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Radical Scavenging Activity of Protein Extracts from Pulse and Oleaginous Seeds

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Abstract : Antioxidants are nowadays attractive not only for the countless benefits to the human and animal health, but also for the perspective of use as food preservative instead of synthetic chemical molecules. In this study, the radical scavenging activity of six protein extracts from pulse and oleaginous seeds was evaluated. The selected matrices are Pisum sativum (yellow pea from two different origins), Carthamus tinctorius (safflower), Helianthus annuus (sunflower), Lupinus luteus cv Mister (lupin) and Glycine max (soybean), since they are economically interesting for both human and animal nutrition. The seeds were grinded and proteins extracted from 20mg powder with a specific vegetal-extraction kit. Proteins have been quantified through Bradford protocol and scavenging activity was revealed using DPPH assay, based on radical DPPH (2,2-diphenyl-1-picrylhydrazyl) absorbance decrease in the presence of antioxidants molecules. Different concentrations of the protein extract (1, 5, 10, 50, 100, 500 µg/ml) were mixed with DPPH solution (DPPH 0,004% in ethanol 70% v/v). Ascorbic acid was used as a scavenging activity standard reference, at the same six concentrations of protein extracts, while DPPH solution was used as control. Samples and standard were prepared in triplicate and incubated for 30 minutes in dark at room temperature, the absorbance was read at 517nm (ABS30). Average and standard deviation of absorbance values were calculated for each concentration of samples and standard. Statistical analysis using t-students and p-value were performed to assess the statistical significance of the scavenging activity difference between the samples (or standard) and control (ABSctrl). The percentage of antioxidant activity has been calculated using the formula [(ABSctrl-ABS30)/ABSctrl]*100. The obtained results demonstrate that all matrices showed antioxidant activity. Ascorbic acid, used as standard, exhibits a 96% scavenging activity at the concentration of 500 µg/ml. At the same conditions, sunflower, safflower and yellow peas revealed the highest antioxidant performance among the matrices analyzed, with an activity of 74%, 68% and 70% respectively ($p < 0.005$). Although lupin and soybean exhibit a lower antioxidant activity compared to the other matrices, they showed a percentage of 46 and 36 respectively. All these data suggest the possibility to use undervalued edible matrices as antioxidants source. However, further studies are necessary to investigate a possible synergic effect of several matrices as well as the impact of industrial processes for a large-scale approach.

Keywords : antioxidants, DPPH assay, natural matrices, vegetal proteins
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