WWW.SUNGRANT.OKSTATE.EDU

U.S. Department of Transportation

SunGrant INITIATIVE South Central Region

Project Title: Development of a customized enzyme cocktail for corn stover and switchgrass saccharification

DR. MOSTAFA ELSHADED

Project Goal:

- Identify genes belonging to 12 distinct enzymatic categories that exhibited highest levels of expression on corn stover and switchgrass, respectively.
- Synthesize, clone, and express target genes in an expression vector.
- Purify products and confirm their enzymatic activity and specificity.

Project Outcomes:

- We have identified target genes belonging to 12 distinct enzymatic categories that exhibited high levels of expression on corn stover and switchgrass, respectively.
- Synthesizing, cloning, and expressing target genes in an expression vector are nearly complete. Genes with the following activities have successfully been targeted for cloning: β-glucosidase, xylanases, cellobiohydrolases, carbohydrate esterases, endogluconases. Xylosidases, mannanases. Cloning of genes with the following activities is underway: mannosidases, α-glucuronidase, and α-N- arabinofuranosidase. In addition, enzyme assays for all 12 targeted activities has been established.
- We initially began to purify products and confirm their enzymatic activity and specificity for a few enzymes (endogluconases and cellobiohydrolases). Purification of three distinct cellobiohydrolases through affinity chromatography is underway. Current results indicate that multiple purification steps may be necessary to purify such enzymes.

PI:
Dr. Mostafa Elshaded
Oklahoma State University
Microbiology and Molecular Genetics

Co-PI:
Dr. Noha Youssef
Oklahoma State University
Microbiology and Molecular Genetics

Funded: $135,000
Start Date: 1/1/14
End Date: 12/31/15

Other Sources of Funding:
Oklahoma State University contributed cost share to meet matching requirement.