SELECTED WRITING & TECHNICAL COMMUNICATION

SANALI JAYALATH

SUSTAINABILITY & ENVIRONMENTAL WRITER

Evidence-based content for readers navigating climate action, biodiversity, conservation and the circular economy.

BIODIVERSITY

CLIMATE ACTION

CIRCULAR ECONOMY

SCIENCE COMMUNICATION

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RESEARCH • WRITE • VERIFY • REFINE

WRITER PROFILE

Science-led sustainability writing

A writer who understands the evidence behind sustainability claims - and can translate it for general audiences.

Environmental science professional and sustainability writer with experience across digital articles, technical reports, scientific publications, donor-funded projects and editorial quality control.

My strongest contribution is the combination of subject-matter depth and reader-focused writing. I research across peer-reviewed literature and institutional sources, calibrate claims to evidence, and shape complex material into clear, useful content without flattening important nuance.

CORE EXPERTISE

- **Climate & carbon**
- **Biodiversity & wetlands**
- **Circular economy**
- **Scientific editing**
- **SEO-aware web writing**
- **International development**

RESEARCH & FACT-CHECKING APPROACH

- Define the reader, purpose and decision the content should support.
- Prioritize credible, current sources; cross-check statistics and real-world examples.
- Separate evidence, interpretation and recommendation; flag uncertainty and limitations.
- Edit for web readability, search intent, American-English style and a consistent brand voice.

PORTFOLIO EVIDENCE 01

Biodiversity & conservation writing

Selected anonymized evidence from an FSC-aligned biodiversity and High Conservation Value assessment project.

WHAT THIS SAMPLE DEMONSTRATES

- Structured flora and fauna inventories, conservation-status terminology and location-based observations.
- Evidence-led management recommendations covering habitat connectivity, undergrowth, erosion and long-rotation forestry.

4. Management of HCVs

4.1. Management options for HCVs

Undergrowth management

The expansion of rubber plantations is a major threat to the remaining forest patches and has led to a considerable degradation of biodiversity. The shift from traditional agriculture to rubber cultivation additionally reduced landscape and agricultural system diversity and with this, the availability of potentially useful habitat types for species inhabiting natural forest. In most cases, monoculture rubber plantations showed to harbor less than half of the species richness in various plant and animal groups compared with natural forest, and often it was found or being assumed that many of these species are unable to exist permanently in rubber plantations. As an ecologically reasonable and economically feasible method to improve species diversity in rubber monoculture plantations, the promotion of natural undergrowth can be done. This can be achieved through the cease of chemical weeding and herbicide application and implementing integrated weed management.

SITE-SPECIFIC MANAGEMENT TEXT REDACTED

SENSITIVE PROJECT RECOMMENDATIONS REDACTED

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B. Minimizing irrigation on the surface of the soil

Leaving higher levels of crop residue and doing less tillage can increase the soil water balance by increasing the amount of water that infiltrates the soil from irrigation or precipitation, and decreasing the amount of water that runs off the soil surface. More residue and less tillage also reduce the rate of evaporation of water from the soil. Maintaining residue on the soil surface and doing less tillage can significantly reduce the amount of irrigation water needed to grow a crop. Surface cover is a major factor to control erosion because it reduces the impact of raindrops falling on bare soils and wind removing soil particles. It also reduces the speed of water flowing over the land.

C. Biological corridors

Most wildlife avoids exposed, treeless areas during daylight hours. In agricultural landscapes where forest stands tend to be isolated, planting narrow forest lanes (3 to 5 rows of trees) to connect isolated stands can increase animal movement between stands. Similarly, fence rows can serve as travel corridors for animals wanting to move between forest stands if natural vegetation is allowed to grow up along them, and if invasive exotic vegetation is controlled. Unfortunately, birds perching on the fence are equal opportunity planters of both desirable and invasive species. There are continuous patches of habitat linking two or more ecosystems. Ideally such linkages connecting mountain areas with lowland areas can be established by development of riverine habitat of the existing stream network flowing through the estate. In this regard, riverine areas can be planted with not only native trees but also suitable hedges to serve this purpose. Stream can function as corridors for aquatic creatures and, if edged by native vegetation, for terrestrial species as well. Corridors do not have to be totally natural — for example, modified agro forests, economically useful smaller plants, fodder plants, medicinal plants, bee flora, fruit plants for animals can be useful, depending on the species-specific patterns of habitat use. If the corridors become less wildlife compatible they are likely to support fewer species.

