

PRODUCTION OF BIOETHANOL FROM PINEAPPLE FRUIT PEEL WASTES (*ANANAS COMOSUS*) USING *SACCHAROMYCES CEREVISIAE*

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Abstract: The production of bioethanol from diverse peel wastes of underutilized fruits could be one of the alternative fuel systems. The objective of the study was to determine the effect of culture conditions and media composition to increase the bioethanol yield from pineapple peel using baker's yeast. The fruit peel juice of pineapple (*Ananas comosus*) was inoculated with *Saccharomyces cerevisiae* (baker's yeast- 2 gL⁻¹) in the fermentation media (total volume 100 mL), pineapple fruit peel wastes (10g/100mL) composed of 10 gL⁻¹ yeast extract, 10 gL⁻¹ KH₂PO₄, 2 g L⁻¹ (NH₄)₂SO₄, 2 g L⁻¹ Peptone and 0.5 g L⁻¹ of MgSO₄•7H₂O and allowed for fermentation for 12 hours at room temperature. The ethanol produced from the pineapple fruit peel waste mixture was 0.30% (V/V) at room temperature after 12 hours of fermentation. The conditions were optimized sequentially by changing one factor at a time while keeping the other variables constant. Significantly higher bioethanol yield [5.0 times, 1.5% V/V (P<0.05)] was obtained from pineapple peel waste at the following optimal conditions of 12 hours of incubation period, 5:1 ratio between air space and fermentation solution, 1.5 g L⁻¹ of yeast inoculum, 10 g 100 mL⁻¹ of pineapple fruit peel, 0.5 g 100 mL⁻¹ soybean powder and 60 mL 100 mL⁻¹ of diluted sulfuric acid. When the pH of the medium was changed from 3.0 – 8.0, a significantly higher ethanol yield (2.8%) was obtained when the pH of the media was kept at 5.0. Thus, bioethanol yield was significantly increased by 9.34 times, (2.8%) when fermentation conditions of pineapple peel waste by yeast were optimized. Therefore, pineapple peel waste could be recommended as a good source for bioethanol production using yeast.

Keywords: Baker's yeast; Fermentation; Optimized conditions; Powdered soybean