



VINGNANAM Research Conference

21st of July 2022



VRC-2022

Faculty of Science
University of Jaffna
Sri Lanka

Jointly Organized by

**Faculty of Science
University of Jaffna
Sri Lanka**



**Western Norway
University of
Applied Sciences**

Bioethanol from mango (*Mangifera indica*) fruit peel wastes using *Saccharomyces cerevisiae* and yield enhancement

A. Amanullah*, and R. Kapilan

Department of Botany, Faculty of Science, University of Jaffna, Sri Lanka

** Correspondence: 2016sb115@univ.jfn.ac.lk*

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 on increasing the bioethanol yield from mango peel using baker's yeast. The fruit peel juice of mango (*Mangifera indica*) was inoculated with *Saccharomyces cerevisiae* (baker's yeast- 2 g/L) in the fermentation media (100 mL, mango fruit peel wastes – 10 g/100 mL) composed of 10 g/L of yeast extract, 10 g/L of KH_2PO_4 , 2 g/L of $(\text{NH}_4)_2\text{SO}_4$, 2 g/L of peptone and 0.5 g/L of $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ and allowed for fermentation for 12 hours at room temperature. The amount of ethanol produced from the mango fruit peel waste mixture was 0.45 % (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. Mango peel waste produced a significantly higher yield of bioethanol [4.0 times, 1.8 % (V/V) ($p < 0.05$)] under the ideal conditions of 12 hours of incubation, a 5: 1 air-to-fermentation-solution ratio, 5 g/L of yeast inoculum, 15 g/100 mL of mango fruit peel, 1 g/100 mL of soybean powder, and 60 mL/100 mL of diluted sulfuric acid. When the pH of the medium was changed from 3.0 – 8.0, significantly higher ethanol yield (3.3 %) was obtained when the pH of the media was kept at 5.0 than the control pH = 6. Thus, bioethanol yield was significantly increased by 7.34 times when fermentation conditions of mango peel waste by yeast were optimized.

Keywords: *Baker's yeast, Bioethanol, Fermentation, mango Fruit peel, Powdered soybean.*