NUMERO 3 - LUGLIO 2021

PACKAGING SCIENCE

E' la Rassegna Scientifica Internazionale della ***Fondazione Carta Etica del Packaging.***

Pubblicazione bimestrale in cui sono presentati 7 articoli multidisciplinari, afferenti al packaging, selezionati da diverse riviste del mondo scientifico digitale.

Packaging Science attraverso le tematiche sempre attuali ed aggiornate dei suoi articoli in diverse discipline, concorre ampiamente alla promozione e all'evoluzione della corretta cultura del packaging e dei ***10 Valori della Carta Etica*** *per accompagnare il packaging verso un futuro più consapevole.*

FONDAZIONE™
CARTA
ETICA
del Packaging

Gestione ambientale, gestione delle risorse umane e gestione delle risorse umane verdi!

Lo scopo principale di questo documento è quello di integrare la letteratura sulla gestione delle risorse umane (HRM) e sulla gestione ambientale. Vengono inoltre fornite idee per la ricerca futura. Poiché il ruolo del capitale umano nell'attuazione della gestione ambientale è un campo di ricerca maturo, è emerso un nuovo argomento noto come gestione delle risorse umane verdi. Esaminiamo studi che analizzano sia la relazione tra gestione generale delle risorse umane e strategia ambientale sia tra gestione delle risorse umane verdi e strategia ambientale.

administrative sciences

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Review

Environmental Management, Human Resource Management and Green Human Resource Management: A Literature Review

José F. Molina-Azorin *, Maria D. López-Gamero, Juan José Tarí, Jorge Pereira-Moliner and Eva M. Pertusa-Ortega

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Abstract: The main purpose of this paper is to integrate the literature on human resource management (HRM) and environmental management. Moreover, the paper shows the role that green human resource management (GHRM) plays in environmental management activities. This article examines the main relationships between human resource management and environmental strategy, emphasizing reciprocal influences. Moreover, the main human resource practices used in the literature are examined. In addition, methodological approaches that can be appropriate to advance the study of the link between human resource management and environmental strategy are proposed. Ideas for future research are also provided. As the role of human capital in implementing environmental management is a mature field of research, a new topic known as green human resource management has emerged. We examine studies that analyze both the relationship between general human resource management and environmental strategy and between green human resource management and environmental strategy.

