

Smart nanocarriers encapsulating chemotherapeutic agents

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INTRODUCTION

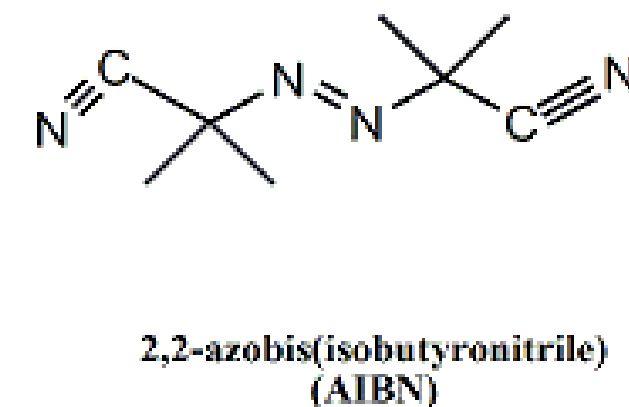
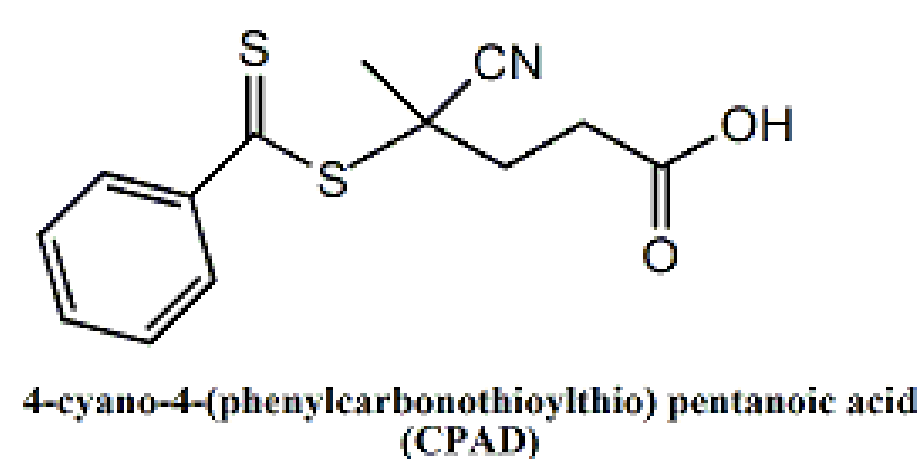
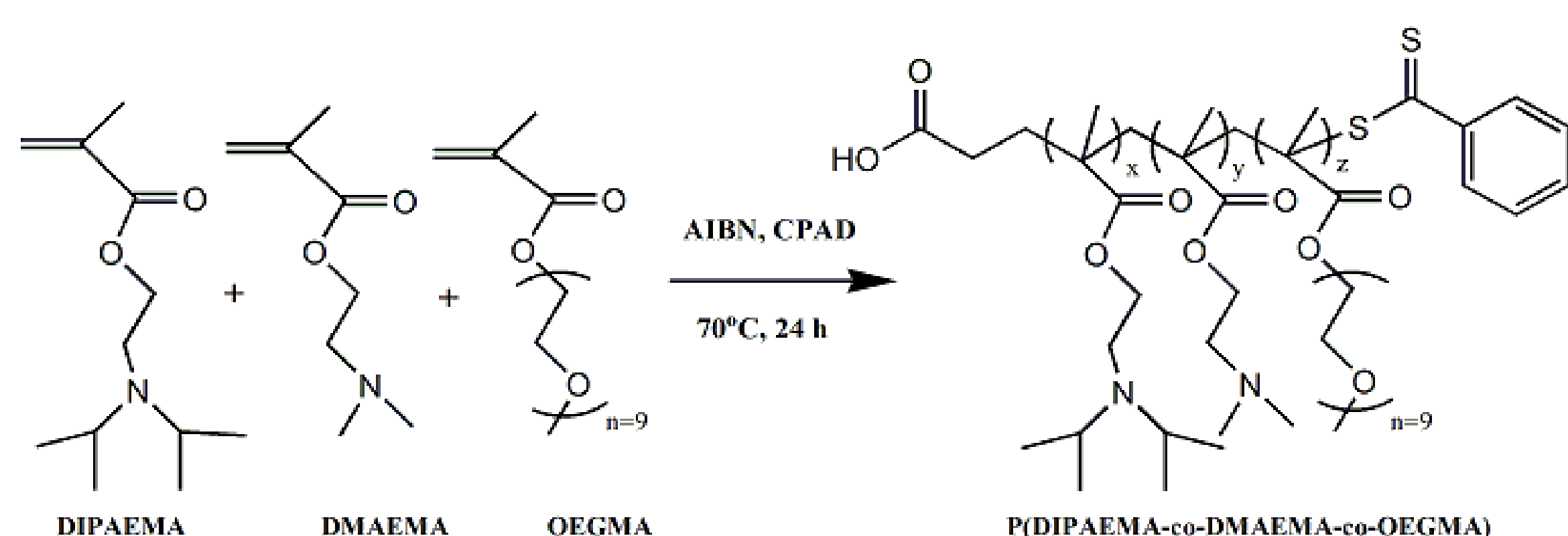
Multi-responsive polymers have gained significant research attention due to their tunable properties under external stimuli. Water insolubility and poor biodistribution of various anticancer molecules limit their therapeutic efficacy. Formulation of these molecules into pH and temperature-responsive nanocarriers is a crucial step in the development of effective and innovative chemotherapies.

