

New Methodology for Monitoring Alcoholic Fermentation Processes Using Refractometry

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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 ($R^2 = 0.98$) between initial and final ° Brix: $^{\circ} \text{Brix}_f = 0.377 \times ^{\circ} \text{Brix}_i$. In addition, we verified the relationship between the variation in final and initial ° Brix ($\Delta ^{\circ} \text{Brix}$) and alcoholic rate produced (A_{exp}): $C \Delta ^{\circ} \text{Brix} / A_{\text{exp}} = 1.1$. 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

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