

## ABSTRACT

### EFFECT OF POLYMER SODIUM ALGINATE AND ERITROPOETIN CONCENTRATION ON CHARACTERISTICS OF ERITROPOETIN-ALGINATE MICROSPHERES

(Prepared by Iontropic Gelation Method Using Aerosolization Technique)

Vita Fitria Ramadhani

The aim of this research was to determine the effect of polymer sodium alginate and eritropoetin (EPO) concentrations on the characteristics including particle morphology (shape and surface), particle size, swelling index, and yield of eritropoetin (EPO)-alginate microspheres prepared by ionotropic gelation method with aerosolization technique. Microsphere preparation involved sodium alginate as polymer and  $\text{CaCl}_2$  as crosslinker, EPO-alginate microspheres were dried using freeze dryer with maltodextrin as lyoprotectant. The concentrations of sodium alginate used were 2% and 3%, and EPO concentrations were 5000 IU and 10000 IU, so that four formulas were obtained.

Results showed that particle size of EPO-alginate microspheres were F1 ( $3,36 \pm 0,126$ )  $\mu\text{m}$ , F2 ( $3,42 \pm 0,098$ )  $\mu\text{m}$ , F3 ( $3,88 \pm 0,131$ )  $\mu\text{m}$ , dan F4 ( $3,95 \pm 0,151$ )  $\mu\text{m}$ . Swelling index measured based on mass and particle size of EPO-alginate microspheres of all formulas showed value less than 10. Respectively yield percentage were F1 ( $77,84 \pm 0,290$ ) %, F2 ( $86,65 \pm 0,191$ ) %, F3 ( $91,89 \pm 0,210$ ) %, and F4 ( $94,65 \pm 0,252$ ) %.

By using factorial design ANOVA, it was found that increasing sodium alginate concentration would significantly increased yield, while increasing EPO concentration significantly increased particle size and yield of EPO-alginate microspheres. Either sodium alginate and EPO concentration did not affect swelling index of EPO-alginate microspheres. Range concentrations of alginate and EPO that produced optimal characteristics of EPO-alginate microspheres can be obtained within feasible area of design space overlaid contour plot generated using software Minitab 17 (figure 5.24).

Keywords : Ca-alginate micropheres, eritropoetin (EPO), ionotropic gelation, aerosolization, characteristics.