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Charcoal And Methanol Production By The Destructive Distillation Of Cellulosic Waste

This experiment was designed to analyze the feasibility of extracting methanol and charcoal from common biodegradable wastes through the process of destructive distillation. Various materials, such as paper, cardboard, and wood splints were heated strongly in an oxygen-poor environment such that the cellulose decomposed into products such as acetone, methanol, acetic acid, and charcoal. On average, the destructive distillation of wood splints yielded 21.6% char and 0.894% methanol by mass. For corrugated cardboard, the percentage of charcoal averaged 24.2% and for methanol, 2.54%. The destructive distillation of paper yielded, on average, 33.9% char and 2.26% methanol. Acetone was also present in the samples, but in much smaller concentrations compared to methanol. The pHs of the solutions were generally in the range of 3.6 to 4.5, indicating a moderate acidity. In general, the reaction began slowly, but the reaction rate quickly increased once the material reached the necessary temperature for pyrolysis. Thus, much of the methanol, acetone, and acetic acid were produced during the second half of the reaction.