مجموعه مقالات چهارمین کنفرانس ملی مهندسی فرآیند، پالایش و پتروشیمی
۷ خرداد ۱۳۹۴، ایران، تهران، مرکز همایش‌های صدا و سیما
مجری: اهم اندیشان انرژی کیمیا ۸۸۶۷۱۶۷۶ – ۰۲۱
www.Processconf.ir

Behavior of chitosan gel beads in a fluidized bed reactor

[1]Hanieh M. Gholizadeh, [2]Hoda Khesali, [3]Samaneh Sanjari, [4]Farzaneh Vahabzadeh

Chemical Engineering Department, Food Engineering and Biotechnology Group, Amirkabir University of Technology (Tehran Polytechnic), Tehran, Iran

h_m.gholizadeh@aut.ac.ir

Abstract

Chitosan as natural and biodegradable biopolymer has attracted considerable attentions because of its commercial applications in many different industrial fields and the reports mainly have focused on the cell immobilization subject. Hydrodynamic properties of solid particles in a liquid suspension are important in design and control of the reactor. The aim of the present work was to study hydrodynamic behavior of chitosan beads in a liquid-solid fluidized bed reactor (FBR). With considering the relationships between the three forces of gravity, buoyancy and drag acting on moveable particles in liquid phase, terminal settling velocity ($U_{t,s}$) and drag coefficient ($C_{D,s}$) as usual fluidization data were calculated for chitosan gel beads using appropriate mathematical expressions (i.e. bulk density of fluidized suspension affects particles buoyancy). Further experiments were performed to quantitatively determine the dependency of superficial liquid velocity on bed expansion (a measure of fluidized bed porosity). The minimum fluidization velocity (U_{mf}, as a measure of fluidization onset and the particles being fluidized) also was measured and data prediction was confirmed using Ergun equation in which, Reynolds number for start of the fluidization has been defined in relation to Archimedes number, indicative of fluidized bed characteristics. Additionally, the results of $U_{t,s}$ were discussed in terms of operative friction force (particle-particle, particle-wall).

Keywords: Chitosan gel beads, Fluidized bed reactor, Hydrodynamics.

---

[1]Master's student

[2]Research assistant

[3]Assistant professor