Electronic supplementary material

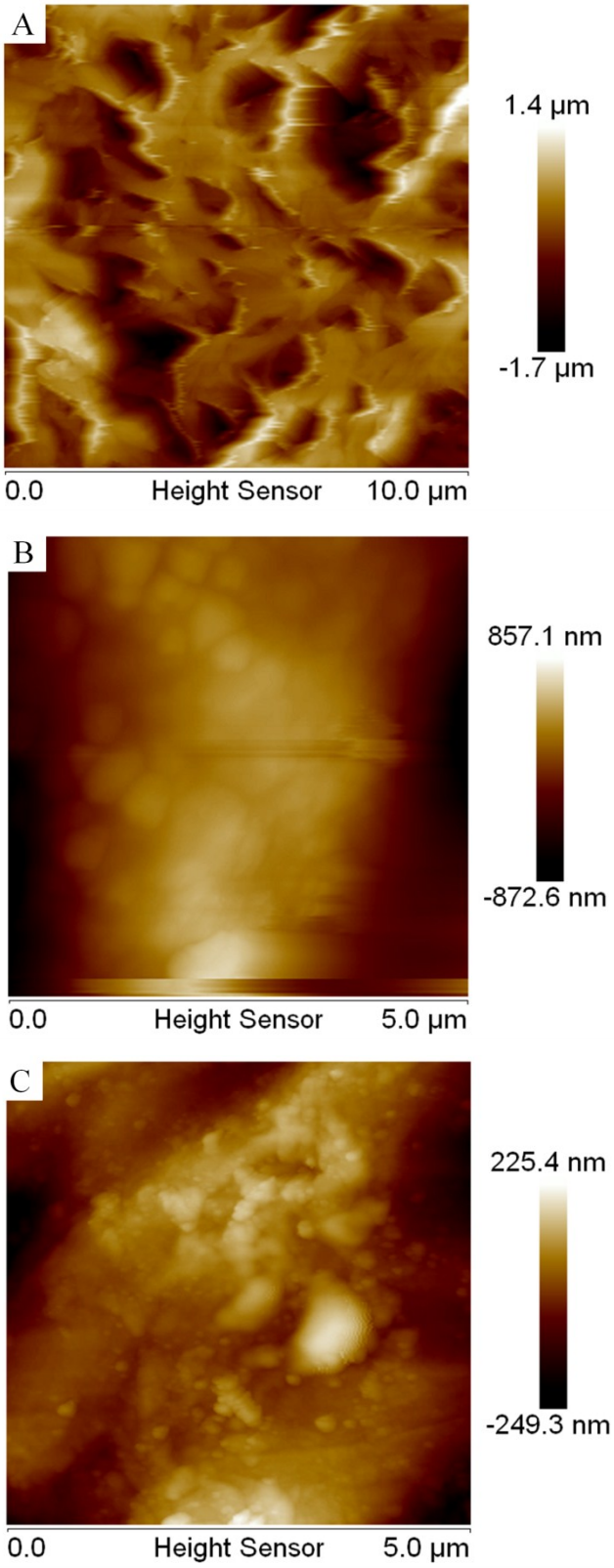


Fig. S1.Two-dimensional atomic force microscope images of nylon membrane (A), surface initiator-functional nylon membrane (B) and boronate affinity membrane (C).

