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Bioethanol production: a co-culturing approach of yeast with cellulolytic fungi

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Biofuel *vis-a-vis* bioethanol, biogas: emerged as an alternative for fossil fuel. The economic and environmental drawbacks associated with fossil fuel consumption supported this notion. Currently, bioethanol has become one of the major sustainable energy sources to replace fossil fuel. The objective of the current study was to investigate the potential of bioethanol production by co-culturing cellulase producing filamentous fungi and ethanol producing yeast isolates. Thirteen species of yeast including 10 wild-type isolates, two commercially available bakery yeast, and one industrially utilized yeast type for ethanol production were studied to understand their ethanol production potential in a fermentation medium. Ethanol production was detected by High-Performance Liquid Chromatography. Efficient ethanologenic isolates were co-cultured with efficient cellulolytic filamentous fungi *Trichoderma* and *Aspergillus* species using cellulose as the carbon source in a medium for ethanol production. Six wild-type isolates were found to be ethanologenic. The highest quantity of ethanol produced by a yeast isolate was 4.13%. The comparison of ethanol production of wild-type isolates with commercially available isolates revealed that wild type yeasts are more efficient in ethanol production. The cocultures of filamentous fungi with yeast gave 0.1-4.34% ethanol. According to the results the coculture of Aspergillus with the commercially available yeast Yuk was found to be more efficient in ethanol production giving 4.34% of ethanol. A significant amount of ethanol was observed in co-culture of wild type Yg with Aspergillus (2.5%) and Trichoderma (0.8%) There is a huge potential for developing these cocultures for industrial scale bioethanol production.