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Genetically Engineered Materials for Biofuels Production

MICHAEL RAAB, Agrivida, Inc.

Agrivida, Inc., is an agricultural biotechnology company developing industrial crop feedstocks for the fuel and chemical industries. Agrivida's crops have improved processing traits that enable efficient, low cost conversion of the crops' cellulosic components into fermentable sugars. Currently, pretreatment and enzymatic conversion of the major cell wall components, cellulose and hemicellulose, into fermentable sugars is the most expensive processing step that prevents widespread adoption of biomass in biofuels processes. To lower production costs we are consolidating pretreatment and enzyme production within the crop. In this strategy, transgenic plants express engineered cell wall degrading enzymes in an inactive form, which can be reactivated after harvest. We have engineered protein elements that disrupt enzyme activity during normal plant growth. Upon exposure to specific processing conditions, the engineered enzymes are converted into their active forms. This mechanism significantly lowers pretreatment costs and enzyme loadings (>75% reduction) below those currently available to the industry.