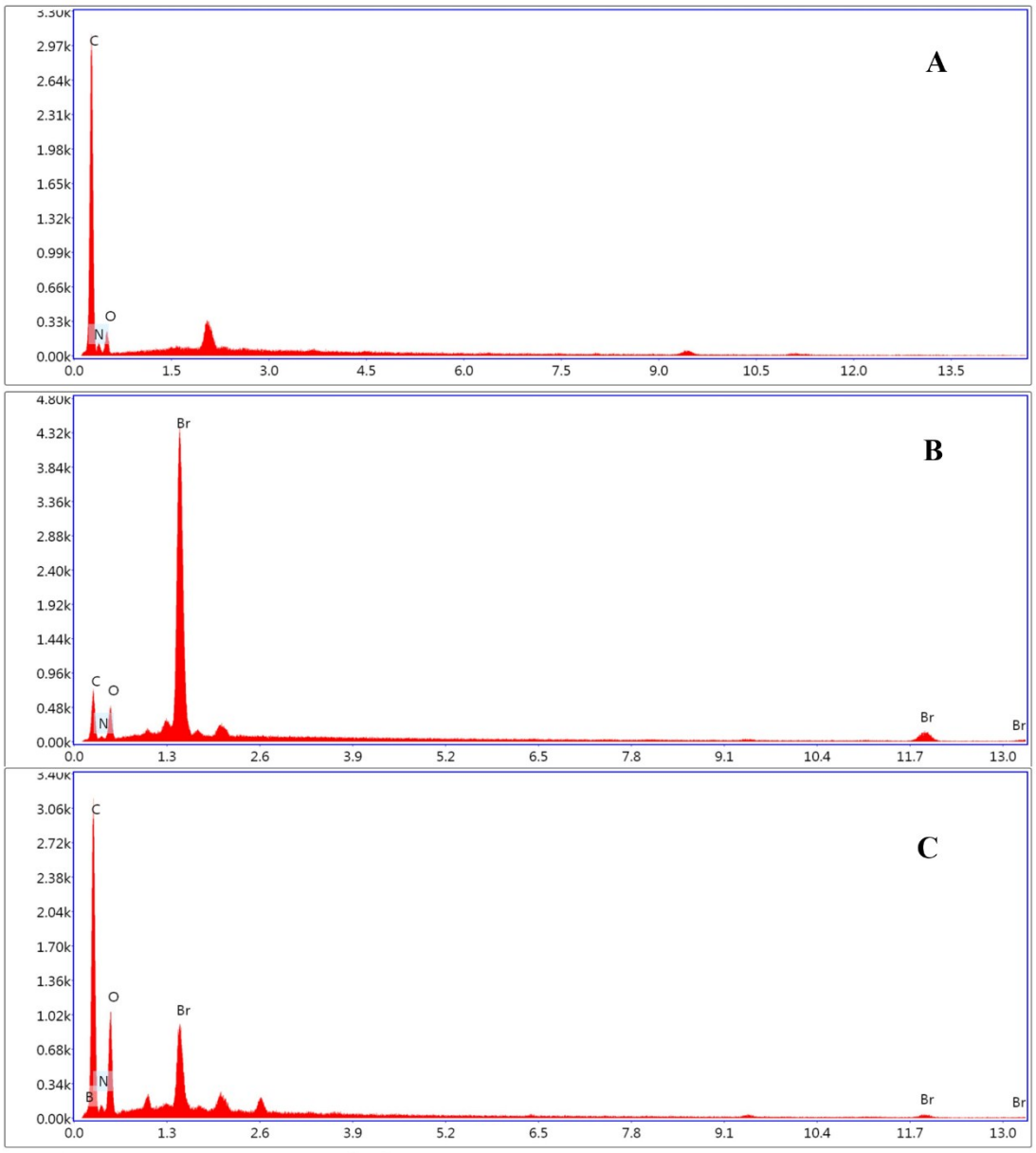
