

DEVELOPMENT OF A SUGAR CANE BAGASSE-BASED COLLOIDAL ENZYMATIC SUBSTRATE.

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Ethanol fuel in Brazil is produced from sugar cane's sucrose fermentation and distillation. However, most of the energy of sugar cane is trapped inside one of the sucrose extraction subproducts, sugar cane bagasse (SCB), mainly in its cell walls in the form of cellulose (the most abundant naturally occurring polymer) and in smaller proportion, hemicelluloses (like xylan, for example) and pectin carbohydrates. For sugar cane 2nd generation biofuel production, this biomass is the energy source. A major problem concerning the mobilization of the potential chemical energy contained in SCB is the well known recalcitrance of cellulose to hydrolysis. To overcome this difficulty, two different classes of processes are currently standardized for cellulose hydrolysis: those that utilize strong mineral acids and those that use cellulases. As an approach to screening for biotechnologically relevant enzymes related to biomass ethanol production, an aqueous colloidal substrate, SCB-based, was designed by our group using the natural substrate donated by an ethanol-producing plant at Campos dos Goytacazes, RJ. Its preparation consists of combined grinding and sieving techniques. It is constituted by a stable particle suspension with sizes of approximately $6,3 \pm 0,3 \mu\text{M}$. The substrate is stable at 4°C for at least six months, is resistant to freezing and the colorimetric enzyme activity assays are linear and very reproducible. It has been tested with many commercial enzymes as well as new, interesting ones, originated from termites.

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