Utilization of Manihot esculenta Peels, Used Coffee Grounds, and Eggshells from Gallus gallus to Create Biodegradable Polymers

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The purpose of this study was to investigate natural waste products that could potentially replace the polystyrene and other synthetic plastics used in disposable face masks. The global production of disposable face masks has become indispensable during this pandemic time. Wearing disposable face masks saves lives, but the terrestrial and aquatic environment are not in the suitable state to welcome the alarming loom of plastic wastes to the already existing environmental nuisance. Disposable face masks are composed of plastics that have a major environmental implication- a foreseeable danger to human existence that might last generations as the growing adverse consequences of plastic pollution threatens the ecosystem, specifically, the aquatic lives- a crucial part of the food web needed for human survival. Three fillers from waste products such as used coffee grounds, eggshells, and cassava peel (with the starch extracted) were mixed with cassava peel starch extract and other additives to create biopolymers that were compared with synthetic polymer used in the melt-blown layer of disposable face masks for flammability, dissolvability, biodegradability, and filtering capabilities. It was concluded that the cassava peel polymer yielded the least flammability, highest biodegradability, and higher dissolvability than the other fillers. The synthetic polymer melted with heat and did not biodegrade or dissolve. All the biopolymers had positive results from the breath test. Utilization of these waste products will minimize pollution, at the same time, will be valuable for their usefulness, rather than considered rubbish that have both promising potential impact to the environment and humans.

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