

Properties of watermelon seed oil

Marta Siol¹, Joanna Bryś¹, Diana Mańko-Jurkowska¹

¹Department of Chemistry, Institute of Food Sciences, Warsaw University of Life Sciences, Poland

INTRODUCTION & AIM

Watermelon seed oil (WO) is amber, and its taste and aroma are described as distinctive, resembling that of nuts [1]. WO is distinguished by its characteristic fatty acid (FA) composition.

Watermelon seed oil is also a rich source of vitamins: A and E and minerals, mainly iron, magnesium, copper, phosphorus, potassium, and manganese. Additionally, it contains antioxidants, including tocopherols, polyphenolic compounds, and carotenoids [2].

The aim of this study was to investigate the properties of WSO. The subject of this study included four commercial oils - three cold-pressed unrefined WSOs and one refined WSO. This study also included a self-obtained oil from Sugar Baby watermelon seeds, isolated using chemical extraction with hexane. The impact of oil type and storage time on the properties of the oil was determined.

METHOD

The degree of hydrolysis and the content of primary oxidation products of the investigated oils were determined according to the AOCS methods [3,4]. The fat fraction was analyzed for fatty acid composition by Gas Chromatography (GC) and oxidative stability using Pressure Differential Scanning Colorimetry (PDSC).

Composition immediately after opening [%]

Composition after 3 months of storage [%]

