

Increasing the Ethanol Content of Wine by Fed – Batch Process

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The aim of this project is to increase the ethanol production by Fed-batch process. The main grapes variety produced in Jaffna peninsula is Istralian blue and contained (gL^{-1}) 86(± 0.1) total sugar, 6.587(± 0.2) protein, 11.7(± 0.2) acid and 0.65(± 0.23) ash. *Saccharomyces cerevisiae* was grown, in NPGE medium containing (gL^{-1}), Non Peeled Grapes Extract (NPGE) (with the total sugar of 86 gL^{-1} by supplementing with sucrose 154 gL^{-1}); yeast extract, 2.5; bacteriological peptone, 1.15; $(\text{NH}_4)_2\text{HPO}_4$, 2.0 and $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$, 0.025 at 30°C and pH 5.0 under stationary condition and the ethanol production at 22h was 86.3 gL^{-1} . When 100mL of NPGE medium (total sugar 240 gL^{-1}) was inoculated at 30°C with *S. cerevisiae*, incubated for 22h and 100 mL of NPGE medium with either 480 or 240 or 120 gL^{-1} total sugar were supplemented, the ethanol produced at 44h was 72.5 (± 0.2), 84.0 (± 0.21) and 78.2 (± 0.28) gL^{-1} respectively. Another three sets of experiments were performed by withdrawing 50 mL of spent medium at 22h from 100mL NPGE medium (in the total sugar concentration 240 gL^{-1}) and adding either 50mL of NPGE medium (480 gL^{-1} total sugar) or 25 mL of NPGE medium (480 gL^{-1} total sugar) & 25 mL of distilled water or 12.5 mL of NPGE medium (480 gL^{-1} total sugar) & 37.5 mL of distilled water and the ethanol produced at 44h was 71.9(± 0.2), 81.7(± 0.3) and 77.3(± 0.5) gL^{-1} respectively. Since the ethanol production was not improved, another set of experiments were carried out by taking NPGE medium with 240 gL^{-1} total sugar was fermented to 22h, NPGE medium with 5mL of the spent medium was withdrawn and supplemented with (5mL) either 240 or 120 or 60 gL^{-1} total sugar and the ethanol production was 76.5(± 0.3), 88.0(± 0.25) and 83.4(± 0.18) gL^{-1} respectively at 44h. This study was able to improve the ethanol production from 86.3 to 88.0 when the spent medium (950 mL) was supplemented with reduced volume (50 mL) of fresh NPGE medium. In these studies alcohol content of wine was not improved.

Key words: Grapes Extract, *Saccharomyces cerevisiae*, Wine, Sucrose.