

## Bioethanol Production Using Simultaneous Saccharification and Fermentation (SSF) Technique with *Dioscorea Rotundata* (Yam) As Raw Material

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### Abstract

This research evaluates the productivity and yield of bioethanol production from *Dioscorea Rotundata* (yam), using Simultaneous Saccharification-Fermentation (SSF). The pretreatment consisted on 30 minutes of starch gelatinization at 68°C; 60 minutes of starch hydrolysis with amylase at 90°C and 30 minutes of maltodextrines hydrolysis with glucoamylase at the same conditions. After enzymatic hydrolysis, the system was cool to 30°C and inoculated with yeast (*SafCider-Fermentis*). The samples were fermented during 26 hours, measuring the reducing sugars and ethanol concentration by DNS and HPLC, respectively.

The yam concentration used on each sample were 10 w/w%, 12.5 w/w%, 15w/w% and 18w/w%. However, the results show that the 10 w/w% sample achieved the best result, in contrast to the suggested concentration of 12.5% w/w% (J. Murgas & M. Vasquez, 2012), who last 50 hours on fermentation with Separated Hydrolysis-Fermentation (SHF). As result, the fermentation occurs faster than the references that have employed SSF method in other types of crops, with approximately 22 hours of fermentation and at least 33% of the reduction in fermentation time. Furthermore, the process achieved a 90% of enzymatic hydrolysis yield, getting the 67 w/w% of total yam mass added as reducing sugars. On the other hand, the best ethanol yield obtained was 46.67 l/ton and 0.188 g/l h as productivity. Nevertheless, fermentation yield was 12.9%, a low value if it is compared with the typical fermentation yield that is between 49.5% and 52%. This deviation was related to a low ethanol selectivity of the yeast used on the samples.

### Biography:

Alfredo Villadiego is a Chemical Engineering and Manufacturing Engineering student from EAN University – Colombia. He is an ascribed AIChE student and intern in Ecopetrol S.A.

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