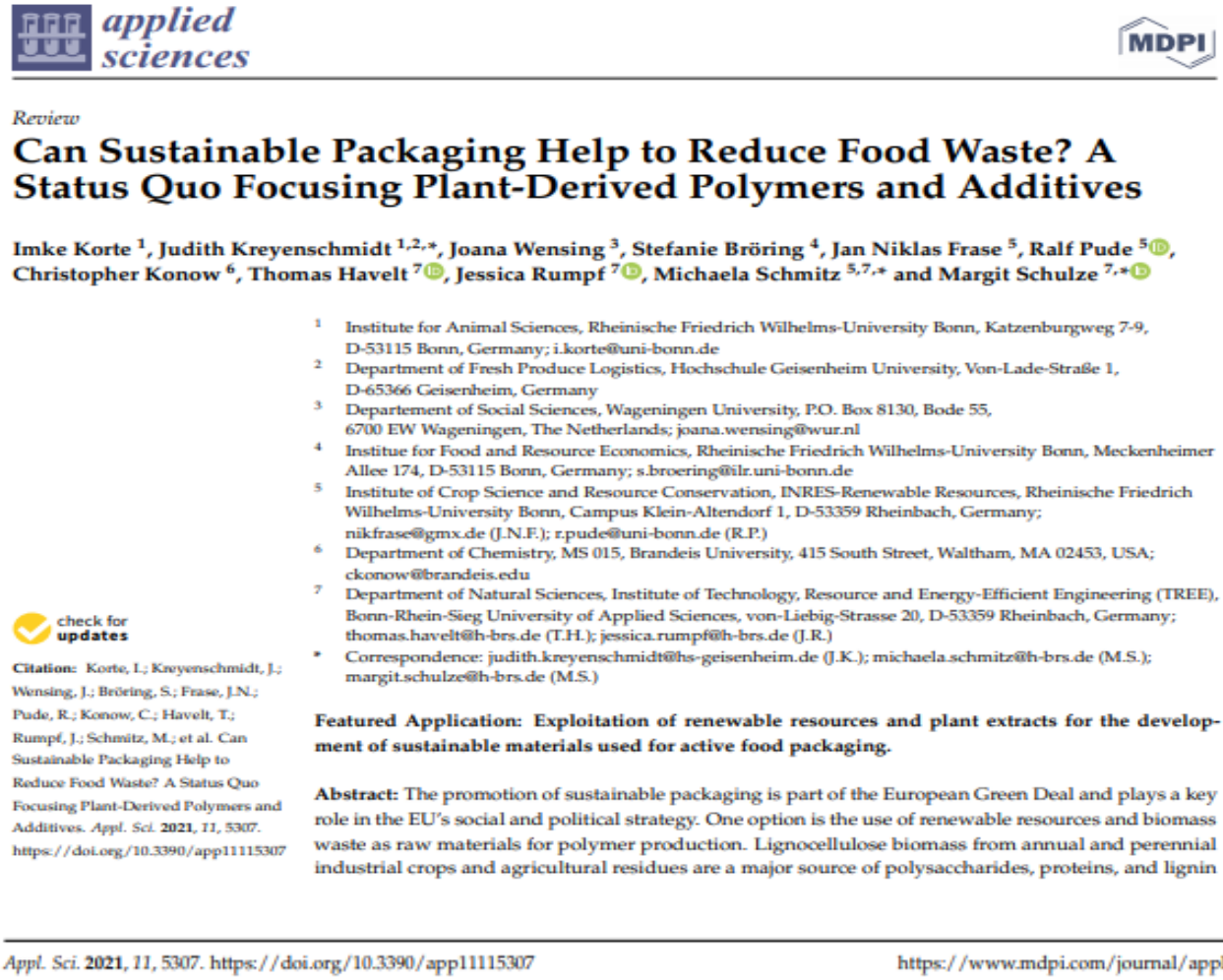
Keywords: human capital; human resource management; green human resource management; environmental management; environmental strategy; literature review

Citation: Molina-Azorin, José F., María D. López-Gamero, Juan José Tarí, Jorge Pereira-Moliner, and Eva M. Pertusa-Ortega. 2021. Environmental Management, Human Resource Management and Green

https://www.mdpi.com/2076-3387/11/2/48

Imballaggi sostenibili per ridurre gli sprechi alimentari? Focus polimeri e additivi derivati dalle piante.

La promozione del packaging sostenibile fa parte del Green Deal europeo. Un'opzione è l'uso di risorse rinnovabili e rifiuti di biomassa come materie prime per la produzione di polimeri. I polimeri a base bio-based hanno un uso pratico ancora limitato a causa delle minori prestazioni nelle funzioni di imballaggio fondamentali che influenzano direttamente la qualità e la sicurezza degli alimenti, la durata di conservazione e quindi la quantità di rifiuti alimentari. Oltre ai polimeri a base bio, questo articolo si concentra sugli estratti vegetali (erbe, fiori, alberi e i loro frutti) come agenti di imballaggio attivi in grado di prolungare la durata di conservazione degli alimenti. Infine, il potenziale di adozione degli imballaggi a base di polimeri da fonti rinnovabili viene discusso dal punto di vista della bioeconomia.



applied sciences

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Review

Can Sustainable Packaging Help to Reduce Food Waste? A Status Quo Focusing Plant-Derived Polymers and Additives

Imke Korte [1], Judith Kreyenschmidt [1,2,*], Joana Wensing [3], Stefanie Bröring [4], Jan Niklas Frase [5], Ralf Pude [5], Christopher Konow [6], Thomas Havelt [7], Jessica Rumpf [7], Michaela Schmitz [5,7,*] and Margit Schulze [7,*]

