

Polymeric nanomicelles encapsulating aggregation-induced emission (AIE) natural molecules

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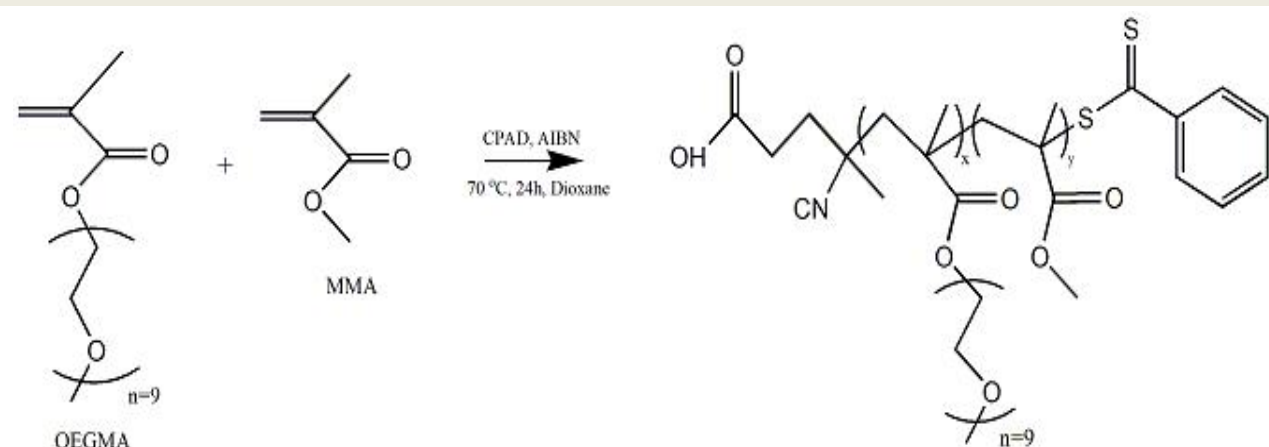
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INTRODUCTION & AIM

Aggregation-induced emission molecules are a newly discovered class of substances that present an enhancement in their emission upon aggregation. Polymeric micelles encapsulating molecules that have both AIE and anticancer properties can be utilized for applications in nanomedicine such as image-guided drug delivery and surgery. In this research, three different amphiphilic random copolymers of poly(oligoethylene glycol methyl ether methacrylate-co-methyl methacrylate), P(OEGMA-co-MMA) were used for the formulation of nanomicelles encapsulating the AIE anticancer molecules curcumin and quercetin in different concentrations.

METHOD

Copolymers with different comonomer compositions were synthesized via reversible addition fragmentation chain transfer (RAFT) polymerization. Curcumin and quercetin nanocarriers were formulated with these copolymers in water with the organic co-solvent protocol while physicochemical and photophysical characterization was carried out by DLS, UV-Vis and FS techniques.

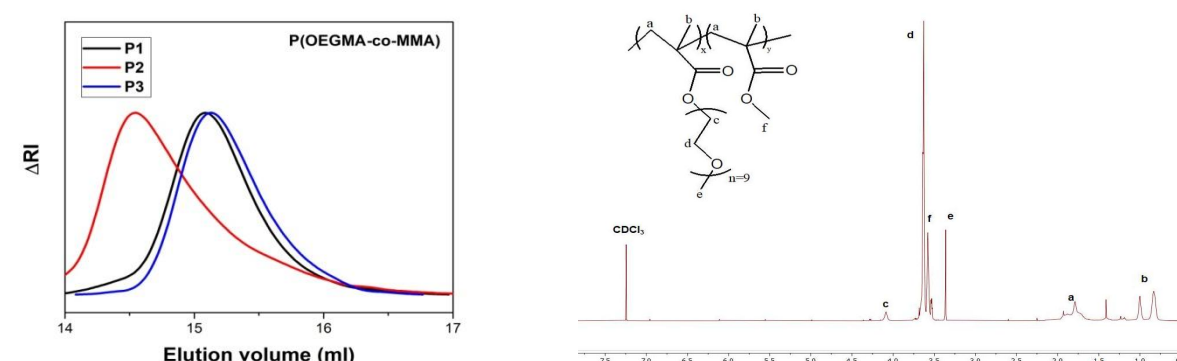


CONCLUSION

Successful formulation of curcumin and quercetin nanocarriers presenting the AIE phenomenon is reported. As experiments revealed promising results, further biocompatibility tests will be carried out in order to utilize such formulations in nanomedicine.

