Dissolving pulp production from sugar cane bagasse

The main goal of this study was characterizing the sugar cane bagasse two main fractions: pith and depithed bagasse, and evaluating the potential of the depithed for production of dissolving grade pulps. The depithed bagasse was chemically characterized and converted into brown pulp of two different extents of delignification degrees (kappa 16.9 and 9.2) by the pre-hydrolysis soda process, which consists of bagasse treatment with hot water (15 min at 180°C) followed by conventional soda pulping. The resulting pulps were fully bleached by the O-D-(EP)-D-P sequence and evaluated for their main dissolving pulp characteristics. The contents of cellulose, hemicelluloses and lignin in the pith and depthed bagasse varied significantly. For example, the lignin S:G:H of the pith and depithed bagasse were 1.0:1.6:1.8 and 1.0:2.1:2.0, respectively. The pre-hydrolysis pretreatment terminated at pH 3.4 and removed 29% of the depithed bagasse weight. The pre-hydrolysis soda process improves the xylan removal but decreases pulp yield. The bleached pulps showed similar glucans (∼95%), xylans (∼5.0%), ash (∼0.4%), silica (∼0.15%) and α-cellulose content (∼92%) regardless of kappa number. The low viscosity values and the high ash and silica contents limit the uses of the bagasse pulps for certain dissolving grades applications, but it is useful for production of viscose rayon and CMC derivatives after some demineralization. The elucidation of the pith lignin S:G:H ratio and the production of high yield (35.1%) dissolving pulp from depithed bagasse fraction without bleaching cost penalties are the main novelties of this paper [Marcela Freitas Andrade* and Jorge Luiz Colodette (Pulp and Paper Laboratory, Department of Forestry Engineering, Federal University of Vicos, Av. P. H. Rolfs, s/n, Campus, 36570-000 Vicosa, Minas Gerais, Brazil), Industrial Crops and Products, 2014, 52, 58-64].

Tropical fruit pulps decreased probiotic survival to in vitro gastrointestinal stress in symbiotic soy yoghurt with okara during storage

The effect of mango and guava pulps on Lactobacillus acidophilus La-5 and Bifidobacterium animalis Bb-12 viability in a soy yoghurt (SY) and on probiotic survival under simulated gastrointestinal conditions were investigated throughout 28 days of storage at 4°C. The impact of fruit pulps on SY sensory acceptability was also assessed. Three formulations were produced from soymilk fermented with ABT-4 culture (La-5, Bb-12, and Streptococcus thermophilus) and supplemented with inulin and okara: SYC (control), SYM (with mango pulp), and SYG (with guava pulp). All formulations showed probiotic viabilities ranging from 8 to 9 log cfu/g, and fruit pulps did not affect the probiotic viabilities. However, the fruit pulps decreased probiotic survival significantly to simulated gastrointestinal stress. Acceptability was higher for SYM and this difference was significant at 21 days. Therefore, the improved acceptability of SY through the addition of fruit pulps might lead to a reduction in probiotic functionality [Raquel Bedani, Antonio Diogo Silva Vieira, Elizeu Antonio Rossi and Susana Marta Isay Saad* (Departamento de Tecnologia Bioquímico-Farmacêutica, Faculdade de Ciências Farmacêuticas, Universidade de São Paulo, Av. Prof. Lineu Prestes, 580, 05508-000 São Paulo, SP, Brazil), LWT - Food Science and Technology, 2014, 55(2), 436–443].

The fate of chicory root pulp polysaccharides during fermentation in the TNO in vitro model of the colon (TIM-2)

The aim of this study was to monitor cell wall polysaccharide (CWP) utilization during fermentation by the human colonic microbiota in
the TNO in vitro model of the colon (TIM-2). Chicory root pulp (CRP) and treated (ensiled) CRP (ECRP) containing four times more soluble pectin than CRP, were fermented in the model. After the adaptation phase of the human fecal inoculum to CRP and ECRP for 48 h, both materials were fermented quite rapidly (57% carbohydrate utilization in 2 h). ECRP carbohydrates (85%) were less fermented in 24 h compared to CRP carbohydrates (92%). It was hypothesized that soluble fibers that are readily fermentable and dominantly present in ECRP programmed the microbiota in TIM-2 to fully adapt to these soluble fibers which was not able to change towards the fermentation of insoluble fibers anymore. Consequently, ECRP insoluble fibers were less utilized than CRP insoluble fibers in TIM-2 leading to an overall lower fiber utilization and SCFA production [Uttara S. Ramasamy Koen Venema, Harry Gruppen and Henk A. Schols* (Laboratory of Food Chemistry, Wageningen University, P.O. Box 17, 6700 AA Wageningen, The Netherlands), Bioactive Carbohydrates and Dietary Fibre, 2014, 4(1), 48-57].

NPARR 5(3), 2014-0289 Two stages of treatments for upgrading bleached softwood paper grade pulp to dissolving pulp for viscose production

To convert bleached softwood paper grade pulp into dissolving pulp for viscose application, two stages of treatments consisting of enzymatic treatment and alkaline peroxide treatment were investigated. It was found that high reactivity (about 80%) of pulp could be achieved by endoglucanases (EG)-rich industrial cellulase treatment, and the α-cellulose content as well as the viscosity of enzymatically treated pulp can be further adjusted by the alkaline peroxide treatment with certain dosages of NaOH and H₂O₂ to finally meet the quality requirements of dissolving pulp. The resulting pulp with 68.7% of reactivity, 92.1% of α-cellulose content, and 506.9 mL/g of pulp viscosity could be obtained after the two stages of treatments. The appropriate dosage of EG-rich cellulase was 300 IU/g bone dry pulp in the stage of enzymatic treatment, while the suitable dosages of NaOH and H₂O₂ were 9 wt% and 1 wt%, respectively, in the stage of alkaline peroxide treatment [Haisong Wang, Bo Pang, Kejia Wu, Fangong Kong, Bin Li* and Xindong Mu (Key Laboratory of Biobased Materials & Qingdao Engineering Research Center for Bioenergy and Biomaterials, Qingdao Institute of Bioenergy and Bioprocess Technology, Chinese Academy of Sciences, Qingdao, Shandong 266101, China), Biochemical Engineering Journal, 2014, 82, 183-187].
Suitability of coir fibers as pulp and paper

This study was to investigate the suitability of coir fibers as an alternative material in making pulp and paper. Maceration process was used to characterize the fiber. Soda-AQ pulping with various combinations of active alkali (18-22%) and cooking time (90-150 minutes) at fixed temperature was done. Physical properties evaluated were density, brightness, opacity, scattering coefficient, tear, burst and tensile index. As concentration of active alkali and cooking time increased, the physical properties values also increased, except for the opacity and scattering coefficient. The optimum condition for producing the strongest paper is using 22% active alkali in 120 minutes [Nor Mazlana Maina, Rosnita A. Talib*, Rushdan Ibrahim, Russly Abdul Rahman and Ainun Zuriyati Mohamed (Department of Food and Process Engineering, Faculty of Engineering, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia), Agriculture and Agricultural Science Procedia, 2014, 2, 304-311].