

ABSTRACT

EFFECT OF DRUG AND POLYMER RATIO ON RELEASE OF METFORMIN HYDROCHLORIDE FROM ALGINATE MICROSPHERES (Prepared by ionotropic gelation method using aerosolization technique)

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Metformin hydrochloride is antidiabetic drug for diabetes mellitus type 2. This research used metformin hydrochloride as a model drug. The aim of this research was to investigate effect of polymer concentration on release rate of metformin hydrochloride from alginate microspheres. Microspheres were prepared by ionotropic gelation method aerosolization techniques using natrium alginate as polymer and calcium chloride as crosslinker. The raw material must be evaluated in qualitative like appearance, DTA, and IR spectrum. After microspheres formed, it will resuspended in maltodextrin solution as stabilizer and dried by using freeze-dryer. This research used three formulas that used ratio of drug and polymer 1:1; 1:1,5; and 1:2 with 10% calcium chloride. The results of metformin hydrochloride microspheres evaluation includes examinations of drug loading, release profile, and release rate. Release evaluation was examine in HCl pH 1,2 for 2 hours and PBS pH 7,4 for 10 hours. The results of drug loading formula F1, F2, and F3 were 2,24 %, 2,61 %, and 3,75 %. Results of drug loading was used to calculate the concentration of metformin hydrochloride for release test. The results of cumulative metformin hydrochloride percentage were F1 = 96,40 %, F2 = 84,27 %, and F3 = 74,98 %. The results of release rate formula F1, F2 and F3 were $9,6390 \cdot 10^{-2}$ %/minute, $9,0985 \cdot 10^{-2}$ %/ minute, and $8,3312 \cdot 10^{-2}$ %/ minute. This results showed that higher polymer concentration produced slower release rate. Statistic analysis showed that metformin hydrochloride release rate was not affected by concentration of polymer.

Keywords : Metformin-Alginate Microsphere, Drug and Polymer Ratio, Ionotropic Gelation, Aerosolization Technique, The Release Rate