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Citation: Korte, I.; Kreyenschmidt, J.; Wensing, J.; Bröring, S.; Frase, J.N.; Pude, R.; Konow, C.; Havelt, T.; Rumpf, J.; Schmitz, M.; et al. Can Sustainable Packaging Help to Reduce Food Waste? A Status Quo Focusing Plant-Derived Polymers and Additives. *Appl. Sci.* **2021**, *11*, 5307. https://doi.org/10.3390/app11115307

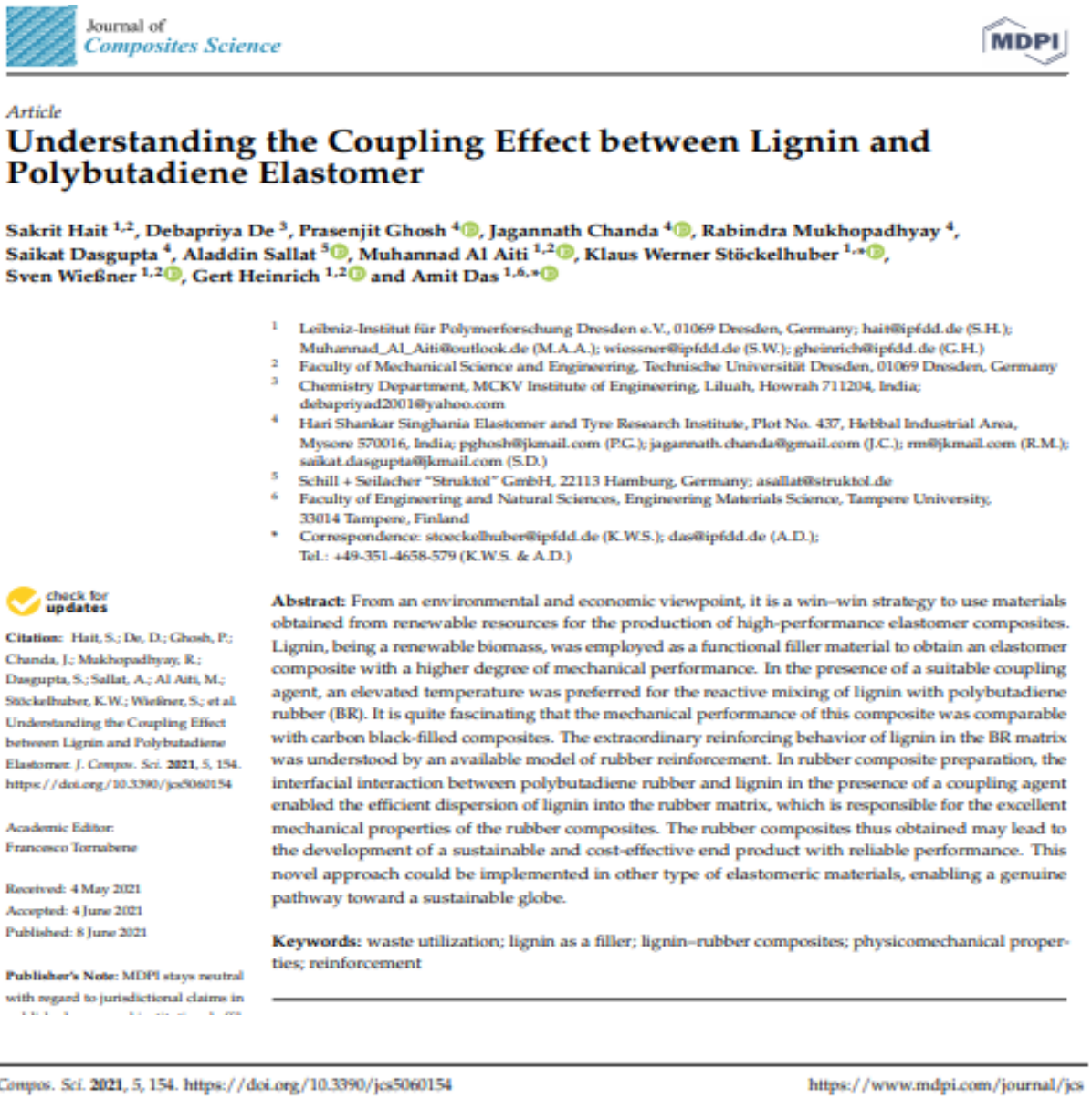
Featured Application: Exploitation of renewable resources and plant extracts for the development of sustainable materials used for active food packaging.