D. Managing timber on Long Rotations

An individual forest/timber stand will provide habitat for different suites of wildlife species at different points in time as the stand ages. For example, some wildlife species thrive in the early stages of stand development and others at the later stages. Few animals thrive in middle-aged stands because of heavy shading. Lands managed on short rotations always have many stands in the middle-aged stage, which means that a large portion of their land is in a stage where it is not producing quality habitat for most wildlife species. Increasing the rotation length of each stand will ensure that a greater number of stands will be producing quality habitat for a variety of wildlife species at any particular point in time. Mature stands of trees are the most valuable from a wildlife perspective. Many wildlife species thrive in conditions provided by more mature forest stands and will congregate in the few older stands they can find.

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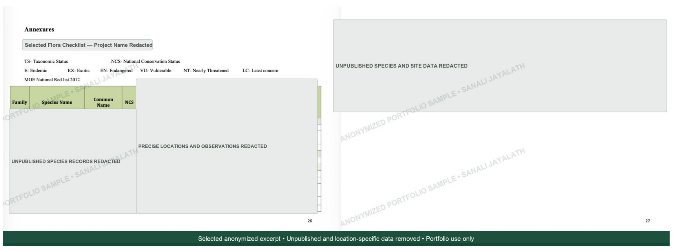
Selected anonymized excerpt • Site identifiers removed • Portfolio use only



Annexures

Selected Flora Checklist — Project Name Redacted

TS- Taxonomic Status NCS- National Conservation Status

E- Endemic EX- Exotic EN- Endangered VU- Vulnerable NT- Nearly Threatened LC- Least concern

MOE National Red list 2012

Family	Species Name	Common Name	NCS
UNPUBLISHED SPECIES RECORDS REDACTED			

PRECISE LOCATIONS AND OBSERVATIONS REDACTED

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UNPUBLISHED SPECIES AND SITE DATA REDACTED

27

Selected anonymized excerpt • Unpublished and location-specific data removed • Portfolio use only

Selected anonymized project excerpts. Site identifiers, precise locations and unpublished species data removed.

PORTFOLIO EVIDENCE 02

Public-facing sustainability writing

"Biomimicry and Inspiration from the Natural World!" - The Commonwealth Union, June 21, 2023.

https://www.eurekamagazine.co.uk/content/technology/inspired-by-nature-how-biomimicry-is-enabling-the-design-of-more-intelligent-and-sustainable-systems/

SCIENCE & TECH   3 min. Read

Biomimicry and Inspiration from the Natural World!

By **Upeksha Jayalath** | June 21, 2023

FROM COMPLEX SCIENCE TO AN ENGAGING WEB STORY

The article explains biomimicry through recognizable examples - from Velcro and kingfisher-inspired trains to termite-mound ventilation and whale-fin wind turbines. It demonstrates accessible framing, scannable examples and a clear sustainability takeaway for a general readership.

- Shinkansen Bullet Train: The design of the Shinkansen, Japan's high-speed train, was inspired by the kingfisher bird's streamlined shape, reducing noise and energy consumption.
- Whale-Inspired Wind Turbines: The tubercles on humpback whale fins inspired wind turbine blade designs that increase efficiency, reduce noise, and minimize the risk of bird collisions.
- Termite Mounds: The efficient ventilation system of termite mounds inspired the design of the Eastgate Centre in Zimbabwe, reducing energy consumption by 90% compared to traditional air-conditioned buildings.
- Gecko-Inspired Adhesives: By studying the adhesive properties of gecko feet, scientists have developed dry adhesives that enable robots to climb walls and ceilings, with potential applications in space exploration and

Published byline screenshot supplied by the author. Web-page layout shown for portfolio evidence.

