Title: PRODUCTION OF HYDROLYTIC ENZIMES FROM LIGNOCELLULOSIC RESIDUES BY MIXED STRAINS OF LECYTHOPHORA SPP.

Authors Polezel, D. R.[1], Canali, M.C.[1], Melo, W.G.P. [1], Pagnocca, F.C. [1]

Instituição [1]Centro de Estudos de Insetos Sociais, UNESP - Univ Estadual Paulista, Campus Rio Claro, Rio Claro, SP, Brasil (Avenida 24 A 1616 - Bela Vista – Rio Claro-SP)

Abstract:

Currently, the production of the second generation (2G) ethanol from lignocellulosic agricultural residues has been one of the most important field of investigation in progress in many countries, including Brazil. Most of the biomass derived from the industrial processing of plant material is largely constituted by lignocellulosic plant fiber, which is highly resistant to enzymatic action. When properly disrupted, this recalcitrant material may be a source of monosaccharides which may give rise to additional bioethanol after fermentation. To select micro-organisms able to efficiently convert lignocellulosic material to ethanol could be an important step forward in this strategic subject. Most of the microbial community living in association with leaf-cutter ants are well adapted to this microenvironment containing high amounts of lignocellulosic material and could be a source of enzymes suitable for efficient degradation of plant fiber and thus contribute for the production of 2G ethanol. Following a preliminary screening for the production of extracellular enzymes as endoamylase, exoamylase, pectinase, xylanase, endoglucanase and exoglucanase, we examined the production of fermentable sugars by five strains of the dimorphic fungus Lecythophora spp. The five strains (TO 375, TO 356, W7, W3A2 and LB 302.1) were mixed in pairs and inoculated in 150 mL bottles containing 25 ml of mineral minimal medium added of 5,0 g of the following dried material: sugarcane bagasse, rice husk, coffee husk or corn cob. Enzyme production was determined using the DNS (3,5-dinitrosalicylic acid) method after incubation at 25 ° C / 4days. Higher amounts of enzymes were found in medium containing coffee husk and probably it was due the higher concentration of available sugar in this substrate.The best production of enzymes was achieved coupling the strains TO 356 and W3A2 and pectinase yield was 1,189 U/mL in medium containing coffee husk, a moderate amount in these not optimized experimental conditions. The optimization of the whole process may lead to a massive and cheaper production of enzymes, which could be useful for large scale production of 2G ethanol from these lignocellulosic materials.

Key-words: 2G ethanol; hydrolytic enzymes; biofuel

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