Abstract: The promotion of sustainable packaging is part of the European Green Deal and plays a key role in the EU's social and political strategy. One option is the use of renewable resources and biomass waste as raw materials for polymer production. Lignocellulose biomass from annual and perennial industrial crops and agricultural residues are a major source of polysaccharides, proteins, and lignin

https://www.mdpi.com/2076-3417/11/11/5307

Lignina in un elastomero: ambiente ed economia!

Dal punto di vista ambientale ed economico, è una strategia win-win utilizzare materiali ottenuti da risorse rinnovabili per la produzione di compositi di elastomeri ad alte prestazioni. La lignina, essendo una biomassa rinnovabile, è stata utilizzata come materiale di riempimento funzionale per ottenere un composito elastomero con un più alto grado di prestazioni meccaniche. In presenza di un agente di accoppiamento adatto, è stata preferita una temperatura elevata per la miscelazione reattiva della lignina con gomma polibutadiene (BR). È piuttosto affascinante che le prestazioni meccaniche di questo composito siano paragonabili ai compositi riempiti di nero fumo.



Journal of *Composites Science*

MDPI

Article

Understanding the Coupling Effect between Lignin and Polybutadiene Elastomer

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Abstract: From an environmental and economic viewpoint, it is a win–win strategy to use materials obtained from renewable resources for the production of high-performance elastomer composites. Lignin, being a renewable biomass, was employed as a functional filler material to obtain an elastomer composite with a higher degree of mechanical performance. In the presence of a suitable coupling agent, an elevated temperature was preferred for the reactive mixing of lignin with polybutadiene rubber (BR). It is quite fascinating that the mechanical performance of this composite was comparable with carbon black-filled composites. The extraordinary reinforcing behavior of lignin in the BR matrix was understood by an available model of rubber reinforcement. In rubber composite preparation, the interfacial interaction between polybutadiene rubber and lignin in the presence of a coupling agent enabled the efficient dispersion of lignin into the rubber matrix, which is responsible for the excellent mechanical properties of the rubber composites. The rubber composites thus obtained may lead to the development of a sustainable and cost-effective end product with reliable performance. This novel approach could be implemented in other type of elastomeric materials, enabling a genuine pathway toward a sustainable globe.

Keywords: waste utilization; lignin as a filler; lignin–rubber composites; physicomechanical properties; reinforcement

https://www.mdpi.com/2504-477X/5/6/154

L'impatto del tipo di imballaggio sul sapore del vino.

Review di letteratura sulle categorie di imballaggi per vino più comunemente disponibili: bottiglie di vetro, bottiglie di polietilene tereftalato (PET), bag-in-box (BIB), lattine di alluminio e Tetra Pak. Vengono discusse la quota di mercato e gli impatti ambientali di ciascuna categoria. Particolare attenzione è rivolta all'impatto riportato sul sapore e sull'aroma del vino confezionato per ogni tipo di confezione. Infine, vengono discussi i potenziali impatti sulle preferenze dei consumatori. Mentre il vetro è ancora il materiale di imballaggio dominante nell'industria del vino e per la domanda dei consumatori, le preoccupazioni economiche e ambientali stanno spingendo l'industria e i consumatori a studiare e adottare materiali di imballaggio alternativi.

