

Control of drug release from liquid preparations of iron

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Background and Aims: Children are particularly vulnerable to iron deficiency which is associated with a high risk of long-term impairment in mental and motor development. Liquid preparations may cause teeth staining and metallic taste of iron that reduce its compliance. One of the methods to control drug release from liquid dosage forms is the use of ion exchange resins.

Methods: Amberlite IPR64 (a Weak acidic resin) was contacted with a Fe²⁺ solution to be loaded. The amount of drug loaded was determined by atomic absorption spectrometry. To prepare a drug –resin suspension, xantan gum, sorbitol and sucrose were utilized as suspending agents and flavorant respectively. Drug release in NaCl 0.7% solution as a simulated natural saliva and in SGF (simulated Gastric fluid) without enzyme as an acidic medium was determined. The taste of suspensions was evaluated with compare a marketed ferrous sulfate syrup using volunteer taste panels.

Results: The formulation was successful in taste masking. Drug release in NaCl 0.7% solution was much slower than it in SGF. Kinetics of release from iron – resin suspension in SGF without enzyme and NaCl 0.7% media followed particle diffusion and zero order kinetics, respectively.

Conclusions: Ion exchange by weak acidic resins is a pH-dependent process. So they are suitable drug delivery systems for iron because they don't exchange their ions rapidly in neutral pH of saliva and are able to protect Fe²⁺ ions from contacting with tongue. In contrast it can immediately release them in acidic gastric fluid before passing out narrow absorption region of Fe²⁺.

Keywords: Ion exchange; Resin; Iron; Suspension