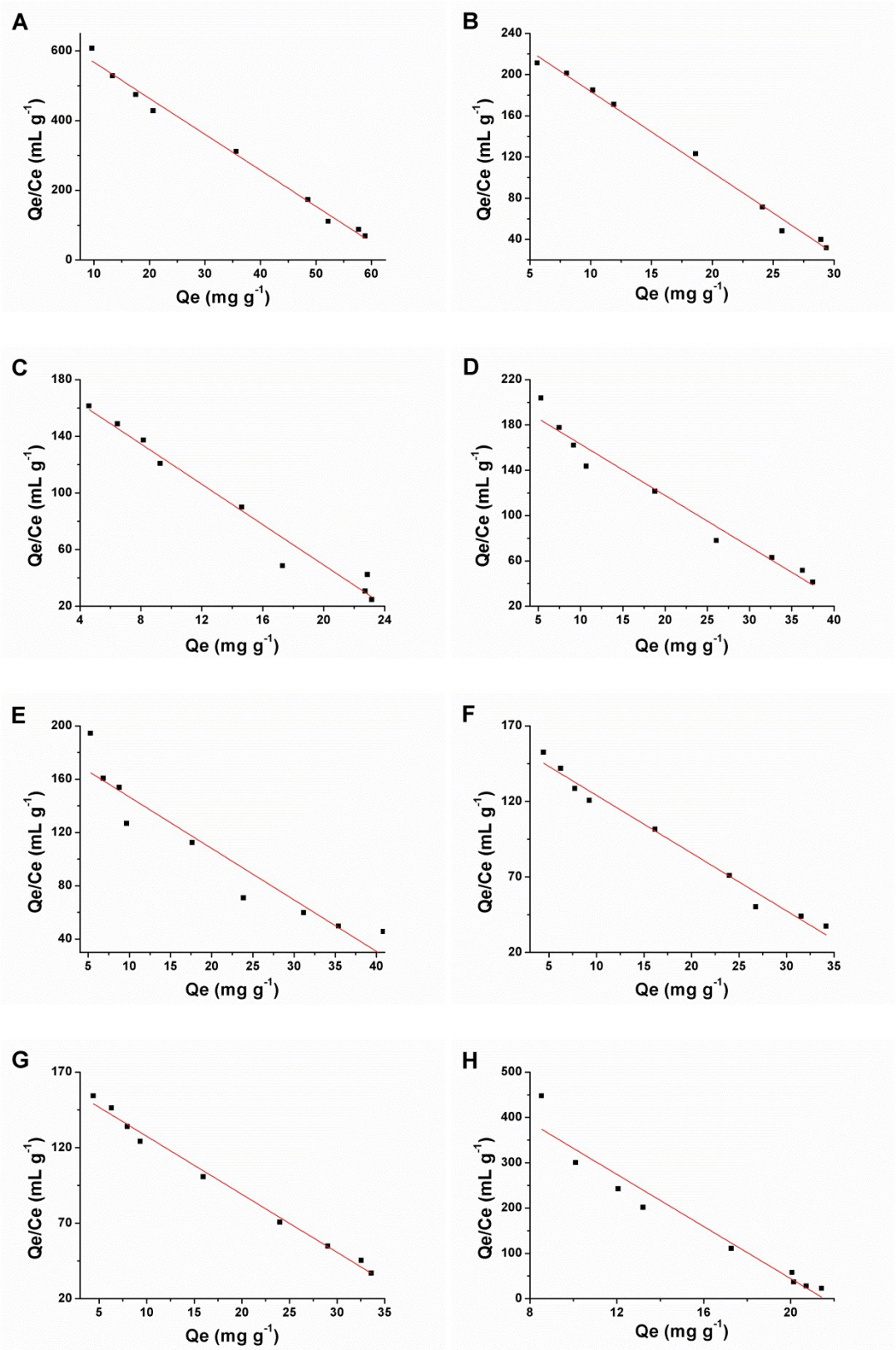


