

**ETHANOL PRODUCTION BY
A THERMOTOLERANT YEAST
AT HIGH GLUCOSE CONCENTRATIONS
IN BATCH AND CELL RECYCLE OPERATIONS**

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The potential economic benefits in ethanol production could be realized by conducting fermentation at 40°C and above. In this study a thermotolerant yeast isolated and developed in our laboratory was used. Sterile PYN medium, which consisted (gl^{-1}) peptone, 3.5; yeast extract, 3.0; KH_2PO_4 , 2.0; $(\text{NH}_4)_2\text{SO}_4$, 1.0; and $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$, 1.0 and glucose 100 was used for inoculum preparation. When PYN medium with 150, 200, 300 and 400 gl^{-1} glucose was inoculated with the yeast strain and incubated at 40°C by reciprocal shaking (150rpm), 150 gl^{-1} glucose was completely utilized at 36h and 68 gl^{-1} ethanol was produced. With 200, 300 and 400 gl^{-1} glucose in PYN medium 72, 70 and 68 gl^{-1} ethanol was respectively produced. When the medium composition was doubled (2 x PYN) except glucose, alcohol production was increased to 88, 92 and 90 gl^{-1} with 200, 300 and 400 gl^{-1} glucose containing 2 x PYN media respectively. When different supplementation (gl^{-1}) such as $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ (5.0) and KH_2PO_4 (5.0) or yeast extract (20), or peptone (14.68), or soy flour (34.5) or oleic acid (1 ml^{-1}) were made to 2 x PYN media having 300 and 400 gl^{-1} glucose, ethanol production was 120 & 130, 130 & 135, 120 & 125, 140 & 145 and 98 & 100 respectively. Soy flour was the best among the supplements and produced 140 and 145 gl^{-1} ethanol at 300 and 400 gl^{-1} glucose respectively. Efficiency of glucose utilization with soy flour supplementation was 93.3 and 85% respectively of the initial 300 and 400 gl^{-1} glucose added. Alcohol production efficiency with soy flour supplementation was improved from 60 to 91.5 and 44.0 to 71.0 with 300 and

400gl⁻¹ glucose when compared with unsupplemented 2 x PYN medium. In the cell recycle operations the first batch fermentation took 36h to exhaust glucose and produced 140gl⁻¹ alcohol. In five batches of subsequent cell recycles 135, 110, 101, 80 and 45gl⁻¹ alcohol was produced. Stuck fermentation was observed with advancing cycles with increasing residual sugar. No fermentation was observed after 6th batch of cell recycle operation.