

## Letter to the Editor

**Cite this article:** Kaczmarczyk S, Dziewiecka H, Kasperska A, Pasek M, Ostapiuk-Karolczuk J, and Skarpańska-Stejnborn A (2025) Response to the comment on 'Effects of Black Chokeberry (*Aronia melanocarpa*) Supplementation on Oxidative Stress, Inflammation, and Gut Microbiota'. *British Journal of Nutrition* **133**: 467–468. doi: [10.1017/S0007114525000145](https://doi.org/10.1017/S0007114525000145)

Received: 31 January 2025

Accepted: 31 January 2025

First published online: 13 February 2025


**Keywords:**

Chokeberries; Health benefits; Antioxidant; Intestinal parameters

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# Response to the comment on 'Effects of Black Chokeberry (*Aronia melanocarpa*) Supplementation on Oxidative Stress, Inflammation, and Gut Microbiota'

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**Dear Editor,**

We greatly appreciate the thoughtful and constructive feedback provided on our systematic review titled '*Effects of black chokeberry (Aronia melanocarpa) supplementation on oxidative stress, inflammation, and gut microbiota: a systematic review of human and animal studies*'. The points raised are both valuable and insightful, and we are pleased to address them below.

**Sensitivity analysis based on study quality**

We agree that a sensitivity analysis based on study quality would provide a more nuanced understanding of the observed effects of *Aronia melanocarpa* supplementation. During the review process, we assessed study quality using standardised criteria, but due to the heterogeneity of methodologies, it was challenging to quantitatively compare the outcomes. The inclusion of sensitivity analysis would indeed help to clarify the impact of methodological rigour on reported benefits. This could be an important target for future work or meta-analyses in this area.

**Dose-response relationship**

Your suggestion to further explore the dose-response relationship is highly pertinent. While we did note the variability in effects based on dosage across the included studies, many lacked sufficient reporting on dose standardisation and the corresponding biological responses. Conducting a deeper analysis of dose-response data would undoubtedly enhance clinical recommendations. Future primary research should prioritise robust, standardised protocols to establish clearer dose-response relationships, which would then enable subsequent reviews to include this critical aspect in greater depth.

**Duration of follow-up and long-term effects**

We agree that follow-up duration is a crucial factor, particularly in assessing the sustainability and long-term safety of black chokeberry supplementation. Unfortunately, many of the studies included in our review were short-term interventions, limiting our ability to draw definitive conclusions on long-term effects. This limitation underscores the need for longitudinal studies that examine chronic conditions, especially those associated with oxidative stress and inflammation, to provide a clearer understanding of the sustained benefits and potential risks of prolonged supplementation.

**Meta-analysis and quantifiable insights**

Your recommendation to conduct a meta-analysis is well-taken. Although our review primarily aimed to summarise existing evidence qualitatively, we recognise the value of a meta-analytical approach to quantify the overall effects of chokeberry supplementation. Unfortunately, due to the substantial heterogeneity in study designs, outcome measures and participant characteristics, a robust meta-analysis was not feasible at this stage. Future research that includes standardised methodologies and outcome measures will greatly enhance the feasibility of conducting comprehensive meta-analyses.

**Incorporating GRADE assessment**

We appreciate the recommendation to include a Grading of Recommendations, Assessment, Development and Evaluation (GRADE) framework to evaluate the confidence level of our effect estimates. This approach would indeed strengthen the review by offering a transparent assessment

of the evidence quality. In future follow-up reviews, we will aim to integrate the GRADE approach to provide greater clarity on the strength of evidence and identify areas requiring additional research.

### Conclusion and future directions

We are grateful for the detailed and thoughtful suggestions, which have highlighted several areas for improvement and future focus. Your comments underscore the importance of methodological rigour, standardisation and transparency in research. These enhancements will not only improve the validity and applicability of future reviews but also provide a stronger foundation for clinical and policy-level recommendations.

Once again, we thank you for your valuable feedback and your recognition of our work as a significant contribution to understanding the health benefits of *Aronia melanocarpa* supplementation. We look forward to seeing how future research builds upon this foundation to explore the full potential of black chokeberry in promoting health and well-being.

Sincerely, Sabina Kaczmarczyk, Hanna Dziewiecka, Anna Kasperska, Marta Pasek, Joanna Ostapiuk-Karolczuk, Anna Skarpańska-Stejnborn.

Authors of '*Effects of black chokeberry (Aronia melanocarpa) supplementation on oxidative stress, inflammation, and gut microbiota: a systematic review of human and animal studies*'.