beverages

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Review

The Impact Packaging Type Has on the Flavor of Wine

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Abstract: This is a literature review of the most commonly available wine packaging categories. This includes glass bottles, polyethylene terephthalate bottles (PET), bag-in-box (BIB), aluminum cans, and Tetra Pak. This review includes a description and history of each category. In addition, the market share and environmental impacts of each category are discussed. Special attention is paid to the reported impact on packaged wine flavor and aroma for each packaging type. Finally, the potential impacts on consumer preference are discussed. While glass is still the dominant packaging material within the wine industry and by consumer demand, economic and environmental concerns are driving the industry and consumers to investigate and adopt alternative packaging materials.

Keywords: wine packaging; flavor; sustainability; wine bottles; aluminum cans; consumer preference

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Beverages **2021**, *7*, 36. https://doi.org/10.3390/beverages7020036 https://www.mdpi.com/journal/beverages

https://www.mdpi.com/2306-5710/7/2/36

Carta antibatterica a base di cloruro di benzalconio per applicazioni anche nell'imballaggio alimentari.

Batteri patogeni e altri microrganismi rappresentano una potente minaccia per l'uomo causando varie malattie infettive. Per controllare la diffusione dell'infezione, sono stati sviluppati diversi prodotti antibatterici. Tuttavia, la maggior parte di essi è nota per essere associata a rischi per la salute, inquinamento ambientale, fabbricazione complessa e / o costi più elevati. Per affrontare questi problemi, in questo studio, è stata sviluppata una carta antibatterica a basso costo, biodegradabile e compatibile con la pelle umana. La carta antibatterica sviluppata è adatta per essere utilizzata nell'industria per scopi di disinfezione e imballaggio alimentare, e anche dal pubblico per la sanificazione delle mani.

chemengineering MDPI

Communication

Development of a Benzalkonium Chloride Based Antibacterial Paper for Health and Food Applications

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Abstract: Pathogenic bacteria and other microorganisms pose a potent threat to humans by causing various infectious diseases. To control the spread of infection, different antibacterial products have been developed. However, most of them are known to be associated with health hazards, environmental pollution, complex fabrication, and/or higher cost. To address these issues, in this study, a low cost, biodegradable and human skin compatible antibacterial paper has been developed. A quaternary ammonium compound, benzalkonium chloride (BKC) has been used for paper surface treatment. The concentration of aqueous solution of BKC coated on paper was varied from 0.1 wt% to 0.2 wt%. No external binder was required for coating BKC onto paper. The efficacy of the coated paper was investigated against *Staphylococcus aureus* ATCC 6538 and *Escherichia coli* ATCC 8739 bacterial strains. This antibacterial paper is highly effective against both strains with the concentrations of BKC being within the allowable limit for cytotoxic effects. The optimum concentration of BKC coated on paper can be considered as 0.15 wt%, as nearly 100% inhibition was achieved with it against both strains. The developed antibacterial paper is suitable for being used in the industry for disinfection and food packaging purposes, and also by the public for hand sanitization.

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Keywords: benzalkonium chloride; antibacterial paper; infectious diseases; hand sanitizer; food packaging

