

Proceeding Paper

# Avocado Peel: Potential Applications to Promote Circularity Based on Its Characterization <sup>†</sup>

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**Abstract:** Avocado peel is usually discarded; however, there is a growing interest in promoting circularity within the value chain, thus contributing to its overall sustainability. To explore potential valorization pathways, gaining a comprehensive understanding of the chemical composition of the peel is essential. In this work, the peel was first subjected to Soxhlet extraction using various solvents, the resulting extracts were evaluated gravimetrically, and the phenolic content was determined by the Folin-Ciocalteu method. The solid fraction was analyzed for glucans, hemicellulose, and lignin content by combining acid-hydrolysis, gravimetric analysis, and liquid chromatography. Moreover, infrared spectroscopy was applied to provide information about chemical features. The results showed that the peel contained mainly extractives (47%) and lignin (30%). The content of fat and polymeric sugars was about 10% of each other. Based on their characterization, a cascading valorization biorefinery scheme can be proposed. First step, phenolic compounds like flavanols can be recovered by water with applications in food, feed, and cosmetics products for antioxidant properties. In the second step, lipids obtained by hexane could be converted via transesterification into biodiesel. Finally, the extracted solid can be pretreated and the sugars solubilized by enzymatic hydrolysis and converted into bioethanol by fermentation. Both, biodiesel and bioethanol, are renewable and cleaner-burning alternatives to fossil fuels in transportation. The solid non-hydrolyzed fraction rich in lignin, can be utilized to generate heating and/or electricity powering the biorefinery processes. In summary, avocado peel biorefinery offers great opportunities for extracting high-value-added compounds and promoting a more circular and resource-efficient economy.

**Keywords:** avocado; biorefinery; circular economy; peel; valorization

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