

Supplementary materials

Article title: **Preparation, characterization and in vitro hypoglycemic activity of banana condensed tannin-inulin conjugate**

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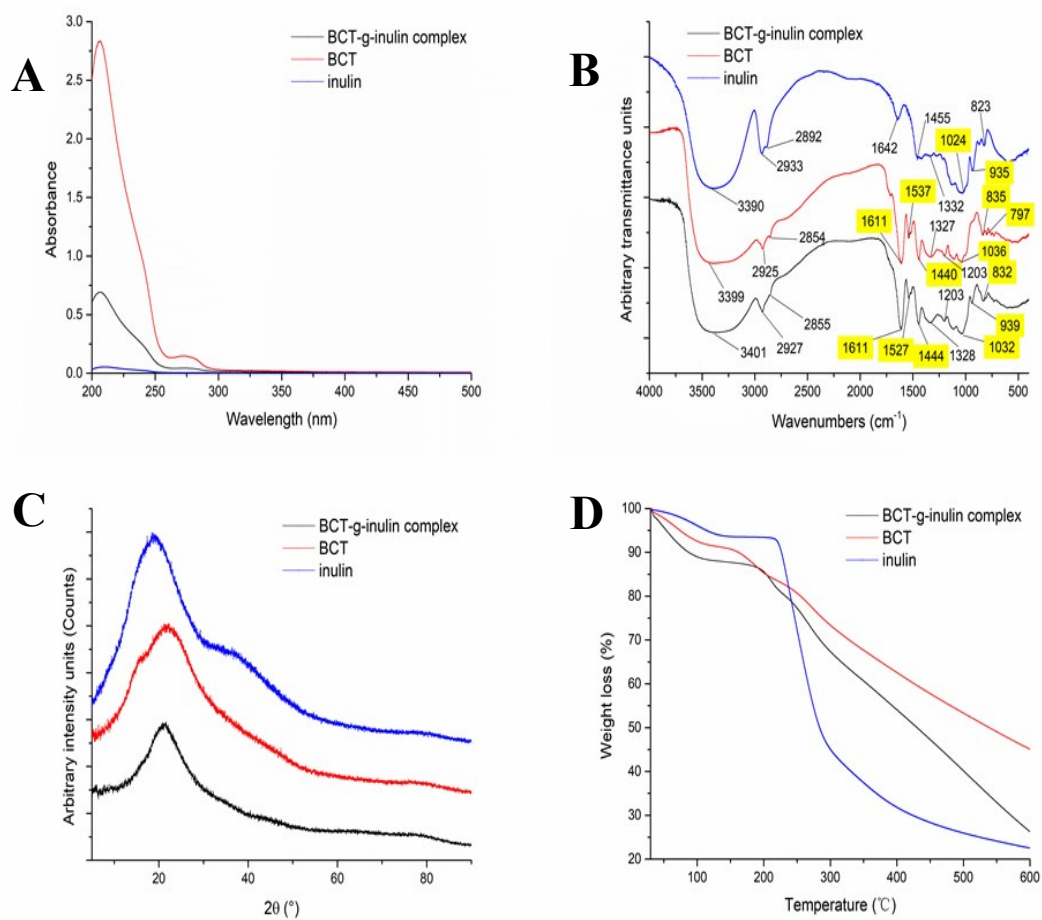


Fig. S1. UV-Vis (A), FT-IR (B) spectra, XRD (C) and TGA (D) curves of BCT, inulin and BCT-g-inulin complex.