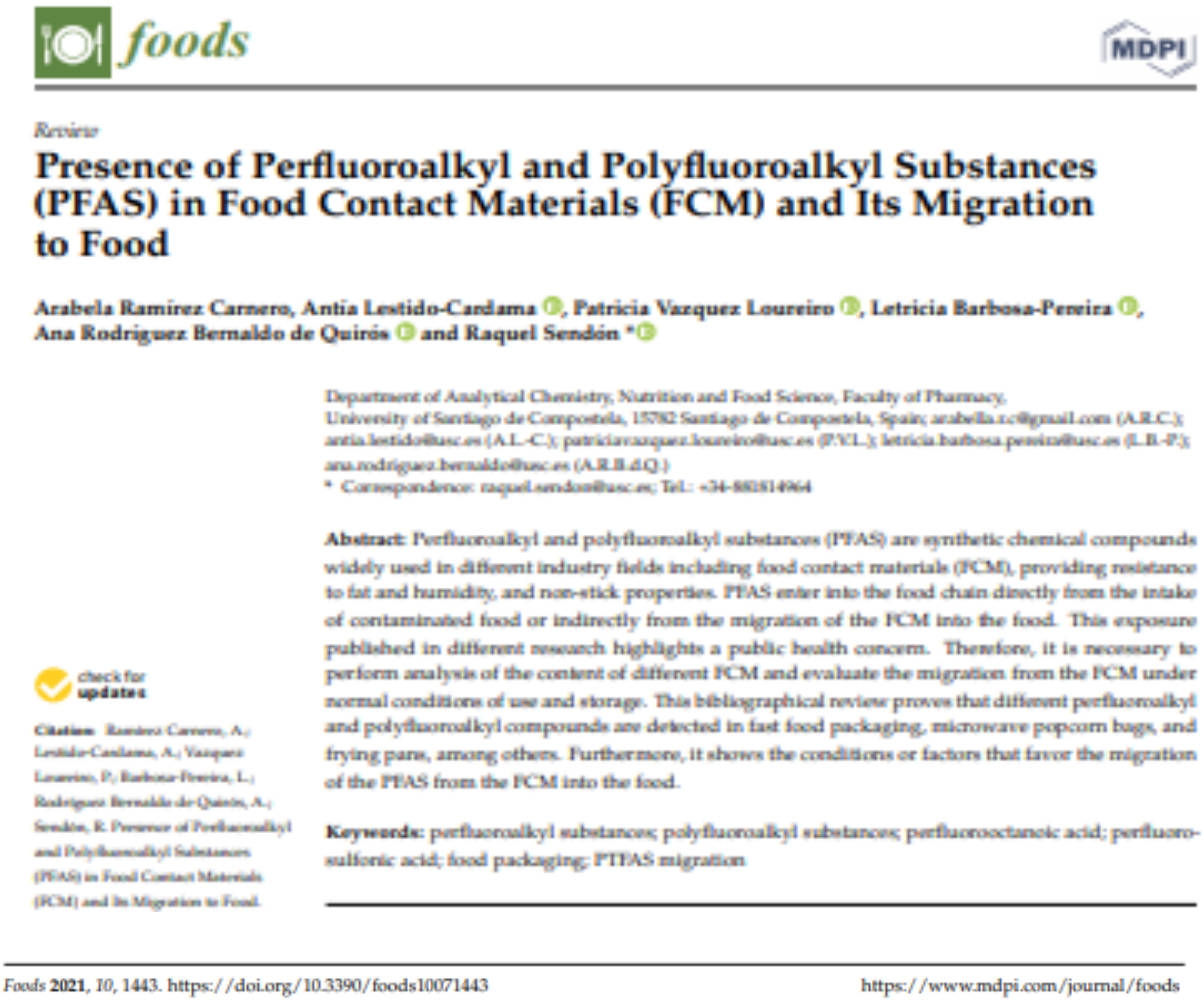
Citation: Shadman, S.A.; Sadab, I.H.; Noor, M.S.; Khan, M.S. Development of a Benzalkonium Chloride Based

ChemEngineering **2021**, *5*, 1. https://doi.org/10.3390/chemengineering5010001 https://www.mdpi.com/journal/chemengineering

https://www.mdpi.com/2305-7084/5/1/1

Review PFAS nei materiali a contatto con gli alimenti e loro migrazione negli alimenti

