Mathematical model controlled potassium chloride release systems from chitosan microspheres

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Chitosan can be prepared in the form of microspheres that serve as a depot for bioactive compounds released in a controlled way to diseased organs. In this study, a mathematical model of potassium chloride release from chitosan microspheres was developed. The model was validated using experimental data. The potassium chloride-loading percentages of 10.01%, 20.84%, and 20.57% were prepared using a cross-linking method. The potassium chloride loading was kept constant at about 20% when the potassium chloride mass in the preparation stage was above 5.024 mg/mL. Experiments and a model calculation of potassium chloride release from the microspheres with a loading of 10.01% and 20.57% were performed. In general, the model reproduces the experimental data. The experiments and the calculation show that during the same period, microspheres containing more potassium chloride release a higher percentage of potassium chloride than do microspheres containing less potassium chloride.