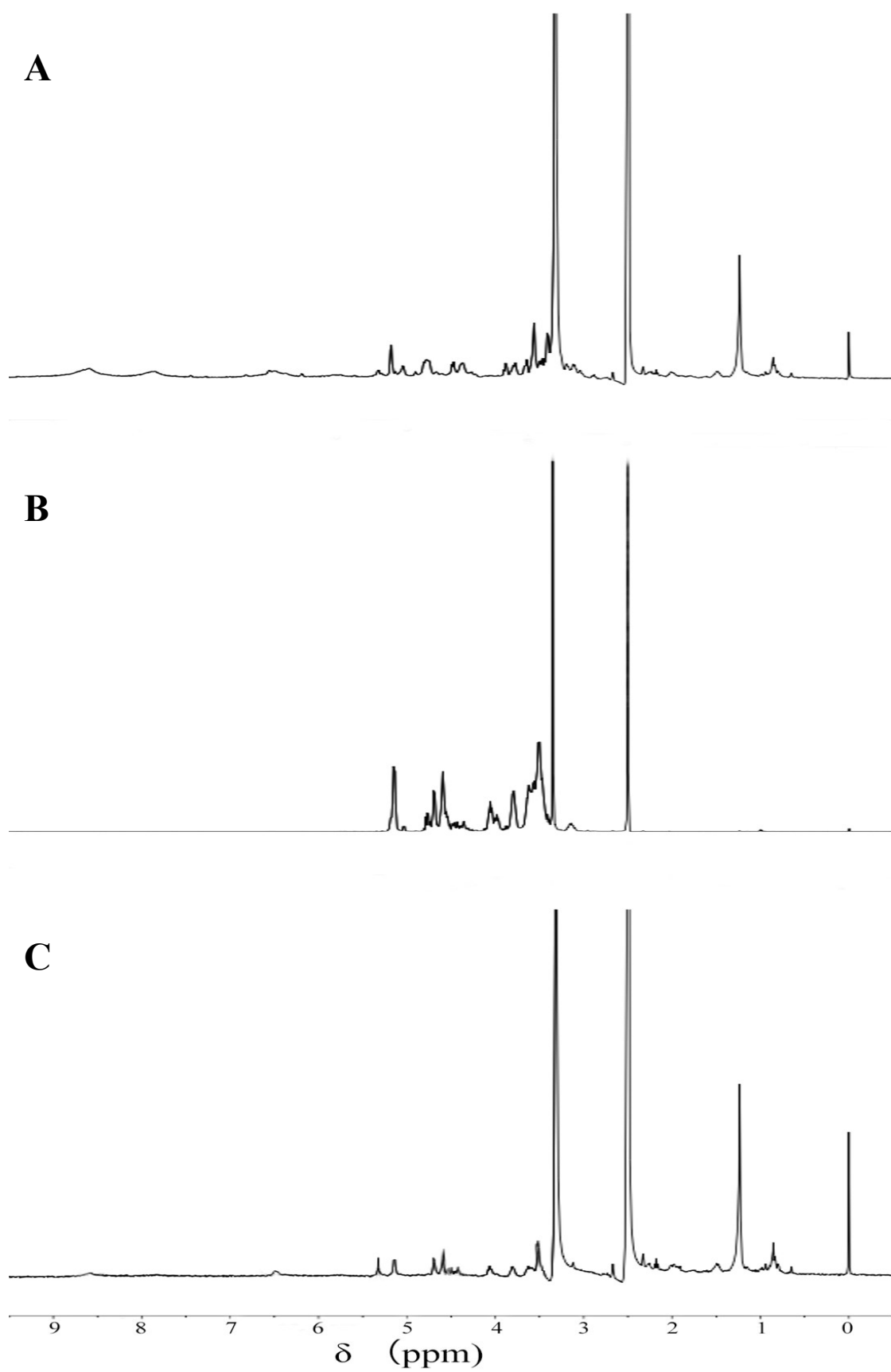


Fig. S2. ^1H NMR spectra of BCT (A), inulin (B) and BCT-g-inulin complex (C).