Fig. S2. Selected area SEM-EDS mapping of nylon membrane (A), surface initiator-functional nylon membrane (B) and boronate affinity membrane (C).


A
Qe/Ce (mL g-1)
Qe (mg g-1)
B
Qe/Ce (mL g-1)
Qe (mg g-1)
C
Qe/Ce (mL g-1)
Qe (mg g-1)
D
Qe/Ce (mL g-1)
Qe (mg g-1)
E
Qe/Ce (mL g-1)
Qe (mg g-1)
F
Qe/Ce (mL g-1)
Qe (mg g-1)
G
Qe/Ce (mL g-1)
Qe (mg g-1)
H
Qe/Ce (mL g-1)
Qe (mg g-1)

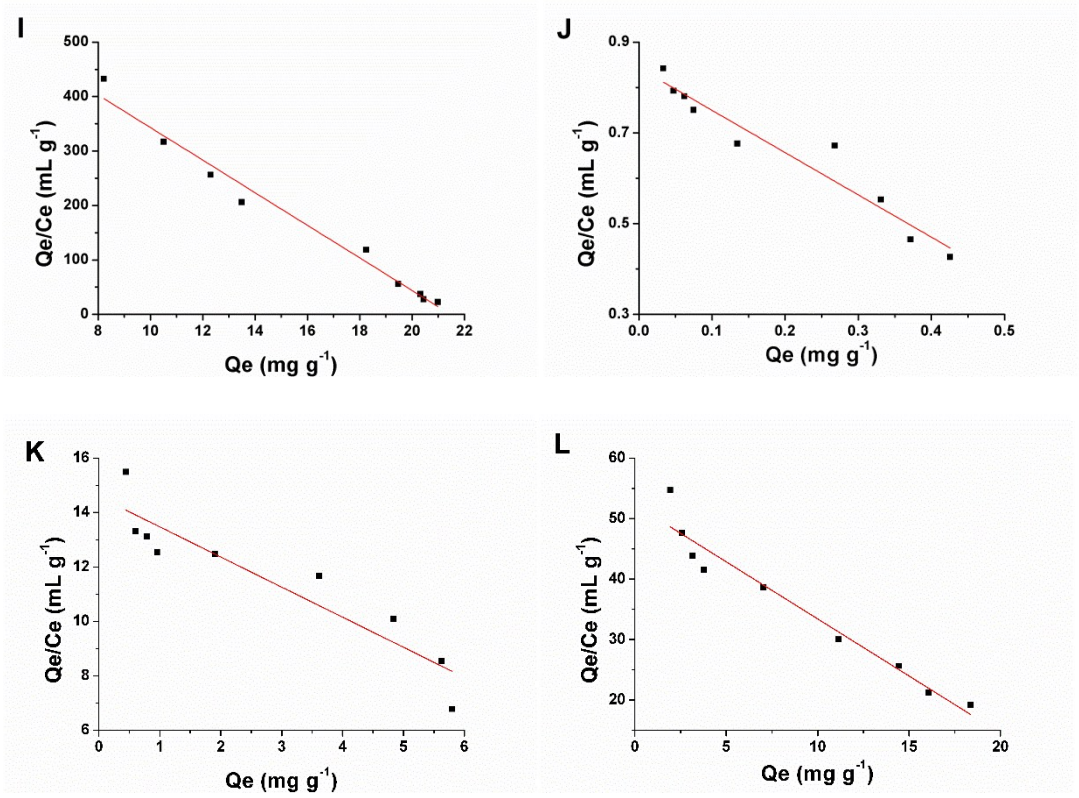


Fig. S3. Scatchard plots for binding of BA membrane with catechol (A),gallic acid (B), caffeic acid (C), luteolin (D), quercetin (E), catechin (F), epicatechin (G), chlorogenic acid (H), rosmarinic acid (I), ferulic acid (J), resorcinol (K) and kaempferol (L).