PORTFOLIO EVIDENCE 03

Circular economy & sustainable materials

Deep research, evidence synthesis and sustainability analysis in a peer-reviewed ACS Omega review.

mechanical	bead milling	low energy consumption	requires multiple cycles	55, 62
	high-pressure homogenization	high yield without pretreatment	it depends on the biomass concentration	62, 76
	ultrasound extraction	improved efficiency, reduced solvent use	risk of PHA degradation	62, 68
innovative biological techniques	enzymatic extraction	highly specific, environmentally friendly	expensive, requires optimization	48, 77
	bio recovery strategies	eco-friendly minimizing hazardous waste, selective binding, cost-effective, reusable biomass, high yield	process optimization and genetic engineering required, incomplete recovery	45, 55, 62
	mealworm-based extraction (Tenebrio molitor)	eco-friendly process, high purity (nearly 100%), circular economy potential	scalability challenges, processing time	21, 55, 78

[a]Overview of PHA extraction methods, categorized into chemical, mechanical, enzymatic, and ultrasound-assisted approaches. Each technique is summarized with submethods, highlighting key advantages, disadvantages, and supporting references for comparative evaluation.

transformation protocols, and responsible use are essential for realizing the full potential of CRISPR-based technologies in microbial biomanufacturing. With continued development, CRISPR/Cas9 holds significant promise for advancing genome editing strategies to meet industrial and environmental demands.[48,49]

2.3.5. Protein Engineering and Synthetic Biological Engineering for Direct Secretion: Using low-molecular-weight proteins, such as phasins, PHA secretion has been shown to reduce extraction costs. Phasins facilitate PHA secretion directly from cells, minimizing the need for cell disruption, which is traditionally required in PHA extraction processes.[50] With synthetic biological engineering,[7] PHAs can be secreted directly, bypassing cell disruption, thus reducing the complexity and costs associated with traditional extraction methods. This approach is especially promising for industrial-scale applications, as it streamlines the production processes.[51]

2.3.6. Strain Improvement for Cost-Efficiency and Property Customization: Engineering organisms like *Halomonas* spp. have permitted the production of specific PHA types with tailored monomer compositions, such as PHBV and P3HB4HB. These adjustments improve PHA's mechanical properties and biodegradability, expanding their suitability for diverse industrial applications.

Developing strains that grow in unsterile, continuous production setups reduces the cost of large-scale PHA production by eliminating the need for sterile conditions, which are often time-consuming, costly, and energy intensive.[46] Specific carbon sources and genetic deletions (e.g., knockout of *gabD* in *H. bluephagenesis*) are used to increase 4HB accumulation, significantly enhancing the material's functional properties. The 4HB molar fraction can be adjusted by controlling glucose concentration, enabling the production of P3HB4HB with a wide range of applications in flexible bioplastics. Metabolic engineering allows for tailoring properties like ductility, elasticity, thermal conductivity, and transparency. Such property control allows PHA to be tailored to meet various industries' specific requirements, expanding its application potential.[35] Genetic and metabolic modifications,

2.3.7. Bridge Recombination as a Breakthrough for PHA Biopolymer Research: Bridge recombination, a novel gene-editing technique, offers a transformative approach to enhancing polyhydroxyalkanoate (PHA) bioplastics. Unlike CRISPR/Cas9, which relies on precise DNA cuts and cellular repair, this method enables large-scale genetic modifications in a single step, facilitating seamless gene insertions, deletions, or swaps.[52,53]

