

Characterisation of lignocellulosic sugars from municipal solid waste residue.

ABSTRACT

Municipal solid waste (MSW) contains significant quantities of plant-derived carbohydrates which have the potential to be exploited as a biomass source. This study evaluated the chemical composition and fractionation of MSW water-insoluble organic matter remaining after recycling of other components (MSWR). The organic matter was prepared as a dry, alcohol insoluble residue (MSWR-AIR, comprising $w = 6\%$ of original MSW) and size fractionated into fractions A, B, C & D. Carbohydrates were present in all the sub-fractions, comprising up to $w = 54\%$; their complexity was also assessed by FT-IR spectroscopy. The lignin content in the samples ranged from $w = 11\text{--}22\%$. The most carbohydrate-rich subfraction (C; $w = 4\%$ original MSW) was sequentially extracted to provide information on the likely constituent cell wall-derived polymers, sugar compositions and uronic acid content. The results indicate that approximately $w = 25\%$ of the MSWR-AIR comprises glucose, which appears to be mostly cellulosic in origin. The results are discussed in relation to the potential for exploitation.

Keyword: Municipal solid waste; Composition; Cell walls; Polysaccharides; Sequential extraction.