

ABSTRACT**CHARACTERISTICS, RELEASE, AND ANTIBACTERIAL ACTIVITY
OF MICROSPHERES CIPROFLOXACIN HCL-Ca ALGINATE WITH
AEROSOLIZATION TECHNIQUE****TRI DANANG KURNIAWAN**

Drug delivery system through the lung is an alternative delivery to overcome oral and parenteral delivery problems. The drug does not experience first pass metabolism in the liver, high bioavailability, low side effect, and the right dose to be delivered to the target. To efficiently deposit the lungs, particles must have a size of 1-5 μm . Ciprofloxacin HCl is an effective broad spectrum antibiotic which was formulated into microspheres. The purpose was to determine the effect of alginate polymer concentration and CaCl_2 concentration on the characteristics, release and antibacterial activity. Microspheres were produced by ionotropic gelation method with aerosolization technique. The results showed spherical characteristics microspheres, with particle size of less than $5\mu\text{m}$, moisture content of less than 10%, yield was between $75.62 \pm 4.47\%$ to $79.40 \pm 3.19\%$, drug loading and entrapment efficiency was range of $2.82 \pm 0.21\%$ to $4.13 \pm 0.30\%$ and $30.05 \pm 2.37\%$ to $74.53 \pm 5.48\%$. F3 was the optimum formula. For 24 hours, the ciprofloxacin released was in the range of 80-100% at pH 7.4. Drug release kinetic showed zero order kinetic with mechanism based on non-fickian diffusion, an increased concentration of alginate and CaCl_2 showed a decrease in release rate. Both microspheres and released sample, antibacterial activity against *Staphylococcus aureus* and *Escherichia coli* was shown. Overall, ciprofloxacin HCl-alginate microspheres produced by ionotropic gelation method with aerosolization technique were highly recommended for pulmonary drug delivery.

Keywords: Ciprofloxacin HCl, Microsphere, Alginate, Characteristic, Release, Antibacterial Activity.