Potential applications of bridge recombination in PHA biosynthesis include enhancing microbial production, improving polymer properties, optimizing feedstock utilization, and accelerating strain development. Genetic modifications in PHA-producing bacteria, such as *Bacillus subtilis* and *Cupriavidus necator*, can optimize yield and efficiency by integrating key metabolic genes. Tailoring biosynthetic pathways enhances PHA's thermal stability, mechanical strength, and biodegradability, making it a more viable alternative to petroleum-based plastics. Engineered microbes can also efficiently metabolize diverse waste-derived substrates, supporting circular bioeconomy principles. Additionally, bridge recombination streamlines genetic modifications, reducing the time and complexity of developing high-performance PHA-producing strains. By integrating bridge recombination into PHA research, scientists can drive cost-effective and scalable Bioplastic production, advancing sustainable materials and circular bioeconomy solutions.

3. ENHANCING PHA RECOVERY FOR CIRCULAR AND SUSTAINABLE SOLUTIONS:

PHAs are recovered through various chemical, mechanical, and biological methods. These approaches can be categorized generally, as depicted in Figure 3. Traditionally, extracting PHA from bacteria relies on halogenated solvents like chloroform, which are toxic and environmentally unfriendly.[54] Researchers are looking at novel methods that are more sustainable. Each method has its benefits and drawbacks (Table 4). The best selection depends on desired PHA purity, scalability, and cost-effectiveness. Environmental and economic aspects are the top priorities when choosing a sustainable PHA extraction method. This means the chosen method should

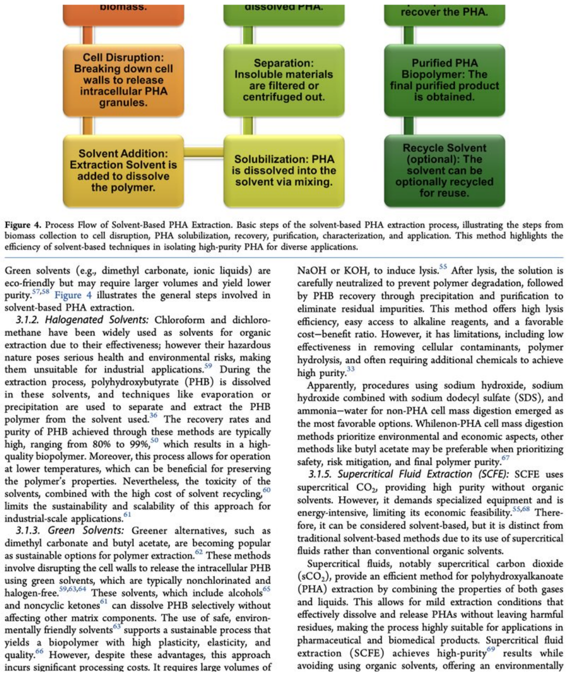


Figure 4. Process Flow of Solvent-Based PHA Extraction. Basic steps of the solvent-based PHA extraction process, illustrating the steps from biomass collection to cell disruption, PHA solubilization, recovery, purification, characterization, and application. This method highlights the efficiency of solvent-based techniques in isolating high-purity PHA for diverse applications.

Green solvents (e.g., dimethyl carbonate, ionic liquids) are eco-friendly but may require larger volumes and yield lower purity.[57,58] Figure 4 illustrates the general steps involved in solvent-based PHA extraction.

3.1.2. Halogenated Solvents: Chloroform and dichloromethane have been widely used as solvents for organic extraction due to their effectiveness; however their hazardous nature poses serious health and environmental risks, making them unsuitable for industrial applications.[59] During the extraction process, polyhydroxybutyrate (PHB) is dissolved in these solvents, and techniques like evaporation or precipitation are used to separate and extract the PHB polymer from the solvent used.[36] The recovery rates and purity of PHB achieved through these methods are typically high, ranging from 80% to 99%,[50] which results in a high-quality biopolymer. Moreover, this process allows for operation at lower temperatures, which can be beneficial for preserving the polymer's properties. Nevertheless, the toxicity of the solvents, combined with the high cost of solvent recycling,[60] limits the sustainability and scalability of this approach for industrial-scale applications.[61]

