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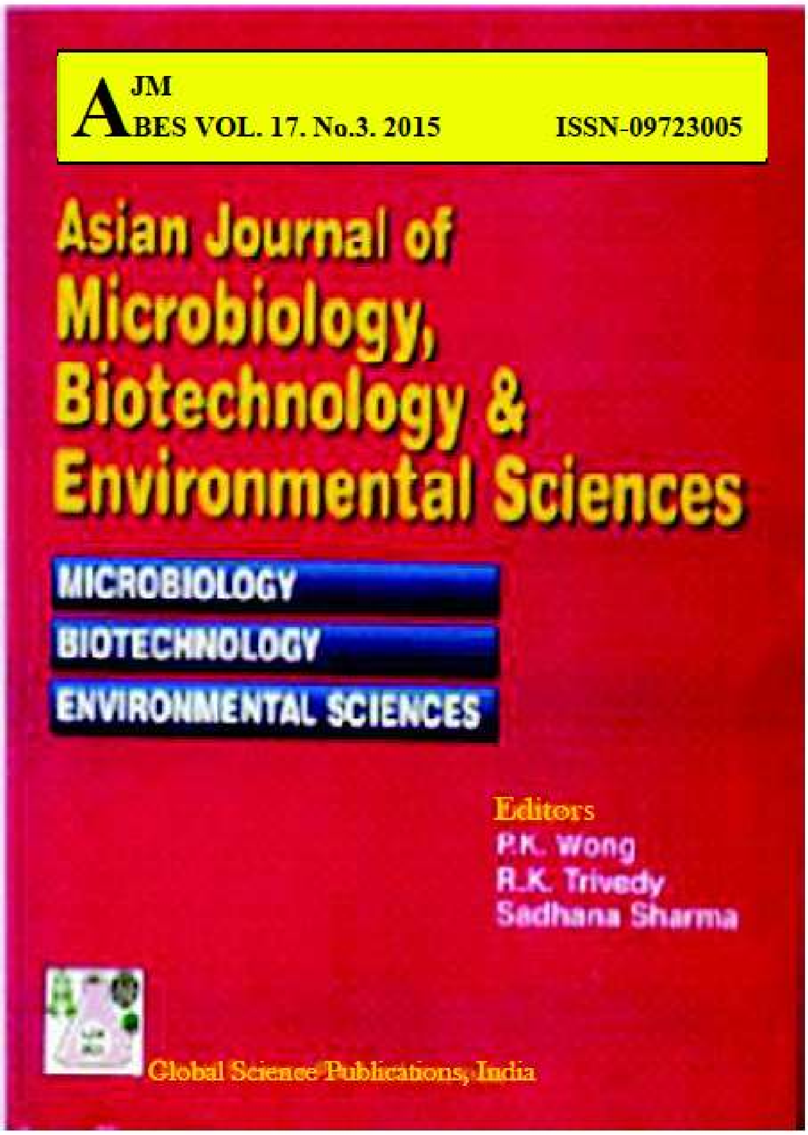

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SUGAR CONSUMPTION IN MONO AND CO-CULTURE *SACCHAROMYCES CEREVISIAE* AND OTHERS SELECTED MICROORGANISM FOR BIOETHANOL PRODUCTION FROM STREAM RICE HUSK MEDIUM

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Abstract–This study sought to explore potential of mono and co-culture fermentation of *S.cerevisiae* with *C. tropicalis, Z. mobilis* and *P. resticulosum* for bioethanol production from stream rice husk medium. Batch fermentation was conducted in a waste rice husk hydrolysate basal medium with 4 g/L urea, 3 g/L $NaNO_3$, 3 g/L NH_4NO_3, 1 g/L KH_2PO_4 and 0.7 g/L $MgSO_4 \cdot 7H_2O$ supplemented and 3 days (30°C, 60-70% relative humidity, dark, 150 rpm agitation) incubation. Maximum ethanol production (2.125±0,259 %/L) was gained from co-culture *S.cerevisiae, C. tropicalis* with efficiency fermentation 89.25±10.95%. Co-culture *S.cerevisiae, C. tropicalis* have ability to generate and convert fermentable sugars from a waste stream rice husk to ethanol. Co-culture *S. cerevisiae, C. tropicalis* demonstrated high potential and such application provides a process for agricultural waste stream resource reuse for production of ethanol in increasing demand.

INTRODUCTION

Paddy is primary Indonesia crops with annual production of approximately 68,956,292 metric tons (BPS, 2012). Rice husks are a lignocellulosic waste product representing 20-22% of paddy by weight. Quantitively, rice husk have high potential as feedstock for industrial production include bioethanol. Utilization of lignocellulosic materials as feedstock for bioethanol production is an alternative strategic to reduce production cost and solve technological problems. Conversion of lignocellulosic material including agricultural waste to bioethanol is important choice to exploitation of alternative energy resources and reduces air pollution (Sa´nchez and Cardona, 2008; Patel *et al.*, 2012).

Indonesia annual bioethanol production of approximately 200.000 kl using sugars cane, cassava, sweet potato and corn (Panaka and Yudiarto, 2007). However, ethanol production from starch or sugar has potentially competes with food production either directly or indirectly by competing with food production for land and water (Chen, 2011). The ability to generate and convert fermentable sugars from lignocellulosic materials to ethanol is the central technological challenge (Wan *et al.*, 2012; Chandra *et al.*, 2007; Dien *et al.*, 2003). Strategies which require a single organism to convert xylose and glucose simultaneously suffer from several limitations. One limitation is that despite the presence of the genetic apparatus to consume both sugars, glucose remains the preferred substrate, and the consumption of the sugars is asynchronous (Eiteman *et al.*, 2008). Currently, co-culture fermentation is development strategic to increasing cellulose hydrolysis rate, enrichment substrate utilization and increasing ethanol production via different metabolic pathway combination to reduce negative effect of inhibitor (Cheng and Zhu, 2012). In this study, we examined sugar uptake and ethanol production from a stream waste rice husk by mono

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