High throughput screening of enzymes for sugar cane hydrolysis and its application for prospecting termite enzymes.

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The discovery of new hydrolytic enzymes is an important field in the development of techniques for the use of lignocellulosic materials as a starting point for fuel production. Termites are an interesting target for new discoveries, as they are organisms which efficiently convert this kind of refractory materials to glucose. Sugar cane bagasse is the most promising available source for the production of 2nd generation renewable fuels in Brazil, being subject of pre-treatment, hydrolysis and fermentation to ethanol in several test refineries. Our group prepared a new colloidal substrate based on sugar cane bagasse (CSCB) for the screening of hydrolytic enzyme activities related to its degradation. We made a regression analysis correlating activities against various polysaccharides (crystalline cellulose, carboxymethylcellulose, laminarin, xylan, pectin, beta-xyloside, beta-glucoside) with those against CSCB. Our results show that enzyme activities against beta-1,3-glucan, carboxymethilcellulose, xylan and beta-xyloside are not limiting steps in CSCB hydrolysis. Pectinase presents a very low correlation with CSCB's hydrolysis. On the other hand, activities against crystalline cellulose and beta-glucoside show a high degree of correlation with the natural substrate's hydrolysis. Furthermore, cellobiohydrolase, endo-glucanase and beta-glucosidases are present in these animals and are of primordial importance to an efficient hydrolysis of CSCB.

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