenging (FRS) properties and determine the total phenolic content (TPC) and total flavonoid content (TFC) of four *Salvia* species (including *S. verticillata*, *S. virgata*, *S. palaestina* and *S. reuterana*).

**Methods:** The in-vitro FRS activities were spectrophotometrically evaluated by some different quantitative methods (DPPH•, ABTS•+, and  $\beta$ -caroten/linoleic acid bleaching assays). The FRS activity of each extract was calculated from the Log concentration-response curve. The TPC and TFC of each extract was determined by Folin-Ciocalteu and methods. The results were statistically compared by one-way ANOVA to see the significance.

**Results:** All examined extracts had antioxidant activities. However, they did not show any antioxidant activity in method and any significant antioxidant activity in  $\beta$ -caroten/linoleic acid method. *S. verticillata* exhibited the strongest activity as a DPPH• scavenger [IC<sub>50</sub> = 134.1  $\mu$ g/ml (P < 0.001)]. On the other hand, all the extracts were active in the ABTS•+ assay and they did not show any significant difference in this method. *S. verticillata* and *S. Reuterana* showed the highest TPC [(148.59  $\pm$  1.77  $\mu$ g/mg (P < 0.001))] and TFC [(47.08  $\pm$  1.44  $\mu$ g/mg (P < 0.001)], respectively. A high correlation was found between TPCs and antioxidant activities of the extracts [r<sup>2</sup> = 0.9443 (for DPPH• assay) and r<sup>2</sup> = 0.8060 (for ABTS•+ assay)].

**Conclusions:** According to the results, all tested *Salvia* species showed strong in-vitro antioxidative activities.

**Keywords:** *Salvia*; Antioxidant; DPPH; ABTS•+