عنوان مقاله:

CDF simulation and investigation of the effect of mixing on air distribution in a stirred tank bioreactor

محل انتشار:

چهارمین کنفرانس بین المللی توسعه فناوری در مهندسی شیمی (سال: 1400)

تعداد صفحات اصل مقاله: 7

نویسندگان:

Parvaneh Esmaeilnejad-Ahranjani - *Department of Anaerobic Bacterial Vaccine Research and Production, Razi Vaccine and Serum Research Institute, Agricultural Research, Education and Extension Organization (AREEO), Karaj, Iran.*

Monireh Hajimoradi - *Department of Immunology, Razi Vaccine and Serum Research Institute, Agricultural Research, Education and Extension Organization (AREEO), Karaj, Iran.*

Masoumeh Bagheri - *Department of Viral Vaccine Production, Razi Vaccine and Serum Research Institute, Agricultural Research,Education and Extension Organization (AREEO), Karaj, Iran.*

خلاصه مقاله:

This study is devoted to the optimization of mixing-related parameters of a ۴۰۰- L bioreactor applied for diphtheria bacteria culture (the upstream process in the vaccine production process) using the computational fluid dynamics (CFD) simulation method. The effects of engineering parameters such as the type, agitation rate, and location of impeller on the hydrodynamic environment inside the bioreactor were studied. Using a concaved blade disc (CBDT) impeller with an agitation rate of ۵۵۰ rpm which is located in ۳۰ cm distance from the bioreactor bottom, a superior improvement in air holdup (۵.۲%), bubbles size (۴.۳۱ mm) and kLa value (۰.۳۰ s-۱) was observed, as compared to the currently utilized bioreactor equipped with Rashton (RT) impeller located in ۲۰ cm distance. These results make the CFD-assisted optimized ۴۰۰-L bioreactor a potential candidate for this bioprocess.

کلمات کلیدی:

Aerobic bioreactor, CFD simulation, Mixing, Oxygen mass transfer.