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# Self-aggregation behavior of hydrophobic sodium alginate derivatives in aqueous solution and their application in the nano-encapsulation of acetamiprid

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## Abstract

In this study, cholesteryl-grafted sodium alginate derivatives (CSAD) with different molecular weights were synthesized by esterification. The structure of CSAD was confirmed by FT-IR and  $^1\text{H}$  NMR spectrometers. The effects of pH and CSAD polymer concentration on the self-assembled behavior and particle size of CSAD were investigated by fluorescence measurement (FM) and dynamic light scattering (DLS). In the presence of  $\text{Ca}^{2+}$ , the cholesteryl-grafted sodium alginate derivative was used for fabricating self-assembled nanoparticles that can effectively encapsulate the drug acetamiprid. The drug-loaded nanoparticles were characterized by transmission electron microscopy (TEM). The encapsulation efficiency ( $EE$ ) and acetamiprid drug release behavior from the nanoparticles were also studied. The results reveal that CSAD self-assembled nanoparticles had a diameter of 100 nm and were nonaggregated in

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