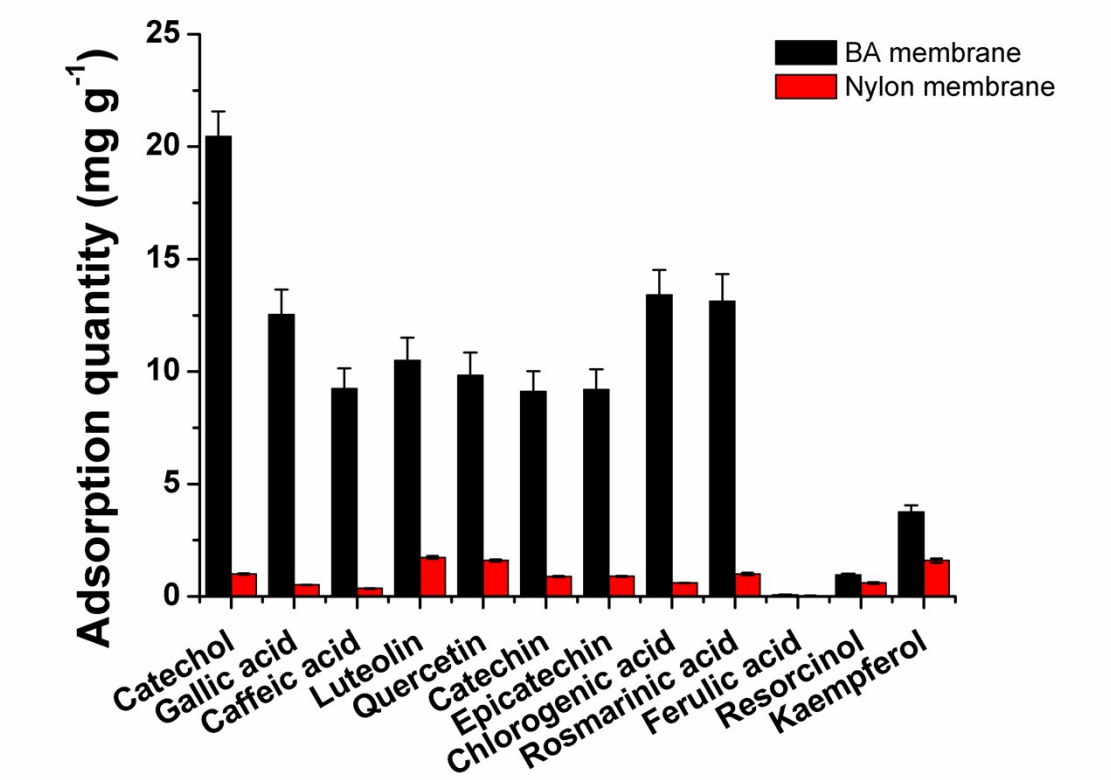


Fig. S4. The adsorption quantity of polyphenols on BA membrane and Nylon membrane.A 5.0 mg of BA membrane or Nylon membrane was used to adsorb different polyphenols in 2.0 mL of 100 μg mL^{-1} solution.