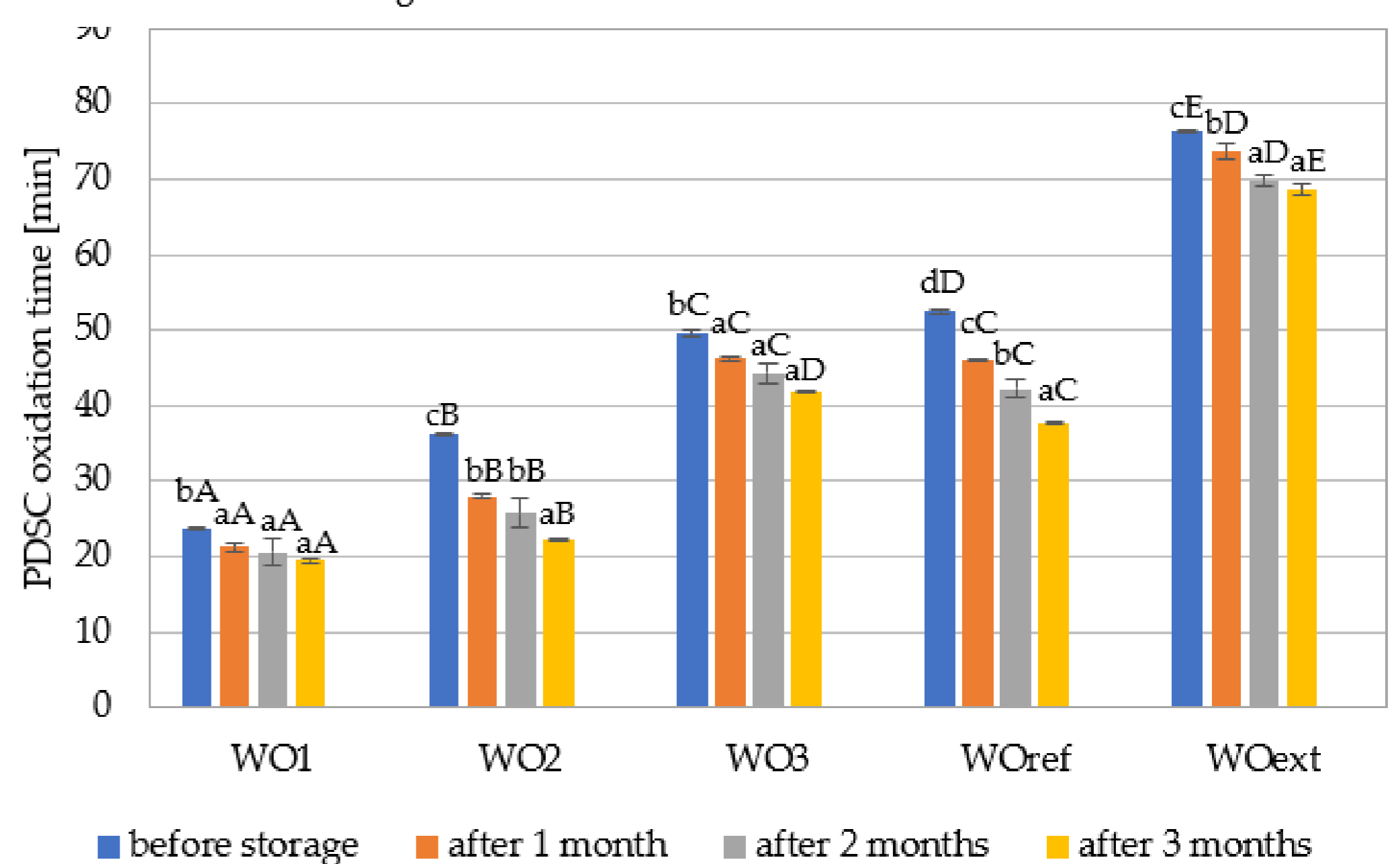
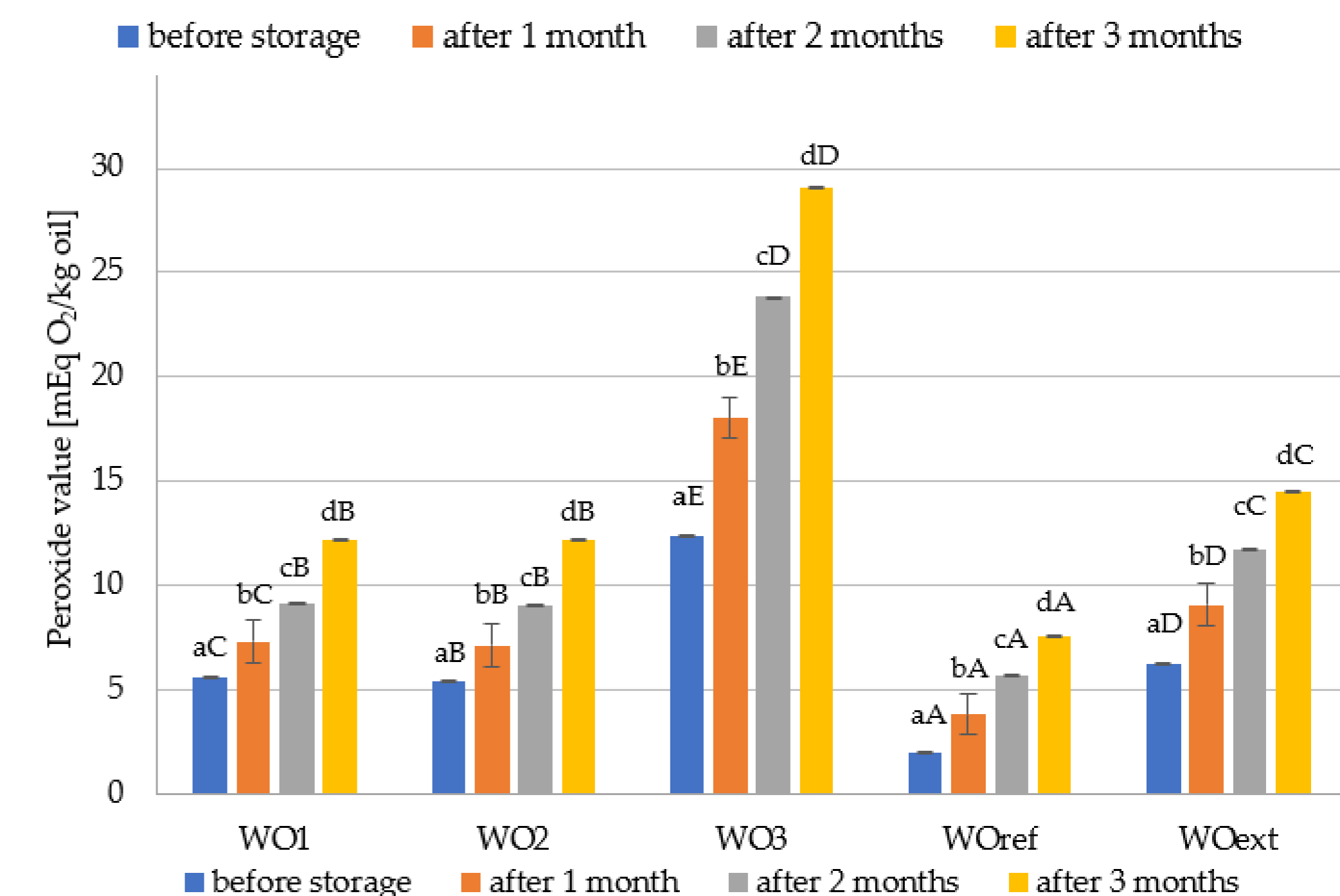
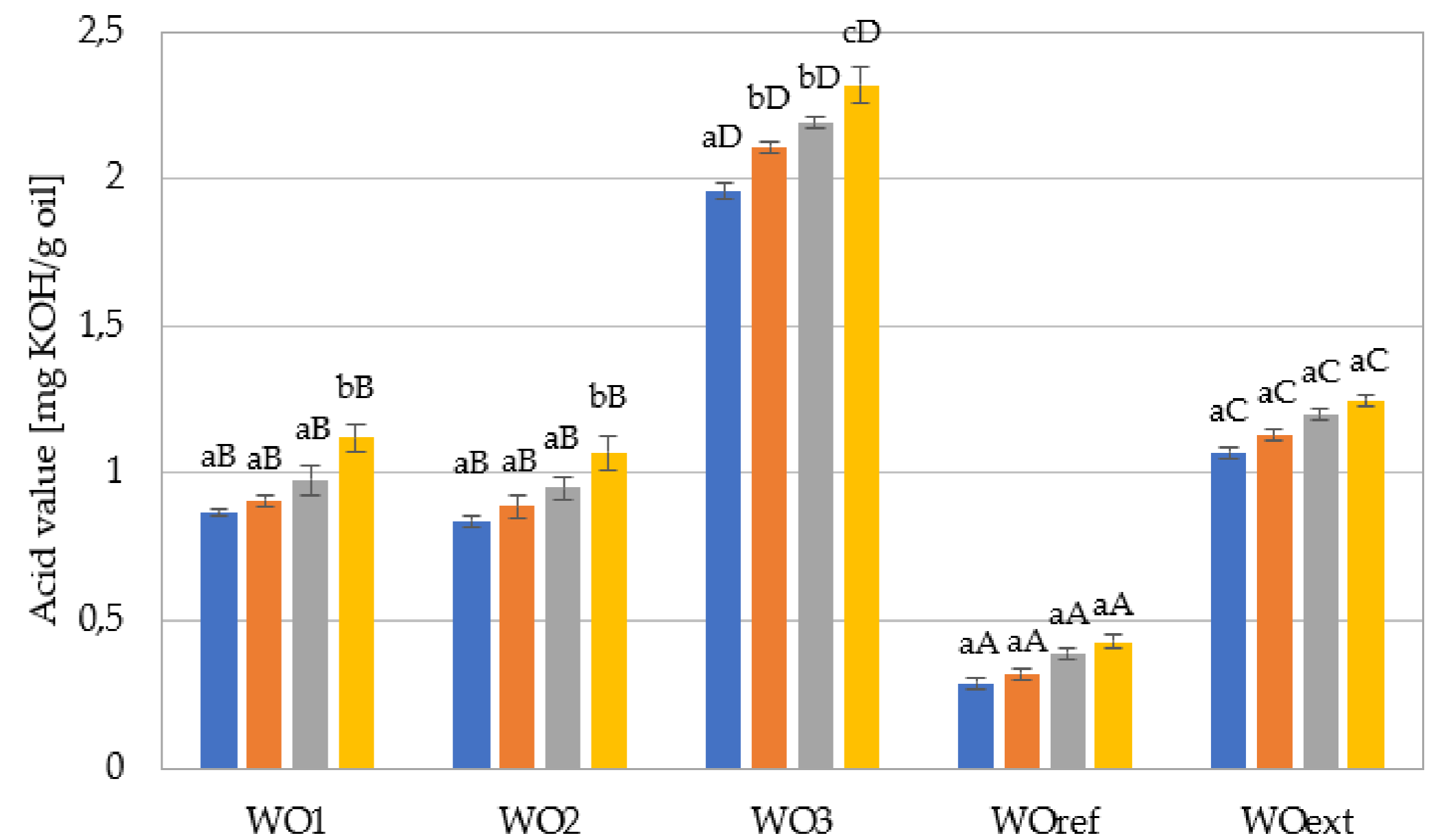
Fatty acid	WO ₁	WO ₂	WO ₃	WO _{ref}	WO _{ext}	WO ₁	WO ₂	WO ₃	WO _{ref}	WO _{ext}
Σ	16.91	17.10	25.70	17.68	20.19	16.70	17.09	24.74	17.32	20.12
SFA	±0.04	±0.27	±0.31	±0.07	±0.03	±0.04	±0.09	±0.15	±0.10	±0.21
Σ	27.62	25.64	15.15	28.58	17.25	27.37	25.64	14.63	28.55	17.13
MUFA	±0.02	±0.07	±0.27	±0.03	±0.02	±0.02	±0.08	±0.02	±0.01	±0.06
Σ	55.12	56.87	59.07	53.61	62.51	55.56	56.92	60.54	53.97	62.67
PUFA	±0.03	±0.28	±0.57	±0.06	±0.02	±0.02	±0.03	±0.13	±0.11	±0.15

