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Application of Refractometric Methodology for Simultaneous Determination of Alcohol and Residual Sugar Concentrations during Alcoholic Fermentation Bioprocess of Date Juice

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

Abstract : Determining the alcohol content in alcoholic fermentation bioprocess is of great importance. In fact, it is a key indicator for monitoring this bioprocess. Several methodologies (chemical, spectrophotometric, chromatographic) are used to the determination of this parameter. However, these techniques are very long and they require: rigorous preparations, sometimes dangerous chemical reagents and/or expensive equipment. In the present study, the date juice is used as the 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 alcoholic fermentation revealed a good correlation (R2=0.98) between initial and final °Brix: °Brixf=0.377×°Brixi. In addition, the relationship between Δ°Brix and alcoholic content of the final product (A,%) has been determined: Δ°Brix/A=1.1. The obtained results allowed us to establish iso-responses abacus, which can be used for the determination of alcohol and residual sugar content, with a mean relative error (MRE) of 5.35%.

Keywords : alcoholic fermentation, date juice, refractometry, residual sugar
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