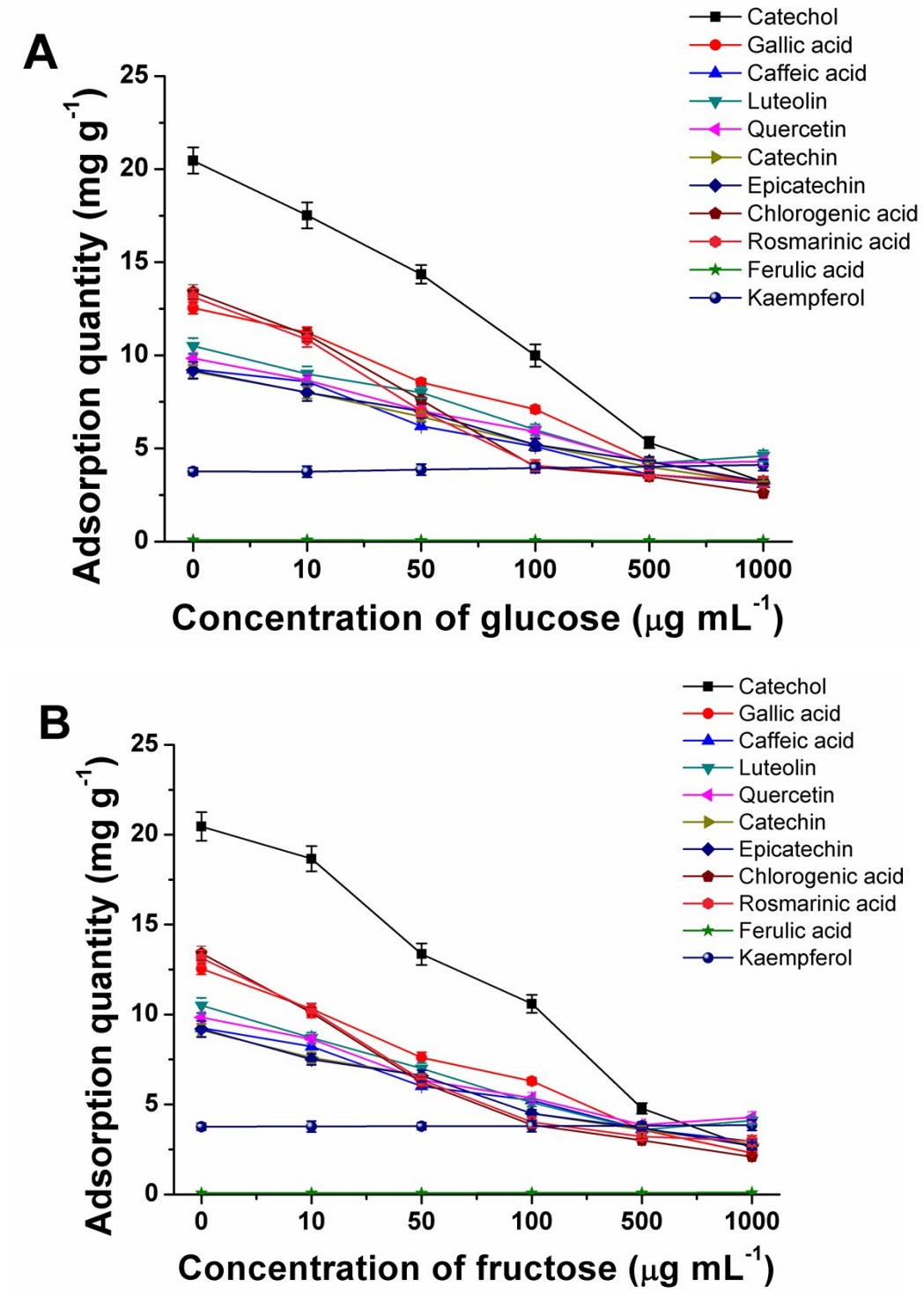


Fig. S5. Effects of glucose (A) and fructose (B) on the membrane extraction procedures.

