

Warangkana Kangwansupapan 2013: Optimized Elution of Cefazolin from Calcium Sulfate Beads. Master of Science (Veterinary Pharmacology and Toxicology), Major Field: Veterinary Pharmacology and Toxicology, Department of Pharmacology. Thesis Advisor: Assistant Professor Pareeya Udomkunsri, Ph.D. 91 pages.

The present study was aimed to the cefazolin elution from the calcium sulfate beads and polymethylmethacrylate (PMMA) beads which prepared from different concentrations of cefazolin. The calcium beads were made by mixing 0.25, 0.5 or 1g cefazolin injection formulation and 10 g calcium sulfate. For PMMA beads, 1 or 2 g cefazolin were mixed with 10 g of PMMA. The beads were placed in phosphate buffer saline and daily eluted cefazolin concentrations were determined by microbioassay for 8 days of experimental period. It was shown that cefazolin-calcium sulfate beads released higher amounts of antibiotic than cefazolin-PMMA beads significantly ($P<0.05$). In addition, the eluted cefazolin concentrations were higher than the minimal inhibitory concentration (MIC) against *Staphylococcus aureus* (ATCC 25923, TISTR 517). The study showed the released cefazolin concentrations from 1g cefazolin-calcium sulfate beads was higher than 0.5 and 0.25 g cefazolin-calcium sulfate beads. The released cefazolin from 2g cefazolin-PMMA bead was higher than 1g cefazolin-PMMA bead. This study showed that cefazolin-calcium sulfate and cefazolin-PMMA beads were effective for treatment of local bacterial infection.

Microbioassay is used to determine the activities of antimicrobial agents by the response of the indicator organism. We studied the storage effects of *Bacillus subtilis* (ATCC 6633, TISTR 008) spore on the determination of antimicrobial concentrations by microbioassay method. The spores of *B. subtilis* were kept at 4 °C and room temperature (25-30°C). *B. subtilis* spores were seeded on Mueller Hinton agar and Antibiotic Medium 5 agar. The *B. subtilis* seeded agar plates were tested with enrofloxacin (0.25, 0.5, 1.0, 2.0 and 3.0 ppm) and gentamicin (0.5, 1.0, 2.0, 5.0 and 10.0 ppm). Plates were incubated at 37 °C for 18-20 hr and diameters of inhibition zones were measured. The tests were repeated every month for 12 months. The antimicrobial concentrations versus inhibition zones were plotted as standard curves. The correlation coefficient (r^2) were calculated and used to compare the effects of spore storage. The r^2 of standard curve for each month and each group were statistical significant difference. Moreover, the storage temperature were effected on *B. subtilis* spore growth ($P<0.05$). It is concluded that both times and storage temperature were influent on *B. subtilis* spore growth on microbioassay.

Student's signature

Thesis Advisor's signature