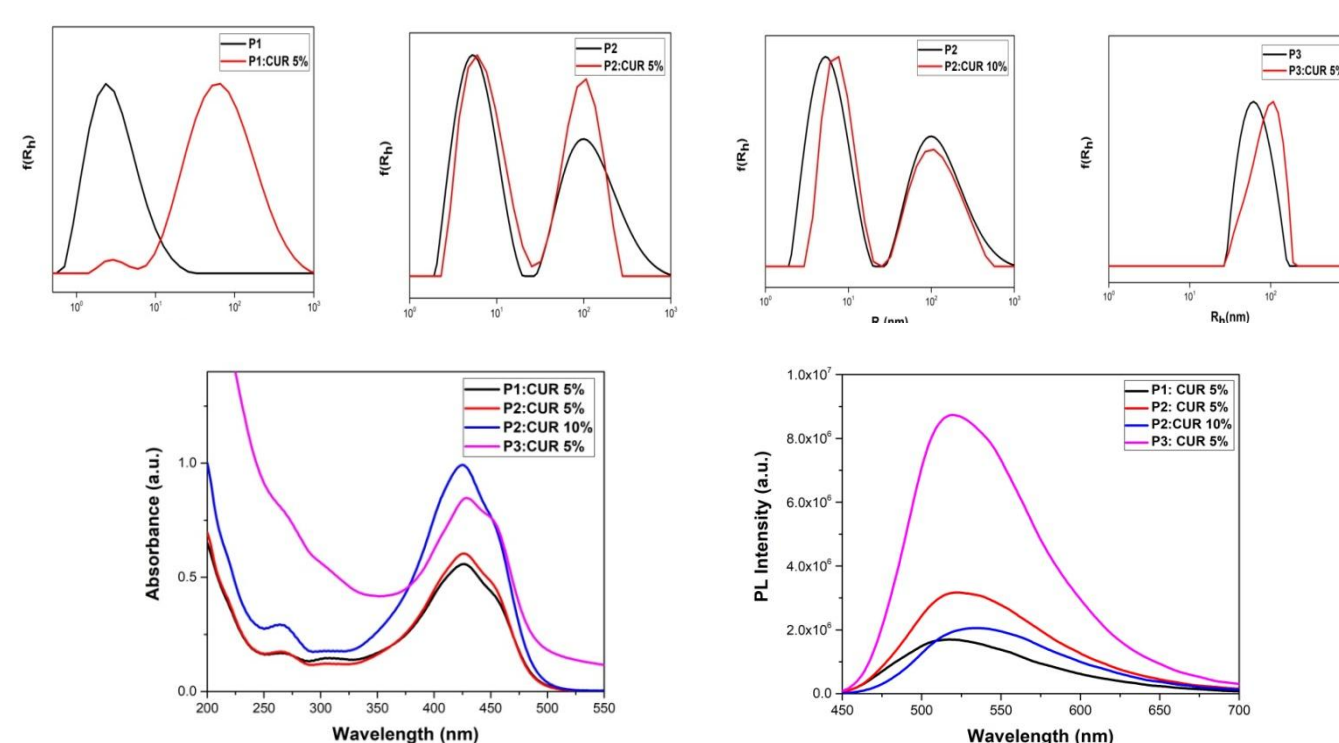
RESULTS & DISCUSSION

Successful synthesis of amphiphilic P(OEGMA-co-MMA) copolymers with low dispersity was accomplished as shown by SEC and NMR.

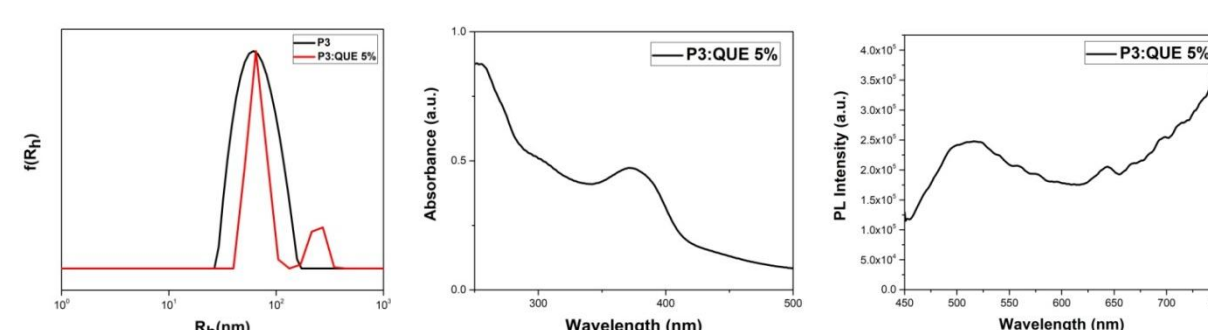


DLS results show formulations of loaded nanomicelles with hydrodynamic radius below 113 nm for curcumin and 241 nm for quercetin. Curcumin was loaded in nanomicelles at a concentration of 10 wt%, while 5 wt% was achieved for quercetin. Fluorescence experiments proved the AIE phenomenon for all nanosystems.

DLS, UV-Vis and FS results for Curcumin nanocarriers



DLS, UV-Vis and FS results for Quercetin nanocarriers



REFERENCES

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