Enzymatically Treated Cellulosic Packaging Waste Utilized to Release Fermentable Sugars for the Production of Bioethanol

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Bioethanol production currently utilizes sugars derived from food crops, which causes challenges in the fight against world hunger. Alternative sources of sugars must be investigated. A potential sugar/glucose source is cellulosic materials; such as the waste cardboard from used packaging. Initially, cellulase was tested to determine if it can use cardboard as a substrate, and release glucose molecules. Once the enzyme's efficacy was established, tests were designed to determine alternative conditions that would release glucose. Under conditions that controlled for other metabolic pathways, by first boiling samples, and under ideal enzymatic conditions, 0.311g of glucose was released per 1.00g cardboard. Under conditions meant to more closely mimic industrial settings; by lowering energy input and not controlling for metabolic activities performed by microbes already present on the cardboard; a yield of 0.40g of glucose was released per 1.00g cardboard. Cellulosic packaging waste is an exciting alternative source of glucose over food crops.

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