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Development of a Clean Fluidized Bed Reactor For Food-Grade CO₂ Production

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Abstract

Combustion of natural gas in fluidized bed reactors can be considered as an economical way of producing energy and food-grade CO₂ largely needed in food industries. Among the fluidized bed reactors, turbulent fluidized beds exhibit several advantages over conventional combustion methods, and bubbling and circulating fluidized beds. Operation of the turbulent fluidized bed at industrial levels may bring many advantages of food industry and therefore, their commercialization could be of great industrial importance. In this study, a new generation of Fluidized bed reactors is developed along with proper inert particles to discover new applications in food processing. In order to develop such a new reactors, a fluidized bed reactor is modified by adding secondary injection port so that the natural gas is properly and safely injected to the bed for the heat generation and CO₂ produced in this way, due to small amount of emissions, has a very low purification cost. Moreover, the new devices could be well operated at medium temperatures and this feature could be of prime importance in commercializing this promising technology for food processing application, i.e., beverage industries.

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