3.1.3. Green Solvents: Greener alternatives, such as dimethyl carbonate and butyl acetate, are becoming popular as sustainable options for polymer extraction.[62] These methods involve disrupting the cell walls to release the intracellular PHB using green solvents, which are typically nonchlorinated and halogen-free.[59,63,64] These solvents, which include alcohols[65] and noncyclic ketones[61] can dissolve PHB selectively without affecting other matrix components. The use of safe, environmentally friendly solvents[63] supports a sustainable process that yields a biopolymer with high plasticity, elasticity, and quality.[66] However, despite these advantages, this approach incurs significant processing costs. It requires large volumes of

NaOH or KOH, to induce lysis.[55] After lysis, the solution is carefully neutralized to prevent polymer degradation, followed by PHB recovery through precipitation and purification to eliminate residual impurities. This method offers high lysis efficiency, easy access to alkaline reagents, and a favorable cost−benefit ratio. However, it has limitations, including low effectiveness in removing cellular contaminants, polymer hydrolysis, and often requiring additional chemicals to achieve high purity.[33]

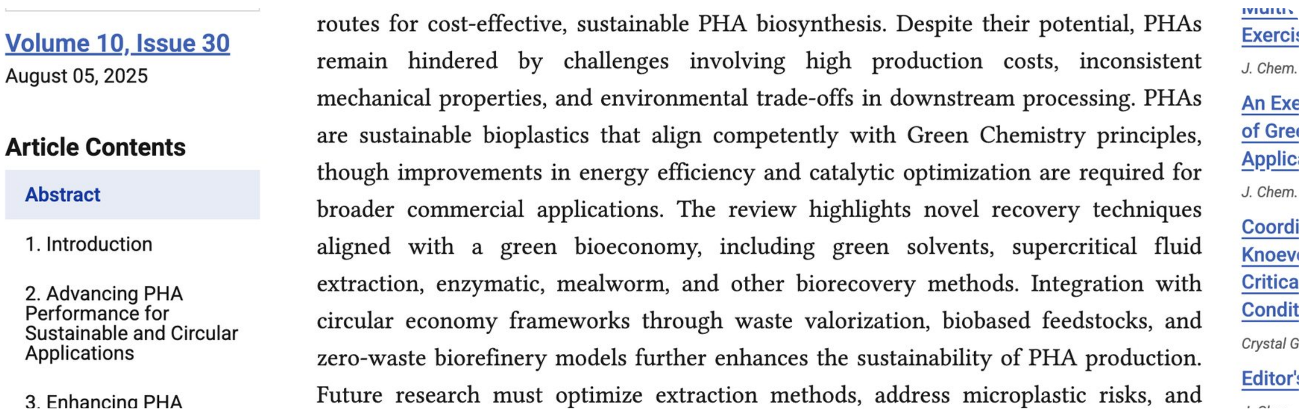
Apparently, procedures using sodium hydroxide, sodium hydroxide combined with sodium dodecyl sulfate (SDS), and ammonia−water for non-PHA cell mass digestion emerged as the most favorable options. Whilenon-PHA cell mass digestion methods prioritize environmental and economic aspects, other methods like butyl acetate may be preferable when prioritizing safety, risk mitigation, and final polymer purity.[67]

3.1.5. Supercritical Fluid Extraction (SCFE): SCFE uses supercritical CO_2, providing high purity without organic solvents. However, it demands specialized equipment and is energy-intensive, limiting its economic feasibility.[55,68] Therefore, it can be considered solvent-based, but it is distinct from traditional solvent-based methods due to its use of supercritical fluids rather than conventional organic solvents.

