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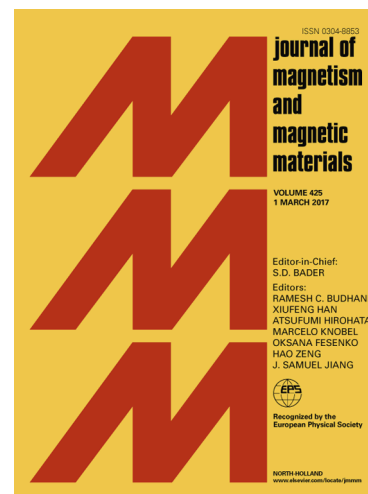
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## The effect of rotating magnetic field on bioethanol production by yeast strain modified by ferrimagnetic nanoparticles

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### Abstract

Bioethanol is a promising liquid biofuel, which can be produced from the wide range of biomass feedstock by the fermentation process with the *Saccharomyces cerevisiae* yeast. The application of the rotating magnetic field (RMF) is one of the possibilities to increase the efficiency of the process. Therefore, the magnetically-assisted bioreactor equipped with RMF generator was used to perform the ethanol fermentation process with the sugar-rich medium. Moreover, the yeast cells were modified by addition of  $\text{Fe}_3\text{O}_4$  nanoparticles. The obtained data suggested that the stimulation of applied cells with RMF did increase the proliferation and the ethanol production process. Furthermore, the calculated maximum specific growth rate and the productivity coefficient showed RMF positive effect on this magnetically-assisted bioprocess. The stimulation was found as ruled by field frequency (connected with magnetic induction of RMF) and it was revealed that the process productivity was higher for experiments with modified cells and the growth rate was higher for the process without the addition of  $\text{Fe}_3\text{O}_4$  nanoparticles.

### Keywords

rotating magnetic field; bioprocessing; bioethanol production; modified cells;  $\text{Fe}_3\text{O}_4$  nanoparticles.

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