
Isolation and Characterization of the Biotechnological Potential of Cerrado's Soil Microorganisms for the Production of Ethanol from Lignocellulosic Biomass

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INTRODUCTION: Cultivation and isolation of microorganisms that serve as input in the process of ethanol production to perform enzymatic hydrolysis for deconstruction of the lignocellulosic biomass is an option with low environmental impact for the production of second generation ethanol. The enzymes secreted by these microorganisms are responsible for depolymerization of cellulose and hemicellulose into small sugars which will subsequently be fermented to alcohol. The soil of the Cerrado biome has a diverse microbiota, which makes it an excellent source to obtain microorganisms. This study aimed to isolate and perform screenings of bacteria, yeasts and filamentous fungi with biotechnological potential for the production of bioethanol from lignocellulosic material. **MATERIAL AND METHODS:** Twelve litterbags containing five grams of sugarcane bagasse pretreated with organosolve were buried five inches deep, for 25 days. The remaining lignocellulosic material in these decomposition bags were diluted and plated on different culture media for the isolation of microorganisms. The microorganisms were isolated in pure culture stored in glycerol 20% at -80°C, thus forming a bank of microorganisms. **RESULTS AND DISCUSSION:** A microbial germplasm bank from Cerrado soil was created containing 273 isolates: 59 bacterial morphotypes, 66 morphotypes of filamentous fungi and 11 yeast morphotypes. This germplasm bank was screened for enzymatic activity on different substrates such as carboxymethyl cellulose (CMC), crystalline cellulose (Avicel®), the pretreated sugarcane bagasse and xylan. The microorganisms with the best biotechnological potential for plant biomass degradation were identified by amplification and sequencing of ribosomal genes. **CONCLUSION:** The discovery of new enzymes for the production of second generation ethanol produced by microorganisms of the Cerrado is a way to sustainably use the biodiversity of this biome.

Key-words: bioethanol, Cerrado, microorganisms
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