

The expression pattern of endo-1,4- β -glucanase in *Arabidopsis thaliana*

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ABSTRACT

Energy security is a problem for the future due to the exhaustion of non-renewable fossil fuels. To find solutions, different types of regionally appropriate renewable energy must be considered. Cellulosic biofuels, a candidate for alternative energy, uses agricultural wastes and other ligneous plants to produce ethanol through the hydrolysis of cellulose from plant cell walls into sugars followed by the fermentations of the sugars into ethanol. The hydrolysis process is currently performed by cellulases from fungi and bacteria. However, plants also produce cellulases, but their function is unknown. The preliminary step to uncovering the role of cellulases in plants is to determine their location (cell type and tissue type). In this experiment, I will use the GUS reporter gene system to tag gene 1 and gene 2 that encode for endo-1,4- β -glucanase, a plant cellulase that cleaves cellulose at the 1,4- β -glucose bond, to determine its pattern of expression in the plant. The findings show the areas of endo-1,4- β -glucanase expression are consistent with the hypothesized regions for gene 2 (hypocotyls, cotyledons, and radicle), but lack of confirmation from multiple trials dismisses any implications of these results.

KEYWORDS

Cellulosic biofuels, cellulose, cellulases, GUS reporter gene system, & gene expression

Note: Only the abstract is available for this thesis. Research is ongoing on this project. Please contact the author of this thesis directly for information.