

Sustainable Cups made from bioplastic from Spent Coffee Grounds

The utilization of disposable tableware and plastic products has become widespread in contemporary society, driven by convenience and affordability. While these items offer immediate benefits, the environmental consequences, including plastic pollution, resource depletion, and ecosystem disruption, are well-documented and continue to escalate.

At the University of Twente, disposable tableware is still used at the canteen. The working staff is concerned about the possibility of theft of the reusable tableware and the potential stains or discoloration of the recycled material. On the other hand, the university is dealing with the issue of coffee ground waste. Although it is already used as a plant fertilizer, coffee grounds could be recycled into bioplastic. The challenge lies in companies favoring recycled plastic over bioplastic due to its cost-effectiveness and convenience.

Thus, this research aims to explore the possibility of addressing both of these issues through a combined solution. If it is not physically possible to solve both challenges, a solution for one of them will be further researched.

The paper explores the design of a stain-resistant, sustainable, and ergonomic cup, focusing on the potential utilization of bioplastic derived from Spent Coffee Grounds (SCG). This study employs a mixed-methods approach, starting with a literature review on sustainable and user-centric design. It then collected primary data through questionnaires among potential cup users in the university canteen to understand user preferences, perceptions of a cup design, and awareness of plastic pollution. It was analyzed quantitatively to identify patterns and trends.

Moreover, this paper explains the design journey and future perspectives for the EcoSip cup, a distinctive reusable cup tailored for the university canteen. Notable design features include a thoughtful asymmetry, presenting a nuanced approach to user comfort. Specifically, the cup's edge exhibits a slight elevation on one side, enhancing the sipping experience with an ergonomic design. Simultaneously, the opposite side is shaped to prioritize a secure and comfortable grip, ensuring ease of handling.

Also, the research involves an analysis of various materials including bioplastic from SCG, bioplastic from Silverskin, and Polypropylene (PP). Each material undergoes analysis to determine its possibility of meeting the defined criteria of stain resistance, sustainability, and ergonomic design. The findings of this research provide valuable insights into the suitability of different materials for designing an optimal cup. The analysis extends beyond SCG to include alternative bioplastics and traditional materials, ensuring a comprehensive exploration. Although a suitable material is not chosen, the research is important for improving how cups are designed, making them better for users, and promoting eco-friendly practices in shared places.