Supercritical fluids, notably supercritical carbon dioxide (sCO_2), provide an efficient method for polyhydroxyalkanoate (PHA) extraction by combining the properties of both gases and liquids. This allows for mild extraction conditions that effectively dissolve and release PHAs without leaving harmful residues, making the process highly suitable for applications in pharmaceutical and biomedical products. Supercritical fluid extraction (SCFE) achieves high-purity[69] results while avoiding using organic solvents, offering an environmentally

PHA, THE GREENEST PLASTIC SO FAR (2025)

First-author review covering microbial synthesis, recovery methods, circular-economy integration, green solvents, scale-up barriers, microplastic risk and responsible applications. The work demonstrates long-form literature synthesis, comparison of competing methods, careful treatment of trade-offs and clear visual communication.



Volume 10, Issue 30
August 05, 2025

Article Contents

Abstract

1. Introduction

2. Advancing PHA Performance for Sustainable and Circular Applications

3. Enhancing PHA

routes for cost-effective, sustainable PHA biosynthesis. Despite their potential, PHAs remain hindered by challenges involving high production costs, inconsistent mechanical properties, and environmental trade-offs in downstream processing. PHAs are sustainable bioplastics that align competently with Green Chemistry principles, though improvements in energy efficiency and catalytic optimization are required for broader commercial applications. The review highlights novel recovery techniques aligned with a green bioeconomy, including green solvents, supercritical fluid extraction, enzymatic, mealworm, and other biorecovery methods. Integration with circular economy frameworks through waste valorization, biobased feedstocks, and zero-waste biorefinery models further enhances the sustainability of PHA production. Future research must optimize extraction methods, address microplastic risks, and

OPEN ACCESS: https://doi.org/10.1021/acsomega.5c00684

PORTFOLIO EVIDENCE 04

Scientific editing & fact-checking

A self-authored demonstration of language editing, evidence calibration, reference control and final consistency review.

EDITING DEMONSTRATION

Before & After

The revised version keeps the same scientific message but gives the reader a clearer route through it.

BEFORE

Plastic waste is becoming a very serious environmental problem and because of this many alternative materials are being studied by researchers. PHA is a biodegradable polymer that can be produced by microorganisms and different waste materials can also be used for this production, which makes it a good solution for both waste management and plastic pollution. However, the production is still expensive and the recovery process frequently uses chemicals, therefore it is important to identify better methods. Fruit-industry residues are available in large quantities and contain sugars which microorganisms can consume. These wastes have the possibility to reduce production costs, although their composition is not always the same and pretreatment is needed before fermentation. More research must be conducted to improve the process and make the material commercially successful.

AFTER

Polyhydroxyalkanoates (PHAs) offer a promising route for addressing plastic pollution while recovering value from organic waste. Microorganisms can synthesize these biodegradable polymers using carbon-rich feedstocks, including residues from fruit processing. This connection between waste valorization and material production could reduce reliance on refined substrates and support more circular manufacturing systems. Commercial adoption, however, remains limited by production costs and resource-intensive recovery methods. Fruit-waste composition also varies by source and season, which can affect pretreatment requirements and fermentation performance. Future work should therefore evaluate feedstock consistency, lower-impact recovery options and process scalability together, rather than treating them as separate challenges.

WHAT CHANGED - AND WHY

Sharper opening The revision identifies the material and the environmental connection immediately.	More careful claims "Promising route" replaces language that presented PHA as a complete solution.
Improved scientific flow Feedstock, production constraints and research needs now follow a logical sequence.	More useful conclusion The final sentence identifies three connected research priorities instead of asking vaguely for "more research."

Editorial principle: I improve clarity and confidence, but I do not introduce findings, strengthen claims beyond the evidence, or replace the author's scientific judgement.

QUALITY-CONTROL DEMONSTRATION

Citation, Reference & Consistency Audit

Language editing is only one layer. A reliable scientific document also needs citations, references, terminology and formatting to agree with one another.

