SUPPLEMENTARY INFORMATION

Preparation and physicochemical properties of biodegradable konjac glucomannan-based films reinforced with bacterial cellulose and tea polyphenol for food packaging

Lan Ma, [a] Pengyu Hu, [a] Yihao Zhang, [a] Yunchuan Dai [a] and Yanzhu Guo *[ab]

[a] *Liaoning Province Key Laboratory of Paper and Pulp Engineering, Dalian Key Laboratory of High value application and development of Botanical Resources, Key Laboratory of High Value Utilization of Botanical Resources of China Light Industry, Dalian Polytechnic University, Dalian 116034, China*

[b] *Guangxi Key Laboratory of Clean Pulp & Papermaking and Pollution Control, School of Light Industry and Food Engineering, Guangxi University, Nanning, 530004, China*

** Corresponding Authors E-mail: guoyz@dlpu.edu.cn (Yanzhu Guo); Tel.: +86-15164033963 (Yanzhu Guo)*

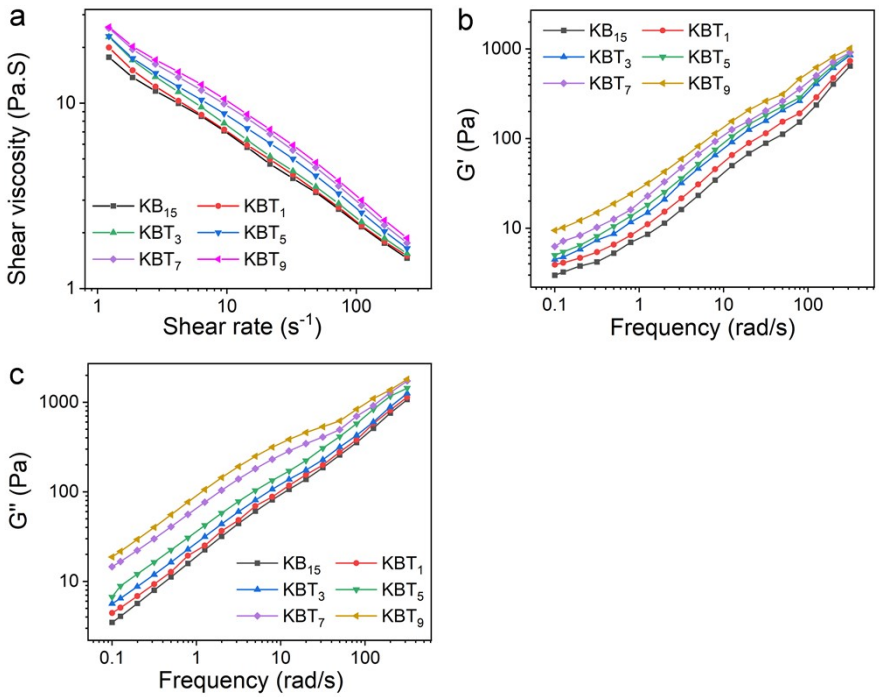

Fig. S1 Shear rate in versus of viscosity (a) of film-forming solutions with different TP contents (0%, 1%, 3%, 5%, 7%, and 9%), and their corresponding storage modulus (G') (b) and loss modulus (G") (c) as functions of angular frequency.

Table S1 Comparison of the mechanical property of KBT film with recent reported polysaccharide-based films.

Samples	Component	TS (MPa)	EAB (%)	Ref
KBT_5	KGM-BC-TP	66.53	39.87	This work
KC-KT@EUG6	KGM/chitosan	15.61	25.87	S1
$K_{54}C_{40}M_6$-CO	KGM/curdlan	30.11	37.60	S2
KCZ-SA6	KGM/chitosan/zein	37.59	9.34	S3
6% PGC-KGM/SHL	KGM/shellac	49.52	35.73	S4
GB-5	Gelatin/BC	54.91	21.70	S5
CS/HPC/CuO-4	Chitosan/hydroxypropyl cellulose	32.87	13.43	S6
F-CSG/CA	Starch/cellulose nanocrystals	38.40	11.80	S7
CHPPE-40	κ-carrageenan/hydroxypropyl methylcellulose	39.15	17.50	S8
CNC @CH/AG	Chitosan/arabic gum/citrate nanocellulose	42.53	2.66	S9
KEA/CS-β-CD@OEO-1	KGM/chitosan/ oregano essential oil	65.71	16.81	S10
KNT	KGM/nanoparticles	82.60	37.70	S11
K_8E_2	KGM/ethyl cellulose	86.23	16.03	S12
Type Ⅳ	KGM/curcumin-metal chelates	68.34	19.12	S13

