World Academy of Science, Engineering and Technology
International Journal of Agricultural and Biosystems Engineering
Vol:8, No:12, 2014

New Methodology for Monitoring Alcoholic Fermentation Processes Using Refractometry

Authors : Boukhiar Aissa, Iguergaziz Nadia, Halladj Fatima, Lamrani Yasmina, Benamara Salem

Abstract : Determining the alcohol content in alcoholic fermentation bioprocess has a great importance. In fact, it is a key indicator for monitoring this fermentation bioprocess. Several methodologies (chemical, spectrophotometric, chromatographic...) are used to the determination of this parameter. However, these techniques are very long and require: rigorous preparations, sometimes dangerous chemical reagents, and/or expensive equipment. In the present study, the date juice is used as a substrate of alcoholic fermentation. The extracted juice undergoes an alcoholic fermentation by Saccharomyces cerevisiae. The study of the possible use of refractometry as a sole means for the in situ control of this process revealed a good correlation (R2 = 0.98) between initial and final ° Brix: ° Brix f = 0.377× ° Brixi. In addition, we verified the relationship between the variation in final and initial ° Brix (Δ ° Brix) and alcoholic rate produced (A exp): CΔ° Brix / A exp = 1.1. This allows the tracing of abacus isoresponses that permit to determine the alcoholic and residual sugar rates with a mean relative error (MRE) of 5.35%.

Keywords : refractometry, alcohol, residual sugar, fermentation, brix, date, juice
Conference Title : ICABBBE 2014 : International Conference on Agricultural, Biotechnology, Biological and Biosystems Engineering
Conference Location : Paris, France
Conference Dates : December 30-31, 2014