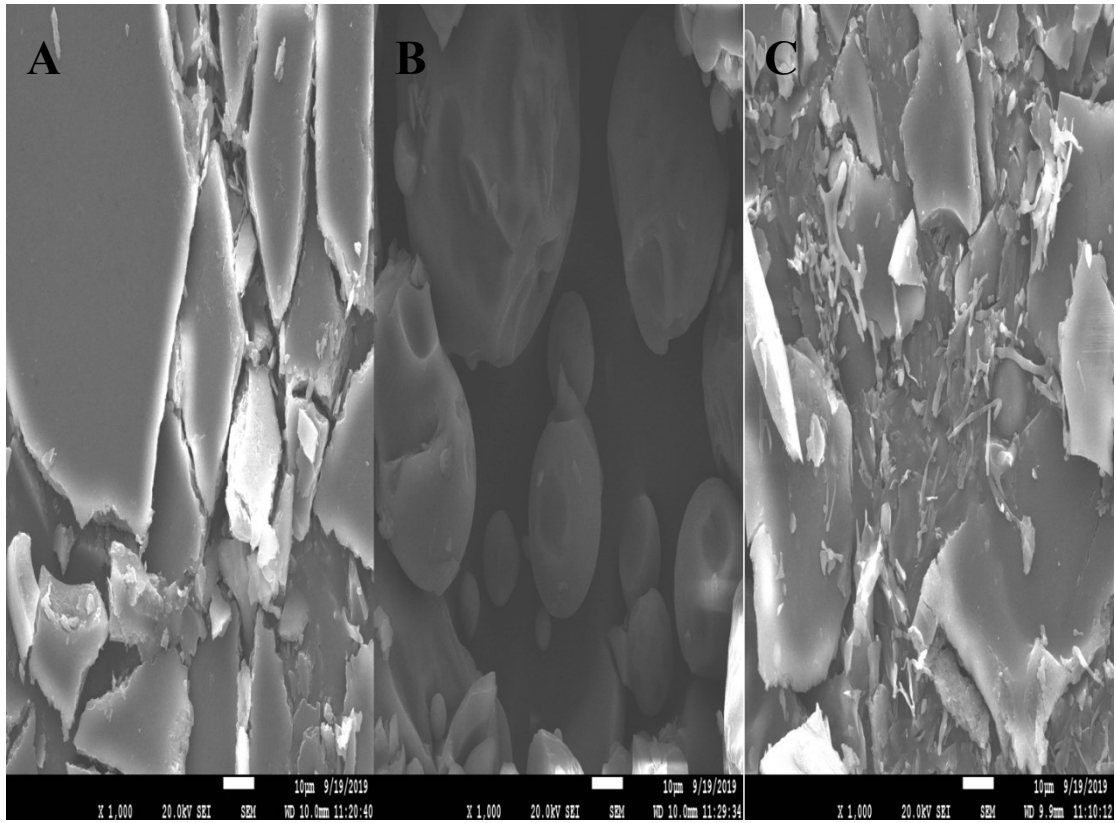


Fig. S3. FE-SEM images of BCT(A), inulin (B) and BCT-g-inulin complex (C) (magnification 1000 ×, scanning electron mode).

Table S1. Effects of the mass ratio of BCT to inulin on the grafting ratio, grafting efficiency and antioxidant activities of BCT-g-inulin complex.

Samples	Inulin	Complex (I)	Complex (II)	Complex (III)
Grafting ratio (g/kg complex)	-	190.50±2.16 ^c	226.90±3.11 ^b	357.54±2.98 ^a
Grafting efficiency (%)	-	52.27±1.32 ^c	59.45±0.94 ^b	74.57±1.44 ^a
ABTS (mmol TE/g complex)	0.04±0.01 ^d	1.02±0.01 ^c	1.21±0.01 ^b	1.95±0.01 ^a
DPPH (mmol TE/g complex)	ND	0.68±0.01 ^c	0.83±0.01 ^b	1.30±0.01 ^a
CUPRAC (mmol TE/g complex)	ND	2.09±0.05 ^c	2.92±0.03 ^b	3.91±0.26 ^a
FRAP (μmol AAE/g complex)	ND	205.39±4.36 ^c	224.87±4.82 ^b	406.88±1.09 ^a

ND: Not detected; TE: Trolox equivalent; AAE: Ascorbic acid equivalent.

Table S2. ¹H NMR signals of BCT, inulin and BCT-g-inulin.

