

[Home](#) / [Archives](#) /[Vol. 98 No. s2 \(2025\): II Plastamination Conference - Naples, Italy, 15-17 October 2025](#) / [Abstract Book](#)

# **BIOPLASTICS IN SPORTS: OPPORTUNITIES AND CHALLENGES FOR A SUSTAINABLE FUTURE**

Filomena MAZZEO, Mario RUGGIERO | *Università degli Studi di Napoli Parthenope, Italy*DOI: <https://doi.org/10.4081/jbr.2025.14579>

**Keywords:** SESSION III - PRODUCTION AND MANAGEMENT. Production, use, and management of plastics: challenges and opportunities, Work in progress in the research

## **Abstract**

Traditional petroleum-based plastics represent one of the major global environmental threats due to their persistence in the environment (over 100 years), high consumption of fossil resources, and accumulation of waste in landfills and oceans. Sectors like sports, characterized by short product life cycles (equipment, disposable accessories) and a strong connection with the environment, significantly contribute to this impact. The aim of this paper is to analyze the potential and challenges of bioplastics in sports, proposing strategies to overcome technical, economic, and cultural barriers. Bioplastics, produced from renewable sources (sugarcane, beer waste, microalgae, vegetable oils) and biodegradable, offer a sustainable alternative. Materials such as polylactic acid (PLA) and biocomposites (e.g., PLA reinforced with cellulose) combine low environmental impact, reduced CO<sub>2</sub> emissions, and suitable technical properties for sports applications (beverage bottles, running shoe soles, and equipment components), along with benefits like lower toxicity and biocompatibility. However, obstacles such as high costs, material fragility, and low consumer awareness hinder their adoption. Innovative solutions, such as integrating carbon nanotubes to enhance mechanical strength and 3D printing to optimize design and production, offer concrete responses. For an effective transition, optimizations in production processes, cooperation between the sports industry, research institutions, and policymakers, as well as consumer awareness campaigns are necessary. In this way, sports can become a model for the circular economy, combining high performance and environmental sustainability.

## **Downloads**



## References

1. Wu, Y.; Gao, X.; Wu, J.; Zhou, T.; Nguyen, T.T.; Wang, Y. Biodegradable Polylactic Acid and Its Composites: Characteristics, Processing, and Sustainable Applications in Sports. *Polymers* 2023, 15, 3096. doi: 10.3390/polym15143096 DOI: <https://doi.org/10.3390/polym15143096>
2. Costa, A.; Encarnação, T.; Tavares, R.; Todo Bom, T.; Mateus, A. Bioplastics: Innovation for Green Transition. *Polymers* 2023, 15, 517. doi: 10.3390/polym15030517 DOI: <https://doi.org/10.3390/polym15030517>
3. Bianchini, A.; Rossi, J. Design, Implementation and Assessment of a More Sustainable Model to Manage Plastic Waste at Sport Events. *Journal of Cleaner Production* 2021, 281, 125345, doi: 10.1016/j.jclepro.2020.125345. DOI: <https://doi.org/10.1016/j.jclepro.2020.125345>

---

Published

16-10-2025

---

Issue

[Vol. 98 No. s2 \(2025\): II Plastamination Conference - Naples, Italy, 15-17 October 2025](#)

Section

Abstract Book

Categories

[Contents](#)

[Abstract Book](#)

---

License

Copyright (c) 2025 the Author(s)



This work is licensed under a [Creative Commons Attribution-NonCommercial 4.0 International License](https://creativecommons.org/licenses/by-nc/4.0/).

**PAGEPress** has chosen to apply the [Creative Commons Attribution NonCommercial 4.0 International License](https://creativecommons.org/licenses/by-nc/4.0/) (CC BY-NC 4.0) to all manuscripts to be published.

#### How to Cite

BIOPLASTICS IN SPORTS: OPPORTUNITIES AND CHALLENGES FOR A SUSTAINABLE FUTURE: Filomena MAZZEO, Mario RUGGIERO | Università degli Studi di Napoli Parthenope, Italy. (2025). *Journal of Biological Research - Bollettino Della Società Italiana Di Biologia Sperimentale*, 98(s2). <https://doi.org/10.4081/jbr.2025.14579>

More Citation Formats



## FOR AUTHORS

### SUBMIT YOUR PAPER

[Guide for Authors](#)

[Benefits for Authors](#)

[How to write a Scientific paper](#)

[How to write a Review article](#)

[Article Processing Charge](#)

## FOR REVIEWERS

[Benefits for Reviewers](#)

[How to Review](#)

[Thanks to Reviewers](#)

## INDEXING

[PubMed](#)

[Scopus](#)

[Web of Science](#)

DOAJ

Google Scholar

CAS

OpenAlex

Analytics

Keywords



is the official journal of the Società Italiana di Biologia Sperimentale and it is published online by [PAGEPress®](#), Pavia, Italy. All credits and honors to [PKP](#) for their [OJS](#).

Platform &  
workflow by  
**OJS / PKP**