

Supplementary Information

Curcumin-loaded high internal phase emulsions stabilized with lysine modified lignin: A biological agent with high photothermal protection and antibacterial properties

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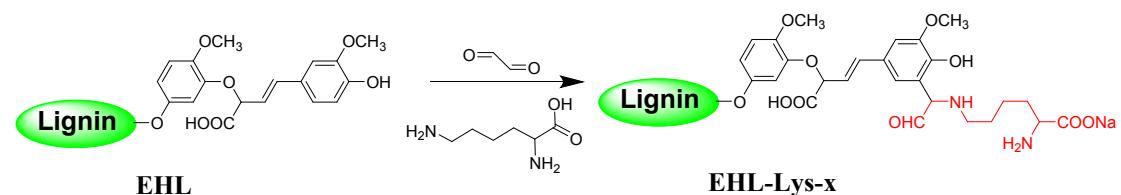
It Includes 4 Pages, 2 Tables, 2 Figures.

Table S1. The reaction parameters and yield of EHL-Lys-x.

EHL (g)	Lys/Phenolic hydroxyl of EHL (molar ratio)	Lys/Glyoxal (molar ratio)	Yield (%)
4.0	0.5:1.0	1:1	88.0
4.0	1.0:1.0	1:1	87.7
4.0	1.5:1.0	1:1	89.5
4.0	2.0:1.0	1:1	87.5

Table S2. Experimental factors & levels for HIPEs stabilized with EHL-Lys-x.

Samples	EHL-Lys-x	EHL-Lys-x content wt%	APG wt%	Oil vol%
HIPEs-1	EHL-Lys-0.5	5.0	3.0	87
HIPEs-2	EHL-Lys-1.0	5.0	3.0	87
HIPEs-3	EHL-Lys -1.5	5.0	3.0	87
HIPEs-4	EHL-Lys -2.0	5.0	3.0	87

**Scheme. S1** The reactions mechanism of EHL-Lys-x.

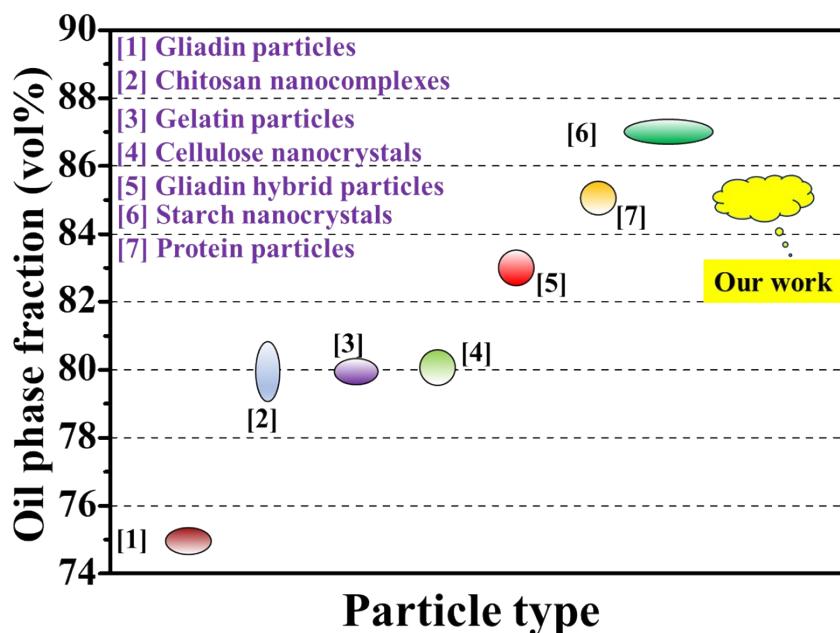


Figure S1. Maximum oil phase volume fraction in O/W HIPPEs stabilized with different food-grade emulsifier.

References

- [1] F. Z. Zhou, T. Zeng, S. W. Yin, C. H. Tang, D. B. Yuan, X. Q. Yang, Development of antioxidant gliadin particle stabilized Pickering high internal phase emulsions (HIPPEs) as oral delivery systems and the in vitro digestion fate, *Food Funct.* 9 (2018) 959-970.
- [2] X. N. Huang, F. Z. Zhou, T. Yang, S.W. Yin, C.H. Tang, X.Q. Yang, Fabrication and characterization of Pickering High Internal Phase Emulsions (HIPPEs) stabilized by chitosan-caseinophosphopeptides nanocomplexes as oral delivery vehicles, *Food Hydrocolloids* 93 (2019) 34-45.
- [3] H. Tan, L. Zhao, S. Tian, T. Ngai, Gelatin particle-stabilized high-internal phase emulsions for use in oral delivery systems: protection effect and in vitro digestion study, *J. Agric. Food Chem.* 65 (2017) 900-907.

- [4] F. Liu, J. Zheng, C. H. Huang, C. H. Tang, S. Y. Ou, Pickering high internal phase emulsions stabilized by protein-covered cellulose nanocrystals, *Food Hydrocolloids* 82 (2018) 96-105.
- [5] F. Z. Zhou, T. Zeng, S. W. Yin, C. H. Tang, D. B. Yuan, X. Q. Yang, Development of antioxidant Pickering high internal phase emulsions (HIPEs) stabilized by protein/polysaccharide hybrid particles as potential alternative for PHOs, *Food Chem.* 231 (2017) 122-130.
- [6] T. Yang, J. Zheng, B. S. Zheng, F. Liu, S. Wang, C. H. Tang, High internal phase emulsions stabilized by starch nanocrystals, *Food Hydrocolloids* 82 (2018) 230-238.
- [7] B. Jiao, A. Shi, Q. Wang, B.P. Binks, High-Internal-Phase Pickering Emulsions Stabilized Solely by Peanut Protein-Isolate Microgel Particles with Multiple Potential Applications, *Angew. Chem. Int. Ed.* 57 (2018) 9274-9278.