METHOD

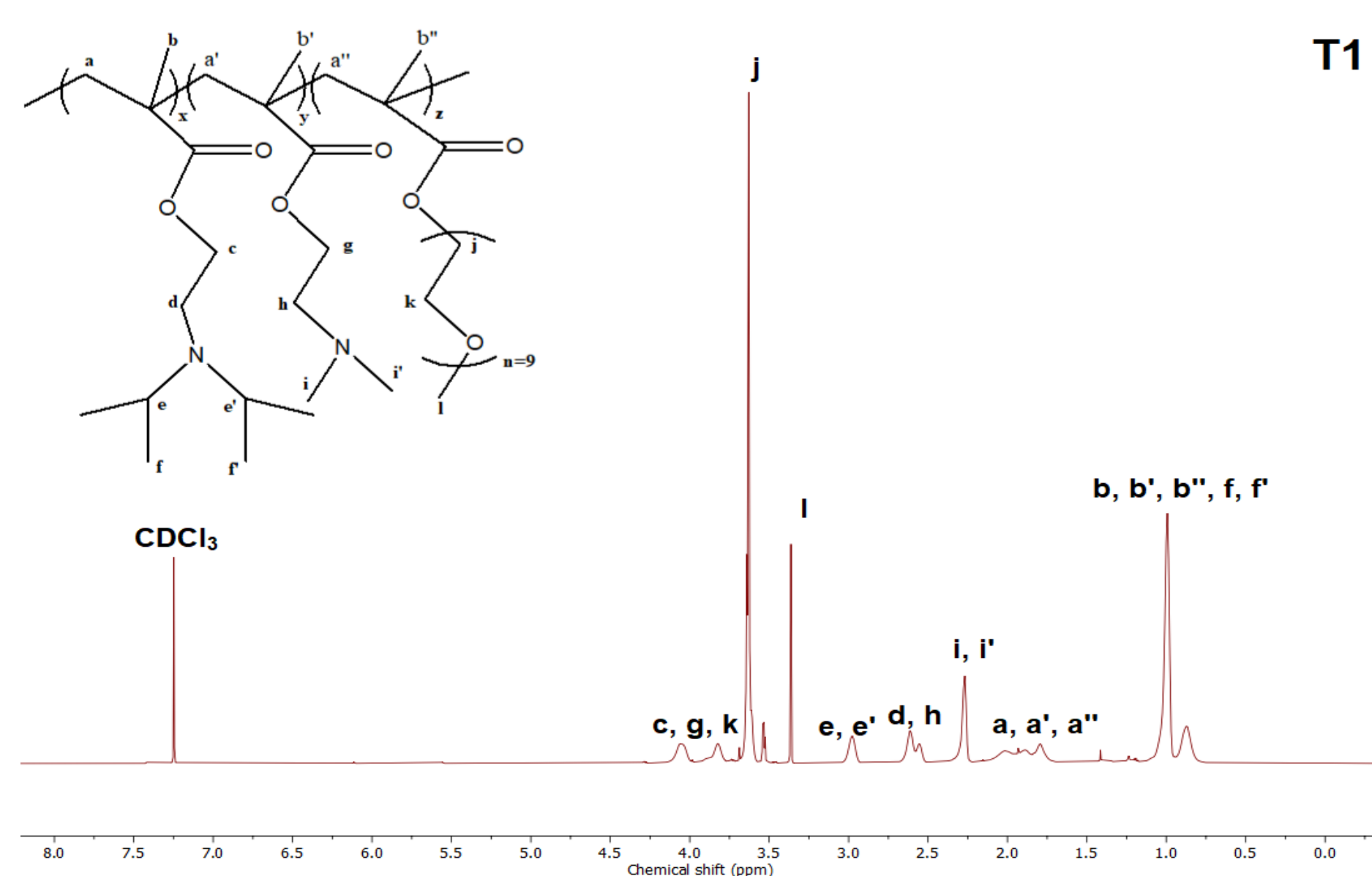
Herein, the formulation of polymeric nanocarriers via the co-solvent protocol is reported. For this reason, poly(2-(diisopropylamino)ethyl methacrylate-co-2-(dimethylamino)ethyl methacrylate-co-oligoethylene glycol methyl ether methacrylate), P(DIPAEMA-co-DMAEMA-co-OEGMA) terpolymers were utilized for the encapsulation of the anticancer molecules curcumin, quercetin, and methotrexate.

