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Study of Mixing During PGSS-Drying

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PGSS-Drying is particularly suitable for encapsulating sensitive products. First, an aqueous solution is mixed with supercritical carbon dioxide in a static mixer. Then, this mixture is suddenly expanded down to atmospheric pressure through a nozzle. The rapid expansion leads to a CO_2 volume increase and the disruption of the aqueous solution into fine droplets, causing the formation of solid particles in the spray tower. In the PGSS-drying process is mainly ruled by the equilibrium and hydrodynamic conditions present during the contact between supercritical carbon dioxide and solution, which takes place in a static mixer. The main phenomena of equilibrium and mass transfer during the PGSS-drying process have been described already by Martín and Weidner [1].

In order to achieve equilibrium between the phases, a good mixing is necessary. Nevertheless, there are no studies focusing on the mixing for the PGSS-drying process. Other studies regarding the analysis of two-phase flow in packed beds have used pressure drop as a basic variable to describe the mixing process .

This work proposes to study the mixing during the PGSS-Drying process [3,4] .Experimental measurements of pressure drop together with 2D CFD simulations are used in order to characterize the mixing process. This information can then be used as a basis for the design of the process.

References

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