

CARBOHYDRATE DISASSEMBLE OF SUGARCANE STRAW IN THE FIELD

Sousa, C.R.; de Souza, A.P.; Grandis, A.; Buckeridge, M.S.

*Laboratory of Plant Physiological Ecology (LAFIECO), Department of Botany,
University of São Paulo, Brazil*

Cellulosic ethanol is an alternative for increasing the amount of bioethanol production in the world. In Brazil, besides bagasse, a possible feedstock for such processes is the sugarcane straw, which is actually left in the field. However, the process that leads the cell wall disassembly under field conditions is unknown and understanding how this happens is considered a good opportunity to improve 2nd generation bioethanol technology. In the present work we aimed at studying how sugarcane straw is degraded in the field after 3, 6, 9 and 12 months. Non-structural carbohydrates, lignin and protein contents were analysed and cell wall composition was determined by cell wall fractionation and determination of monosaccharide composition. Non-structural carbohydrates quickly disappeared during the first 3 months in the field. In the cell walls a decrease (ca.26%) in residue's yield was observed concomitantly with an increase of 13.3% in ammonium oxalate and sodium chloride fractions, which are composed of pectin, branched arabinoxylan and more soluble β -glucan. Changes in monosaccharide composition from each fraction showed that the first polymer to be solubilised is the arabinoxylan (after 3 months) followed by β -glucans and cellulose (after 6 months). The earlier solubilisation of arabinoxylans suggests that this polymer is more accessible than β -glucan in the field and that its solubilization allowed cellulose degradation after 6 months. In spite of the earlier arabinoxylan easier solubilisation, the hexose:pentose ratio decreased, suggesting that the pentoses from polymer are degrade slowly. Our data indicate that between the 3rd and 6th months of exposition of straw in the field might be considered as a target for researchers interested in metagenomics to find hydrolytic enzymes to be used in 2nd generation bioethanol processes that involve the use of sugarcane straw.

Key words: sugarcane, cell wall, carbohydrate degradation

Financed by: CNPq (Proc. 574002/2008-1) and FAPESP (Proc. 08/57908-6)

This document was created with Win2PDF available at <http://www.win2pdf.com>.
The unregistered version of Win2PDF is for evaluation or non-commercial use only.
This page will not be added after purchasing Win2PDF.