RESULTS & DISCUSSION

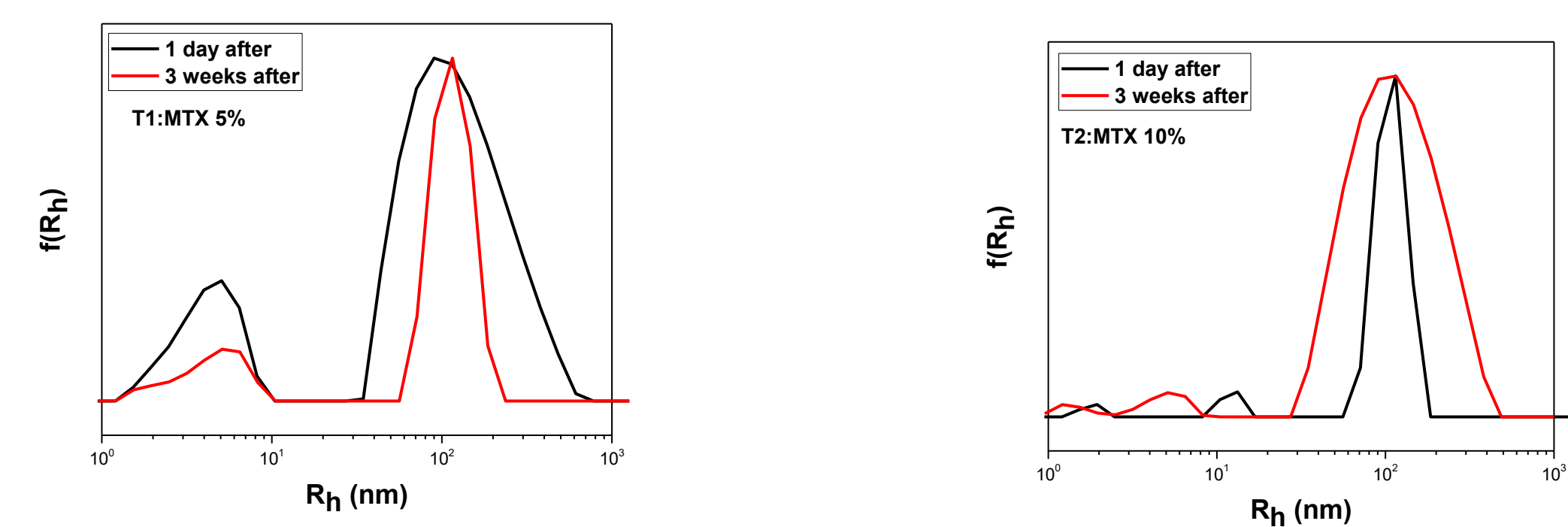
Synthesis of P(DIPAEMA-co-DMAEMA-co-OEGMA) terpolymers via RAFT polymerization



