

Development of resazurin assay for evaluation of yeast viability and vitality in microbreweries (in Portuguese)

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Abstract

The growing of microbreweries in Brazil has imposing an increase in the production of different supplies for brewing, including yeast biomass for beer fermentation. In Brazil, only four companies produce and sell yeasts for microbreweries, and only two companies are able to attend microbreweries. Additionally, these companies should be able to deliver yeast cells to different states and cities in Brazil. During transport, the yeast cells are exposed to thermal stress (due to the lack of temperature control) and chronological aging (due to the long period of storage and transport). When delivered to the microbreweries, those yeast cells display problems during beer fermentation as the consequence of a lower yeast vitality and viability and affecting beer's quality. Thus, in this work a new colorimetric assay was developed to access the vitality of yeast cells by using resazurin. Resazurin is a highly dichromatic dye, showing a colorimetric change proportional to the yeast cell vitality that can be easily visualized by naked eye. To evaluate the potential of resazurin to differentiate yeast cells with low and high vitality, different yeast ale and lager strains (US-05 and W34/70, respectively) were submitted to heat shock stress and their vitality was accessed by resazurin, testing different variables as concentration of work solution, cellular density and incubation time. The resazurin data, supported by acidification power test, showed a vitality decrease in cells submitted to heat shock stress. Furthermore, the sensibility of the resazurin assay was explored during chronological aging of yeast cells. The assay was capable to detect differences of vitality and viability between yeast strains. In addition, the potential of the resazurin test to predict the fermentative capacity of stressed and non-stressed yeast cells was observed in wort attenuation assays, confirming the applicability of resazurin in the microbrewery context.

Citation: Julia Moraes, Diego Bonatto Development of resazurin assay for evaluation of yeast viability and vitality in microbreweries (in Portuguese). **protocols.io**

dx.doi.org/10.17504/protocols.io.pnedmbe

Published: 21 Apr 2018

Document