Le sostanze perfluoroalchiliche e polifluoroalchiliche (PFAS) sono composti chimici sintetici ampiamente utilizzati in diversi settori industriali, compresi i materiali a contatto con gli alimenti (FCM), che forniscono resistenza a grasso e umidità e proprietà antiaderenti. I PFAS entrano nella catena alimentare direttamente dall'assunzione di cibo contaminato o indirettamente dalla migrazione del FCM nell'alimento. Pertanto, è necessario eseguire l'analisi del contenuto di diversi FCM e valutare la migrazione dall'FCM nelle normali condizioni di utilizzo e conservazione. Questa revisione bibliografica dimostra che diversi composti perfluoroalchilici e polifluoroalchilici vengono rilevati negli imballaggi di fast food, sacchetti di popcorn a microonde e padelle, tra gli altri. Inoltre, mostra le condizioni o i fattori che favoriscono la migrazione dei PFAS dall' FCM all'alimento.



foods

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Review

Presence of Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) in Food Contact Materials (FCM) and Its Migration to Food

Arabela Ramirez Carnero, Antia Lestido-Cardama, Patricia Vazquez Loureiro, Letricia Barbosa-Pereira, Ana Rodriguez Bernaldo de Quirós and Raquel Sendón *

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Abstract: Perfluoroalkyl and polyfluoroalkyl substances (PFAS) are synthetic chemical compounds widely used in different industry fields including food contact materials (FCM), providing resistance to fat and humidity, and non-stick properties. PFAS enter into the food chain directly from the intake of contaminated food or indirectly from the migration of the FCM into the food. This exposure published in different research highlights a public health concern. Therefore, it is necessary to perform analysis of the content of different FCM and evaluate the migration from the FCM under normal conditions of use and storage. This bibliographical review proves that different perfluoroalkyl and polyfluoroalkyl compounds are detected in fast food packaging, microwave popcorn bags, and frying pans, among others. Furthermore, it shows the conditions or factors that favor the migration of the PFAS from the FCM into the food.

Keywords: perfluoroalkyl substances; polyfluoroalkyl substances; perfluorooctanoic acid; perfluorosulfonic acid; food packaging; PTFAS migration

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Citation: Ramírez Carnero, A.; Lestido-Cardama, A.; Vazquez Loureiro, P.; Barbosa-Pereira, L.; Rodríguez Bernaldo de Quirós, A.; Sendón, R. Presence of Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) in Food Contact Materials (FCM) and Its Migration to Food.