	¹ H NMR signals δ (multiplicity, J = Hz, assignment)
BCT	8.62 – 8.57 (m, 4H), 7.88 – 7.83 (m, 3H), 6.85 (s, 22H), 6.70 (d, J = 93.3 Hz, 34H), 6.69 (d, J = 104.1 Hz, 54H), 6.36 (dd, J = 264.6, 117.3 Hz, 69H), 7.47 – 5.34 (m, 90H), 5.78 (ddd, J = 137.0, 76.2, 61.6 Hz, 107H), 5.05 (s, 4H), 4.90 (s, 3H), 4.77 (s, 6H), 4.66 (s, 3H), 4.48 (d, J = 8.1 Hz, 6H), 4.39 – 4.34 (m, 5H), 3.93 – 3.84 (m, 6H), 3.78 (d, J = 10.9 Hz, 7H), 3.60 (d, J = 33.8 Hz, 18H), 3.52 – 3.29 (m, 136H), 3.20 (s, 14H), 2.50 (s, 228H), 2.33 (s, 9H), 2.25 (dd, J = 32.6, 19.0 Hz, 19H), 2.31 – 2.20 (m, 6H), 2.47 – 0.92 (m, 96H), 0.83 (d, J = 19.0 Hz, 8H).
Inulin	5.25 – 5.06 (m, 2H), 4.85 – 4.27 (m, 5H), 4.27 – 3.48 (m, 12H), 3.73 – 3.48 (m, 8H), 3.73 – 3.01 (m, 14H), 2.51 (tt, J = 3.6, 1.8 Hz, 1H).
BCT-g-inulin	8.56 (m, 1H), 6.50 (s, 2H), 5.35 (s, 8H), 5.60 – 4.21 (m, 69H), 4.59 (s, 7H), 4.59 (s, 24H), 4.56 – 4.28 (m, 12H), 3.32 (s, 373H), 2.57 – 1.95 (m, 417H), 2.18 (dd, J = 254.9, 253.1 Hz, 567H), 1.24 (s, 68H).

Table S3. Molecular weights of BCT, inulin and BCT-g-inulin complex.

	BCT	Inulin	BCT-g-inulin complex
M_n	924	4816	2058
M_w	1066	5366	2740
Polydispersity index	1.15	1.11	1.33

Table S4. Effects of inulin and BCT-g-inulin complex concentrations on the kinetic parameters of α -amylase.

Groups	K_m (mg/mL)	V_{max} (μ M/min)	K_m/V_{max}
Inulin (25 μ g/mL)	0.008	4.715	0.0018
Inulin (50 μ g/mL)	0.009	4.664	0.0019
Inulin (75 μ g/mL)	0.011	4.655	0.0023
BCT-g-inulin complex (25 μ g/mL)	0.578	4.772	0.1212
BCT-g-inulin complex (50 μ g/mL)	0.722	4.575	0.1579
BCT-g-inulin complex (75 μ g/mL)	1.762	4.525	0.3895

K_m : The Michaelis constant; V_{max} : Maximum velocity.

Table S5. Effects of inulin and BCT-g-inulin complex concentrations on the kinetic parameters of α -glucosidase.

Groups	K_m (mg/mL)	V_{max} (μ M/min)	K_m/V_{max}
Inulin (4 μ g/mL)	1.536	2.537	0.6056
Inulin (8 μ g/mL)	1.635	2.528	0.6469
Inulin (12 μ g/mL)	1.627	2.389	0.6807
BCT-g-inulin complex (4 μ g/mL)	0.296	0.728	0.4075
BCT-g-inulin complex (8 μ g/mL)	0.904	0.749	1.2074
BCT-g-inulin complex (12 μ g/mL)	0.996	0.668	1.4914

Table S6. Binding parameters for the interactions of α -amylase with inulin and BCT-g-inulin complex.

	K_{sv} ($\times 10^{-1}$ mL/ μ g)	K_q [$\times 10^7$ mL/(μ g \cdot S)]	K_a ($\times 10^{-1}$ L/ μ g)	n
α -amylase + inulin	0.15	0.15	0.46	0.60
α -amylase + BCT-g-inulin complex	2.18	2.18	0.78	1.79

Note: K_{sv} : the dynamic quenching constant, K_q : the quenching rate constant of the biomolecule, K_a : the binding constant, n: binding sites.

Table S7. Binding parameters for the interactions of α -glucosidase with inulin and BCT-g-inulin complex.

	K_{sv} ($\times 10^{-1}$ mL/ μ g)	K_q [$\times 10^7$ mL/(μ g \cdot S)]	K_a ($\times 10^{-1}$ L/ μ g)	n
α -glucosidase + inulin	0.22	0.22	1.00	0.43
α -glucosidase + BCT-g-inulin complex	2.25	2.25	1.58	1.13