431r Calcium Alginate Gel Beads Synthesis by Electrodispersion in Vegetable Oils

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A new microencapsulation method that utilizes electric fields to atomize alginate and nanocalcium carbonate aqueous mixtures from a nozzle into an organic continuous phase has been developed. The gelation reaction takes place in the dispersed droplets, which serve as microreactors. The acetic acid in the organic phase diffuses into the microreactor droplets causing the calcium ions to be released and gelation to occur. This method allows the formation of reactive water-in-oil emulsions where it is important to form slurries with a minimum amount of agglomeration. Spherical gel beads with a mean size of about 20 μm are obtained. The influence of the electric field strength, the alginate and calcium carbonate concentrations in the aqueous phase, the acetic acid concentration in the oil phase and the flow velocity of both phases on the calcium alginate beads is studied. The calcium alginate gel beads that are synthesized by electrodispersion in vegetable oil have a highly porous and uniform structure, which show great potential in the controlled-release of drugs.