

## Comparison the Effect of Different Pretreatments on Ethanol Production from Lemon Peel (*Citrus × latifolia*)

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**Abstract :** The aim of this work is to open up the structure of lemon peel (*Citrus × latifolia*) with mild pretreatments. The effects of autoclave, microwave and ultrasonic with or without acid addition were investigated on the amount of glucose, soluble and insoluble lignin, furfural, yeast viability and bioethanol. The finding showed that autoclave- acid impregnated sample, has the highest glucose release from lignocellulose materials (14.61 and 14.95 g/l for solvent exposed and untreated sample, respectively) whereas at control sample glucose content was at its minimal level. Pretreatments cause decrease on soluble and insoluble lignin and the highest decrease cause by autoclave following with microwave and ultrasonic pretreatments ( $p \leq 5\%$ ). Moderate increase on furfural was seen at pretreated samples than control ones. Also, the most yeast viability and bioethanol content was belong to autoclave samples especially acid- impregnated ones (40.33%). Comparison between solvent treated and untreated samples indicated that significant difference was between two tested groups ( $p \leq 1\%$ ) in terms of lignin, furfural, cell viability and ethanol content but glucose didn't show significant difference. It imply that solvent extraction don't influences on glucose release from lignocellulose material of lemon peel but cause enhancement of yeast viability and bioethanol production.

**Keywords :** Bioethanol, Lemon peel, Pretreatments, Solvent Extraction

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