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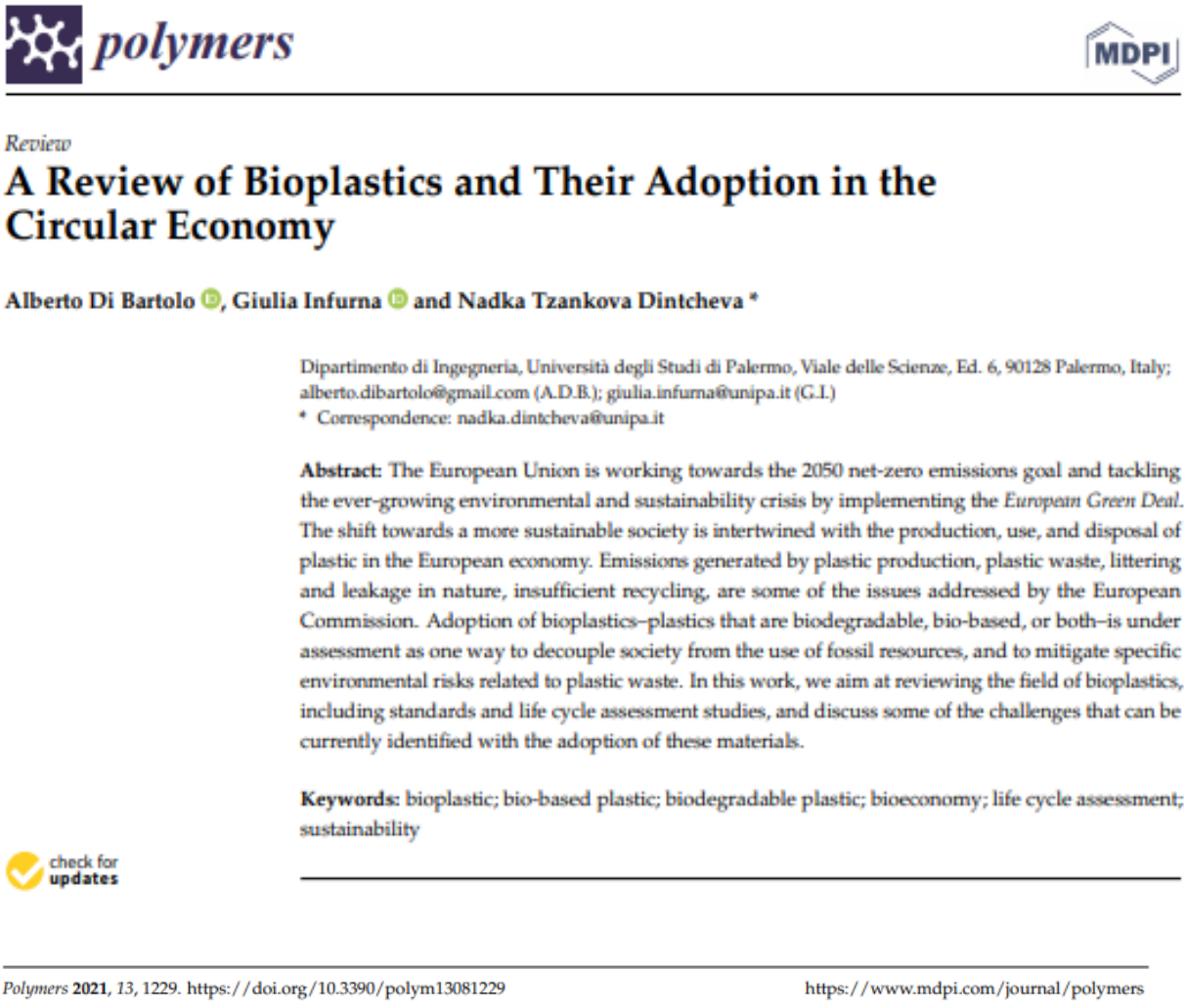
Review sulle bioplastiche e della loro adozione nell'economia circolare

L'Unione europea sta lavorando per raggiungere l'obiettivo di zero emissioni nette per il 2050 e per affrontare la crisi ambientale e di sostenibilità in continua crescita attuando il Green Deal europeo. Il passaggio a una società più sostenibile si intreccia con la produzione, l'uso e lo smaltimento della plastica nell'economia europea. L'adozione di bioplastiche-plastiche biodegradabili, bio-based o entrambe è in fase di valutazione come un modo per allontanare la società dall'uso di risorse fossili e mitigare specifici rischi ambientali legati ai rifiuti di plastica. In questo lavoro, miriamo a rivedere il campo delle bioplastiche, compresi gli standard e gli studi di valutazione del ciclo di vita, e discutere alcune delle sfide che possono essere attualmente identificate con l'adozione di questi materiali



polymers

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Review

A Review of Bioplastics and Their Adoption in the Circular Economy

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Abstract: The European Union is working towards the 2050 net-zero emissions goal and tackling the ever-growing environmental and sustainability crisis by implementing the *European Green Deal*. The shift towards a more sustainable society is intertwined with the production, use, and disposal of plastic in the European economy. Emissions generated by plastic production, plastic waste, littering and leakage in nature, insufficient recycling, are some of the issues addressed by the European Commission. Adoption of bioplastics–plastics that are biodegradable, bio-based, or both–is under assessment as one way to decouple society from the use of fossil resources, and to mitigate specific environmental risks related to plastic waste. In this work, we aim at reviewing the field of bioplastics, including standards and life cycle assessment studies, and discuss some of the challenges that can be currently identified with the adoption of these materials.

Keywords: bioplastic; bio-based plastic; biodegradable plastic; bioeconomy; life cycle assessment; sustainability

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