Citation support	A broad environmental claim appeared without a source.	Flagged the statement and requested an appropriate peer-reviewed citation.
Citation-reference match	One in-text citation had no corresponding reference-list entry.	Added it to the query list and checked all entries in both directions.
DOI consistency	DOIs appeared as plain text, URLs and mixed "doi:" formats.	Standardized them as complete https://doi.org/ links.
Terminology	PHA and PHAs were used inconsistently without defining the distinction.	Defined the abbreviation once and applied singular/plural usage consistently.
Claims and tone	"Best solution" overstated what the evidence demonstrated.	Revised to "promising option" and retained the relevant limitation.
Style consistency	UK and US spelling conventions were mixed.	Applied one convention throughout, based on the target journal or client brief.

REFERENCE-MANAGEMENT EXAMPLE

Consistent DOI presentation

Jayalath, S. U., et al. (2025). PHA, the Greenest Plastic So Far: Advancing Microbial Synthesis, Recovery, and Sustainable Applications for Circularity. ACS Omega. https://doi.org/10.1021/acsomega.5c00684

Jayalath, S., Kothalawala, P., De Alwis, A., Keerthisinghe, T., Costa, S., & Wijerathna, L. (2022). Polyhydroxyalkanoates from Fruit Wastes: A Sustainable Panacea for Plastic Crisis! BPRM, 2(2). https://doi.org/10.31705/BPRM.v2(2).2022.3

FINAL DELIVERY CHECK

Meaning preserved	**Claims calibrated to evidence**
Abbreviations defined	**Terminology consistent**
Citations and references cross-checked	**Requested style applied**

Deliverable demonstrated: scientific language editing, structural refinement, fact-checking queries, citation review, reference formatting and final consistency control.

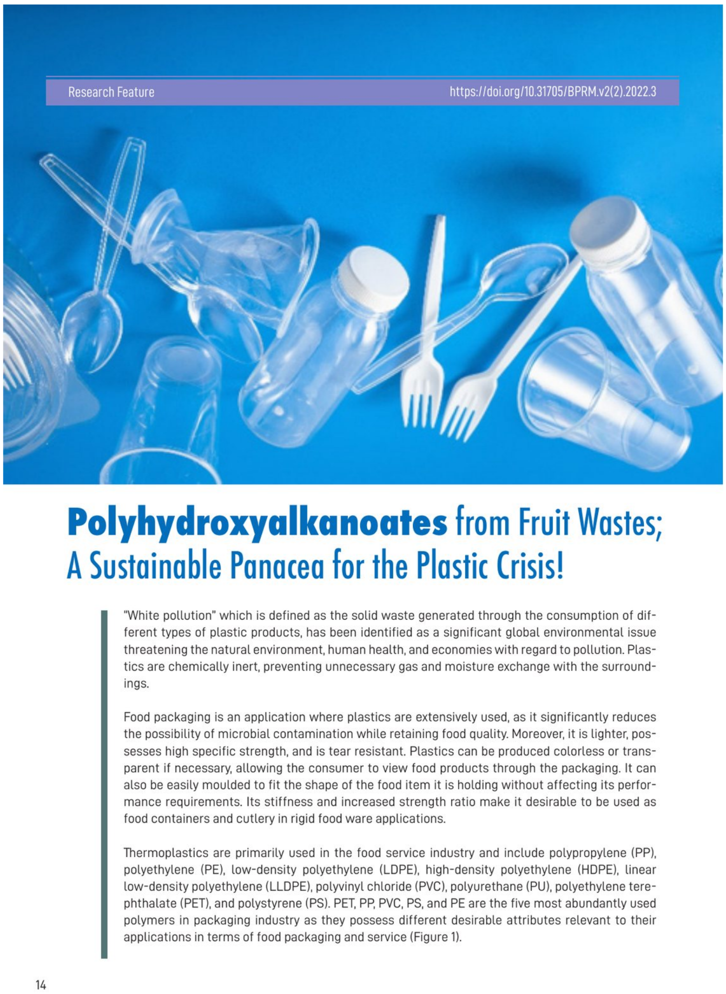
EDITORIAL QUALITY CONTROL

- Flags unsupported claims and requests credible citations.
- Cross-checks in-text citations, reference entries, DOI formats and terminology.
- Adapts US or UK spelling to the client brief while preserving the author's voice.

