

Alginate-Based Gel Particle as a Novel Drug Delivery Vehicle for Curcumin

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As more and more hydrophobic compounds are turned away each year due to the fact that they cannot dissolve in the human body, the goal of this project was to create a novel alginate-based drug delivery vehicle for curcumin in such a way that the particle could be metabolized by the body, unlike most other particles, and to provide a system that had anti-bacterial properties. It was hypothesized that if the curcumin:CTAB alginate gel particle was given to bacteria such as *S. aureus* or *E. coli*, then bacterial growth would be inhibited. The curcumin was isolated from turmeric at a local chemistry laboratory. The critical micelle concentration of cetyltrimethylammonium bromide (CTAB) was determined at another local chemistry laboratory. Different curcumin dilutions were then prepared utilizing the data obtained from the critical micelle concentration. Then cloud point titration was performed on each of the curcumin dilutions and a CTAB (1.25 mM) solution. Then these solutions were pipetted into a *S. aureus* suspension and an *E. coli* suspension. When an analysis of variance (ANOVA) was performed on optical density values for *S. aureus* after 6 hours and after 24 hours, the p-value was found to be less than 0.05 meaning that the results were significant. When an ANOVA was performed on optical density values for *E. coli* after 6 hours, the p-value was found to be 1.22E-2; however, when an ANOVA was performed on optical density values for *E. coli* after 24 hours, the p-value was found to be 0.250. Therefore it was concluded that the novel curcumin:CTAB alginate gel particle had anti-bacterial effects and that surfactant charge played a role in bacterial inhibition.