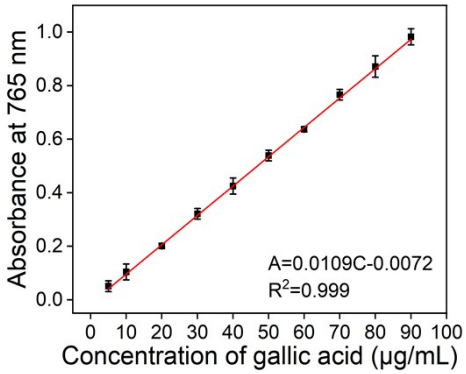

Fig. S2 The standard curve for gallic acid

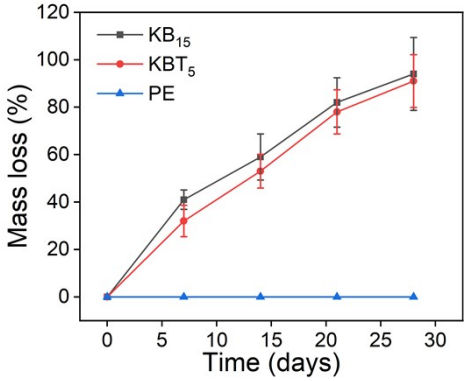

Fig. S3 Mass loss of KB_{15}, KBT_5 and PE film.

References:

S1. M. Li, H. Wei, X. Wang, Y. Wang, X. Lei, O. Dai, C. Wen and J. Pang, *Carbohydr. Polym.*, 2025, **368**, 124117.

S2. K. Chen, J. Jiang, Y. Tian, Y. Guo, T. He, Y. Xie, K. Wu, F. Zhu and F. Jiang, *Int. J. Biol. Macromol.*, 2025, **291**, 139080.

S3. X. Wang, Y. Chen, X. Zhao and J. Pang, *Foods*, 2025, **14**, 1563.

S4. Y. Wang, K. Wang, Y. Wang, P. Zhao, M. Cheng, J. Lu, X. Xi, X. Wang, X. Han and J. Wang, *Ind. Crops Prod.*, 2025, **225**, 120497.

S5. F. Yu, J. Fan, J. Zhang, X. Liu, Y. Meng, Y. Chi, Z. Yang, C. Li, H. Sun, H. Zhang and L. Kang, *Food Hydrocoll.*, 2026, **172**, 111928.

S6. M. N. Gunaki, S. P. Masti, O. J. D'Souza, M. P. Eelager, L. K. Kurabetta, R. B. Chougale, A. J. Kadapure and S. K. Praveen Kumar, *Food Hydrocoll.*, 2024, **152**, 109937.

S7. M. H. Islam, M. Hosna Ara, M. A. Khan, J. Naime, M. A. R. Khan, M. L. Rahman and T. A. Ruhane, *ACS Omega*, 2025, **10**, 8960-8970.

S8. Y. Zhong, J. Guo, X. Wang, Y. Cui, Z. Liu, H. M. Mubeen, S. Yan, G. Wang, H. Xu and M. Li, *J. Future Foods*, 2025.

S9. M. Sultan, H. Elsayed and G. Taha, *Food Biosci.*, 2023, **56**, 103246.

S10. D. Zhang, G. Cao, N. Bu, L. Huang, H. Lin, R. Mu, J. Pang and L. Wang, *Int. J. Biol. Macromol.*, 2023, **244**, 125365.

S11. F. Xiang, Y. Xia, Y. Wang, Y. Wang, K. Wu and X. Ni, *Food Packag. Shelf Life.*, 2021, **29**, 100701.

S12. K. Wu, X. Yan, D. Zhu, Y. Tao, Y. Zeng, X. Li, W. Sun, H. Qian, F. Jiang and S. Chen, *Int. J. Biol. Macromol.*, 2023, **241**, 124629.

S13. S. Zhou, J. Li, D. Lin, X. Feng, R. Zhang, D. Wang, A. Zhao, H. Tian and X. Yang, *Int. J. Biol. Macromol.*, 2024, **282**, 137231.