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# Nonlinear model predictive control applied to the separation of praziquantel in simulated moving bed chromatography

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**Abstract**

An adaptive nonlinear model predictive control of a simulated moving bed unit for the enantioseparation of praziquantel is presented. A first principle model was applied at the proposed purity control scheme. The main concern about this kind of model in a control framework is in regard to the computational effort to solve it; however, a fast enough solution was achieved. In order to evaluate the controller's performance, several cases were simulated, including external pumps and switching valve malfunctions. The problem of plant-model mismatch was also investigated, and for that reason a parameter estimation step was introduced in the control strategy. In every studied scenario, the controller was able to maintain the purity levels at their setpoints, which were set to 99% and 98.6% for extract and raffinate, respectively. Additionally, fast responses and smooth actuation were achieved.

*Keywords:* Predictive control, Simulated moving bed, Nonlinear isotherm

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