Sample	DIPAEMA (wt%)	DMAE MA (wt%)	OEG MA (wt%)	M _w (x10 ⁴ g/mol)	M _w /M _n
T1	39	21	40	1.92	1.30
T2	20	22	58	1.69	1.31

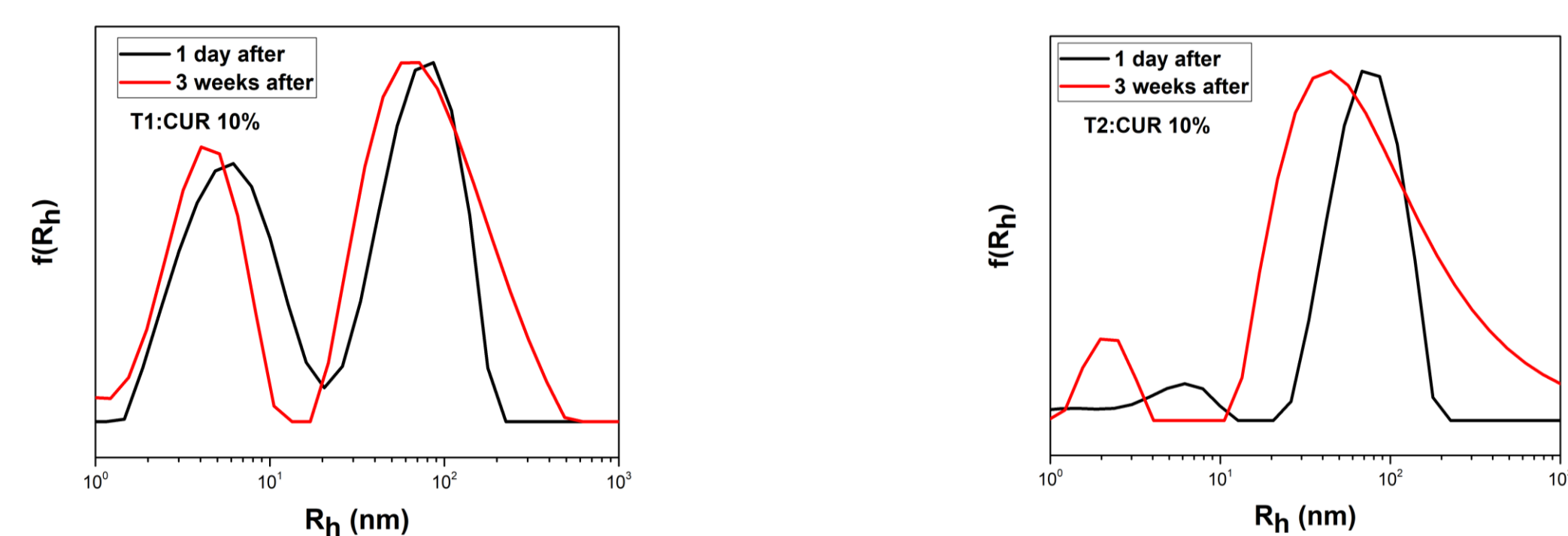


Nanoformulations of methotrexate nanocarriers: DLS results

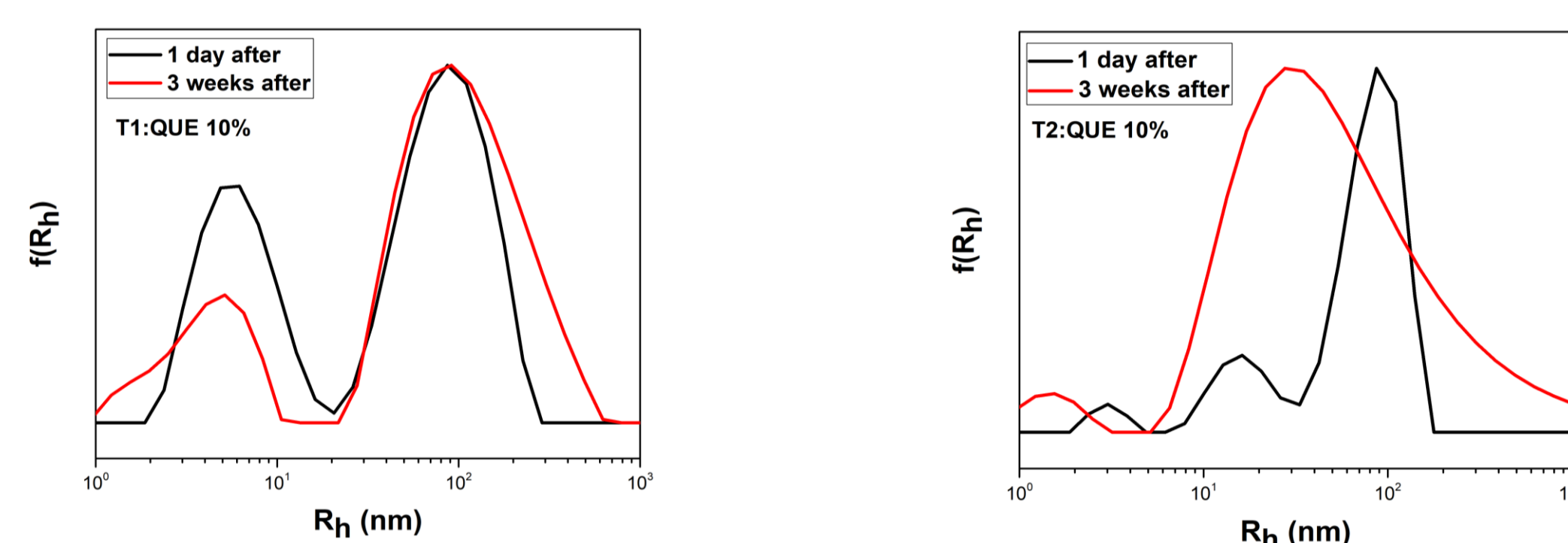


Natural anticancer molecules

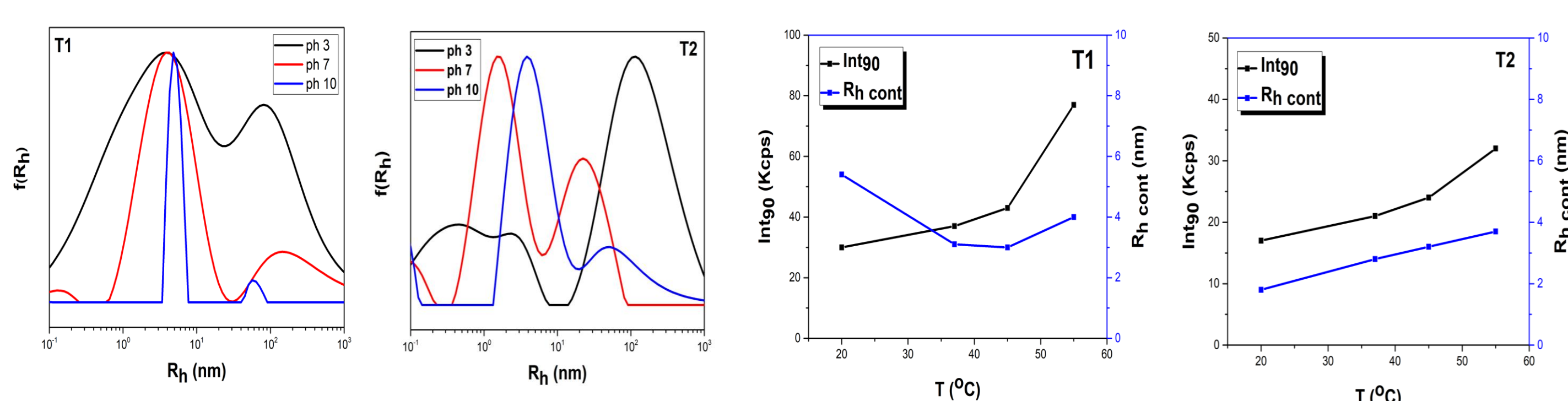