PORTFOLIO EVIDENCE 05

Earlier environmental feature

A 2022 research feature demonstrating sustained writing experience in waste valorization and sustainable materials.



Research Feature https://doi.org/10.31705/BPRM.v2(2).2022.3

Polyhydroxyalkanoates from Fruit Wastes;
A Sustainable Panacea for the Plastic Crisis!

"White pollution" which is defined as the solid waste generated through the consumption of different types of plastic products, has been identified as a significant global environmental issue threatening the natural environment, human health, and economies with regard to pollution. Plastics are chemically inert, preventing unnecessary gas and moisture exchange with the surroundings.

Food packaging is an application where plastics are extensively used, as it significantly reduces the possibility of microbial contamination while retaining food quality. Moreover, it is lighter, possesses high specific strength, and is tear resistant. Plastics can be produced colorless or transparent if necessary, allowing the consumer to view food products through the packaging. It can also be easily moulded to fit the shape of the food item it is holding without affecting its performance requirements. Its stiffness and increased strength ratio make it desirable to be used as food containers and cutlery in rigid food ware applications.

Thermoplastics are primarily used in the food service industry and include polypropylene (PP), polyethylene (PE), low-density polyethylene (LDPE), high-density polyethylene (HDPE), linear low-density polyethylene (LLDPE), polyvinyl chloride (PVC), polyurethane (PU), polyethylene terephthalate (PET), and polystyrene (PS). PET, PP, PVC, PS, and PE are the five most abundantly used polymers in packaging industry as they possess different desirable attributes relevant to their applications in terms of food packaging and service (Figure 1).

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POLYHYDROXYALKANOATES
FROM FRUIT WASTES

A Sustainable Panacea for the Plastic Crisis!

Published in BPRM, 2(2), this feature connects plastic pollution, food-industry residues, microbial fermentation and biodegradable polymers for a broad research readership.

WRITING CAPABILITIES

- Long-form environmental explanation
- Waste-to-resource narrative
- Technical comparisons and figures
- Research-to-practice framing

https://doi.org/10.31705/BPRM.v2(2).2022.3

Evidence across research, web and field practice

1 PUBLISHED RESEARCH

2025	Jayalath, S. U., & de Alwis, A. P. PHA, the Greenest Plastic So Far: Advancing Microbial Synthesis, Recovery, and Sustainable Applications for Circularity. ACS Omega, 10(30), 32564-32586. https://doi.org/10.1021/acsomega.5c00684
2022	Jayalath, S., Kothalawala, P., De Alwis, A., Keerthisinghe, T., Costa, S., & Wijerathna, L. Polyhydroxyalkanoates from Fruit Wastes: A Sustainable Panacea for Plastic Crisis! BPRM, 2(2). https://doi.org/10.31705/BPRM.v2(2).2022.3

2 PUBLIC-FACING & TECHNICAL WRITING

2023	Biomimicry and Inspiration from the Natural World! The Commonwealth Union - Science & Tech.
2018-20	Selected anonymized biodiversity monitoring and High Conservation Value technical-reporting evidence from FSC-aligned project work.
Portfolio	Scientific Editing & Reference Management: before-and-after editing, claims calibration, citation audit and style consistency demonstration.

3 CURRENT RESEARCH & CONFERENCE OUTPUT

Under review	The Potential of Improved Biomass Cookstoves to Reduce Carbon Emissions in Tea Estates.
In preparation	An Overview of Biochar Practices in Sri Lanka: Feedstock Availability, Research Progress, Opportunities, and Challenges.
2025	Co-author, PHA circularity poster, American Institute of Chemical Engineers Annual Meeting, Boston. Presented by Prof. Ajith de Alwis on behalf of the research team.

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