



Abstract

Antioxidant Activity of Culinary-Processed Food †

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† Presented at the 14th European Nutrition Conference FENS 2023, Belgrade, Serbia, 14–17 November 2023

Abstract: Background: Exogenous compounds with antioxidant activity mainly include plant compounds such as polyphenols, β -carotene, lycopene, vitamin C and vitamin E. Culinary processing significantly affects the organoleptic characteristics and nutritional value of food. However, little is known about the effect of cooking processing on the antioxidant activity of foods. Objectives: This study aimed to investigate whether cooking processes affect the antioxidant activity of foods and whether there are differences in antioxidant activity between different foods. Materials and methods: Raw materials were used to prepare raw and cooked soups. Four model raw and four cooked soups (tomato, cucumber, cauliflower, vegetable) were prepared according to recipes given in Polish food composition tables, each in triplicate. Samples were lyophilized and extracted with the following solvents: methanol/water (90:10 vol.) and acetone/water/acetic acid (70:29.5:0.5 vol.). Antioxidant activity was determined by an electrochemical method using the e-BQC analyzer, Bioquochem, Spain, and expressed in μC , and by the FRAP spectrophotometric method according to Benzie and Strain, in which values were expressed in mM/100g dry weight. The Kolmogorov–Smirnov and Wilcoxon tests were used for intergroup comparisons and the Spearman test was used for correlations. Results: Antioxidant activity measured by the electrochemical method was found to be higher in acetone extracts compared to methanol extracts ($p < 0.05$) in terms of Q1 (fast-acting antioxidants), Q2 (slow-acting antioxidants) and QT (total charge) parameters. No significant differences were found by FRAP between methanolic and acetone extracts ($p = 0.057$). In acetone extracts, higher antioxidant activity was found in cooked soups compared to raw soups for tomato, cucumber and cauliflower soups. In both methanolic and acetone extracts, the antioxidant activity determined by the electrochemical method (parameter Q1) correlated with the FRAP method: 0.92 and 0.63, respectively. No correlation was found between the FRAP method and parameter Q2 of the electrochemical method in either extract. Discussion: The model soups had different antioxidant activities, but it was higher for boiled soups, which may be related to the better availability of antioxidants after cooking. The methanol extraction method allows the extraction of compounds that similarly affect the antioxidant activity determined by the electrochemical and FRAP methods.



Citation: Sejbuk, M.; Zinkow, A.; Kuczyńska, M.; Cyuńczyk, M.; Mirończuk-Chodakowska, I.; Witkowska, A.M. Antioxidant Activity of Culinary-Processed Food. *Proceedings* **2023**, *91*, 158. <https://doi.org/10.3390/proceedings2023091158>

Academic Editors: Sladjana Sobajic and Philip Calder

Published: 1 February 2024



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Keywords: antioxidant activity; food; culinary processing; electrochemical method; FRAP method

Author Contributions: Conceptualization, M.S., A.M.W., and I.M.-C.; methodology, M.S., A.M.W. and I.M.-C.; software, M.S. and A.M.W.; validation, I.M.-C.; formal analysis, M.S., A.Z., M.K. and M.C.; investigation, M.S., A.Z., M.K. and M.C.; resources, A.M.W. and M.C.; data curation, A.M.W.; writing—original draft preparation, M.S., A.Z. and M.K.; writing—review and editing, A.M.W. and I.M.-C.; supervision, A.M.W. and I.M.-C.; project administration, A.M.W.; funding acquisition, A.M.W. All authors have read and agreed to the published version of the manuscript.

Funding: The project was financed from the state budget funds granted by the Minister of Science within the framework of the programme "Student Scientific Circles Create Innovations" project number SKN/SP/568419/2023 and from UMB grant B.SUB.23.295.



Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Data are available from the authors.

Conflicts of Interest: The authors declare no conflicts of interest.

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