



Abstract

Quality Assessment of Black Currant, Strawberry and Cranberry Seeds' Lipid Fraction [†]

Agata Górka * , Iga Piasecka , Kinga Kienc, Ewa Ostrowska-Ligeza , Magdalena Wirkowska-Wojdyla and Joanna Bryś

Department of Chemistry, Institute of Food Sciences, Warsaw University of Life Sciences (WULS), Szkoła Główna Gospodarstwa Wiejskiego (SGGW), 02-787 Warsaw, Poland

* Correspondence: agata_gorska@sggw.edu.pl

[†] Presented at the 3rd International Electronic Conference on Foods: Food, Microbiome, and Health—A

Celebration of the 10th Anniversary of Foods' Impact on Our Wellbeing, 1–15 October 2022; Available online: <https://sciforum.net/event/Foods2022>.

Abstract: The proper management of the waste generated during food production and processing is currently one of the major and urgent challenges for the food industry. Berry seeds are believed to be a source of bioactive substances that could be reused in food and cosmetic production, in agreement with the EU policies of circular economy and sustainable development. The aim of this study was to extract oils from black currant, strawberry and cranberry seeds and to determine the quality of the obtained oils. The following parameters were determined: fatty acid composition by gas chromatography; distribution of fatty acids between the *sn*-2 and *sn*-1,3 positions of triacylglycerols by enzymatic hydrolysis; the oxidative stability of fat by pressure differential scanning calorimetry and melting characteristics by differential scanning calorimetry. The oils were extracted with yields of 5.71, 11.62 and 22.74% in the cases of black currant, strawberry and cranberry seeds, respectively. Based on the obtained results, it can be stated that the oils studied were a rich source of polyunsaturated fatty acids, especially linoleic and alpha-linolenic acids. Linoleic acid was mainly present in the internal position of triacylglycerol molecules, whereas saturated fatty acids usually occupied the external positions of triacylglycerols. Black currant and strawberry seed oils were characterized by short oxidation induction times, which proves their low oxidative stability. The melting curves for black currant and strawberry seed oils were of a similar shape characterized by one endothermic event, indicating the presence of low-melting triacylglycerol fractions containing polyunsaturated fatty acids. The shape of the DSC curve for cranberry seed oil differed from the shape of the melting curves for blackcurrant and strawberry seed oils, and indicated two endothermic transitions, proving the presence of low-melting fractions containing polyunsaturated fatty acids and medium-melting fractions rich in monounsaturated fatty acids. The shape of the curves corresponded to the analysis of the fatty acid composition. On the basis of the conducted analyses, it can be concluded that cranberry seed oil is characterized by the highest quality parameters of the analyzed oils; it may be a source of both polyunsaturated and monounsaturated fatty acids; the distribution of fatty acids at the internal and external positions of the triacylglycerols is nutritionally favorable. This oil is also characterized by the highest resistance to oxidative processes.

Keywords: berry seeds; fatty acid composition; fatty acid distribution; oxidative stability; melting characteristics



Citation: Górka, A.; Piasecka, I.; Kienc, K.; Ostrowska-Ligeza, E.; Wirkowska-Wojdyla, M.; Bryś, J. Quality Assessment of Black Currant, Strawberry and Cranberry Seeds' Lipid Fraction. *Biol. Life Sci. Forum* **2022**, *18*, 31. <https://doi.org/10.3390/Foods2022-12953>

Academic Editor: Joana S. Amaral

Published: 30 September 2022

Publisher's Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2022 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

Supplementary Materials: The presentation material of this work is available online at <https://www.mdpi.com/article/10.3390/Foods2022-12953/s1>.

Author Contributions: Conceptualization, A.G. and I.P.; methodology, A.G., E.O.-L., M.W.-W. and J.B.; software, A.G.; validation, A.G., K.K. and I.P.; formal analysis, K.K.; investigation, K.K.; resources, A.G.; data curation, A.G.; I.P. and K.K.; writing—original draft preparation, A.G.; writing—review

and editing, A.G.; visualization, A.G.; supervision, A.G.; project administration, A.G.; funding acquisition, A.G. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

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