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Exploiting nanomaterials for release on demand in drug delivery systems

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This work was to develop a novel drug delivery system exploiting special opportunities afforded by synthesis of nanomaterials to be applied inside the colon. It must be robust enough to cope with the adverse conditions in the gastrointestinal tract (GI) and be able to reach and release “on demand” at the colon area at the right time. An oral capsule formulation with iron oxide nanomaterials (IONs) containing coating (fatty acids and paraffin) was used to transport drug and release drug in the colon. With that in mind, the synthesis of magnetic IONs via a co-precipitation method were conducted. The key physical properties of the materials were characterized employing standard techniques such as HPLC, FTIR, DSC, DLS, XRD, TEM and SEM. Hard capsules filled with model drug, paracetamol, were coated with IONs containing coatings. The optimum composition as well as effective release “on demand” was explored using magnetic nanomaterials hyperthermia. Results showed that paraffin-based coatings had appropriate properties for this application. Finally, taking into account all the results, a design of a novel drug delivery system, together with an experimental setup for testing the “release in demand” was proposed. The approach is generic, easy to set up and could also be applied to many other situations where delivery on demand is required.

Biography

Laili Che Rose is currently a Senior Lecturer at Universiti Malaysia Terengganu. Her initial interest is in the area of fine particles with special emphasis in surfactant systems. Now, her interest is directed more in the area of nanomaterials and their applications in drug delivery systems. She obtained her PhD from University of East Anglia, Norwich, England in 2013. To date, she has authored and co-authored more than 30 articles in refereed journals.

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