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Enzymatic Activity of Common Brown Rot and White Rot Fungi in Respect to Various Bioenergy Fuels

Brown and white rot fungi are important decomposers of hemicellulose and cellulose in non-edible plant tissues. These carbohydrates are a main component of plant cellular tissues that account for their structural and storage cells. Brown rot fungi metabolize cellulose and hemicellulose from wood tissue while white rot fungi remove cellulose, hemicellulose, and lignin from wood tissue. Both fungi produce enzymes called cellulases to break down cellulose polymers. Endoglucanase, exoglucanase, and β -glucosidase are the cellulases known to be produced by fungi to degrade cellulose components. All three cellulases are not produced equally amongst fungal species. For example, brown rot fungi do not produce exoglucanase. Wood tissues have been studied a great deal in relation to the effects of brown and white rot fungi upon cellulose. This experiment is testing whether these cellulases may be produced in different quantities for non-woody substrates such as wheat straw, switch grass, and corn stover. I tested the activities of cellulases in *Gloeophyllum trabeum* (isolate ATCC 11538), a brown rot fungus, and *Trametes versicolor* (isolate ATCC 12679), a white rot fungus, in relation to relevant substrates. Commercially, fungal enzyme additions to substrates are universal, all containing the same amounts of endo, exo, and beta-glucosidase, regardless of the type of substrate being used. The experiment will show whether or not these fungi, naturally-efficient plant tissue degraders, change the combinations of cellulases they use while actively degrading tissues. It will also show whether or not enzymes should be used in varying ratios dependent upon the substrate in regards to commercial enzyme decay of plant tissues.



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