WO₁-WO₃ – unrefined commercial oils, WO_{ref} – refined commercial oil, WO_{ext} – self-extracted oil; MUFA - monounsaturated fatty acids; PUFA - polyunsaturated fatty acids; SFA – saturated fatty acids.

CONCLUSION

The study showed that the production method and storage could affect the fatty acid composition, oxidative stability and overall quality of watermelon seed oils. The identified fatty acid composition was typical of watermelon seed oils, with slight differences in SFAs, MUFAs and PUFAs. Cold-pressed oils showed a higher susceptibility to oxidation due to their higher PUFA content. Refined oil showed better resistance to oxidative changes, reflecting the removal of pro-oxidant compounds during the refining process. However, all oils experienced increasing peroxide and acid number values over time, indicating oxidative and hydrolytic processes occurring during storage.

RESULTS & DISCUSSION



WO₁-WO₃ – unrefined commercial oils, WO_{ref} – refined commercial oil, WO_{ext} – self-extracted oil; Results marked with the same lowercase letters (a – b) do not differ statistically significantly within the same type of oil (before and after storage). Results marked with the same uppercase letters (A – E) do not differ statistically significantly within the type of oil at the level of $\alpha = 0.05$.

FUTURE WORK

Further research should focus on determining the content of antioxidant and prooxidant substances present in watermelon seed oils and understanding the mechanism of their action.

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