Curcumin nanocarriers: DLS results



Quercetin nanocarriers: DLS results



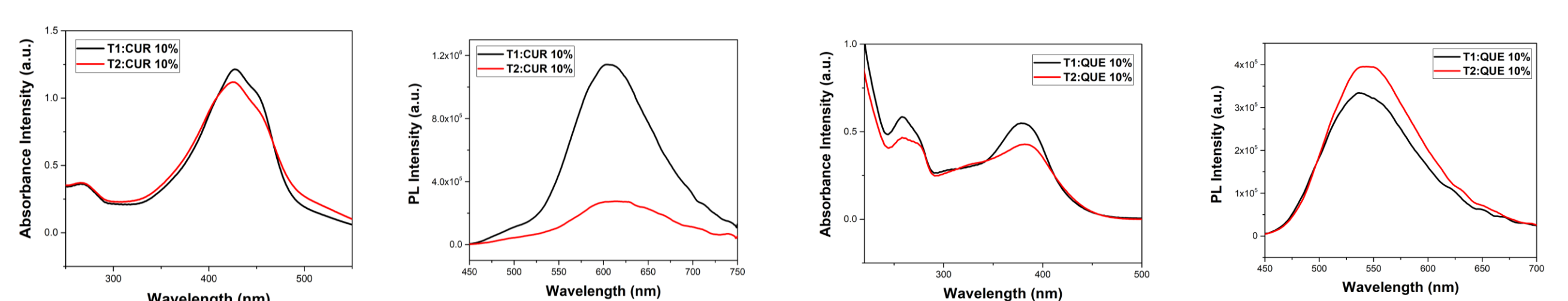
DLS: pH & thermo-responsiveness



CONCLUSIONS

Smart nanocarriers were fabricated via a cost-effective and scalable method. Such nanostructures can offer a promising approach in cancer treatment as they can respond to external stimuli triggered by cancer tissue conditions.

Aggregation-Induced Emission of curcumin and quercetin nanocarriers: UV-Vis & FS results



REFERENCES

- Pantelaiou, M.A.; Vagenas, D.; Karvelis, E.S.; Rotas, G.; Pispas, S.. *Nanomaterials* 2024, 14, 1631, doi:10.3390/nano14201631.
- Pantelaiou, M.A.; Vagenas, D.; Pispas, S. *Polymers* 2025, 17, doi:10.3390/polym17050635