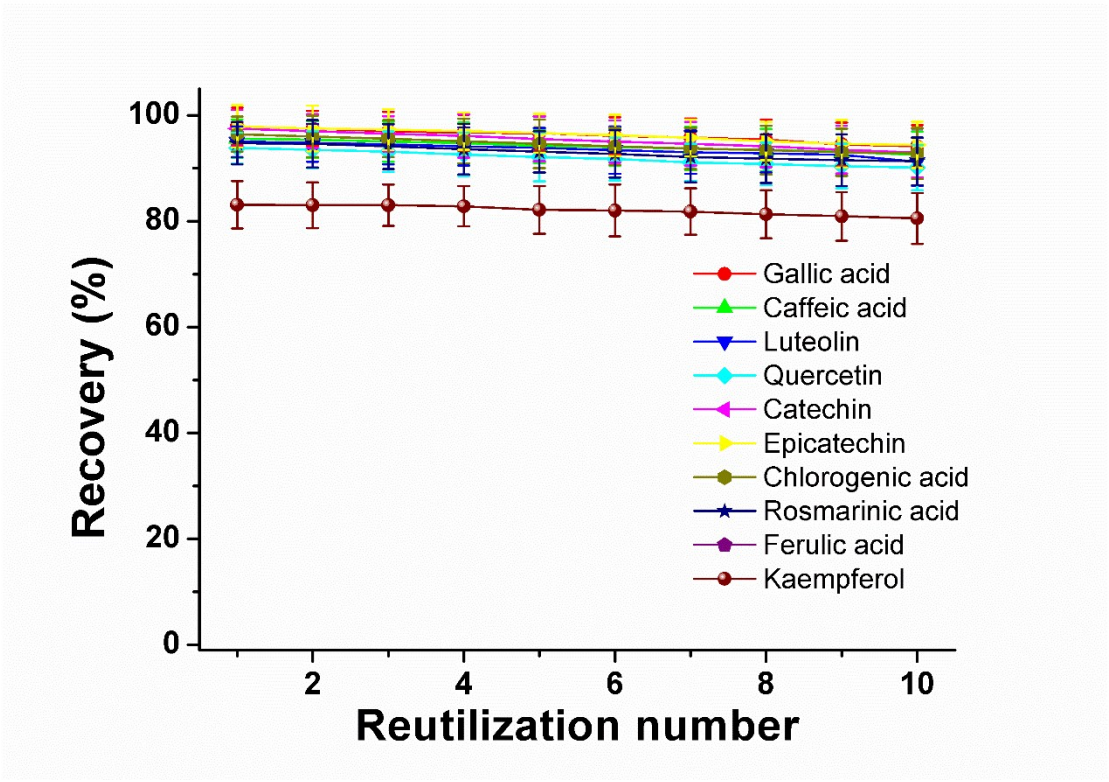


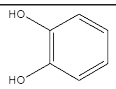
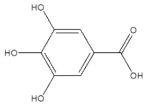
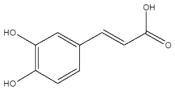
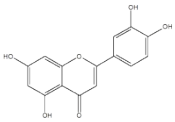
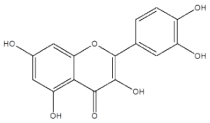
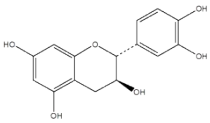
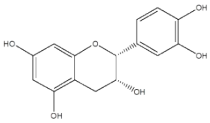
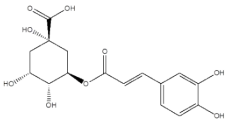
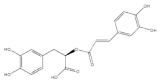
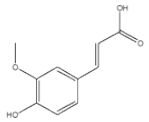
Fig. S6. Reusability of BA membrane in real sample (n=3). Sample pretreatment: 1.0 mL of tea sample with spiked concentrations at 0.1 μg $mL^{-1}$was mixed with 1.0 mL of 50 mM phosphate buffer (pH 8.0); Desorption condition: 2.0 mL of TCA-methanol (3/97, *v*/*v*). The BA membrane was washed with 2.0 mL of methanol and 1.0 mL of phosphate buffer (50 mM, pH 8.0) before next use.

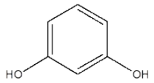
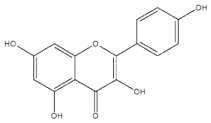
Table S1. The intraday, interday and batch-to- batch repeatability of BA membranes.

	Binding amount of chlorogenic acid on BA membrane ($\mu mol\ g^{-1}$) [a]					RSD (%)
	n=1	n=2	n=3	n=4	n=5	
Intraday precision	56.77	56.12	58.78	57.46	56.82	0.5
Interday precision	56.77	59.96	57.95	54.34	51.75	1.9
Batch-to-batch	56.77	54.69	59.36	59.74	54.36	3.9

[a] Approximately 5 mg of BA membrane was used for extracting from 2 mL of chlorogenic acid solution (pH=8.0, 500 $\mu g\ mL^{-1}$) every time.

Table S2. Chemical structure, mane, log P_{ow}, molecular volume, molecular weight and p*Ka* of these compounds.

Chemical structure Name	Log P_{ow} [a]	Molecular volume (cm^3 mol^{-1}) [b]	Molecular weight [b]	pK_a (pK_{a1})
 Catechol	0.88±0.20	100.08	110.11	7.12 [c]
 Gallic acid	0.91±0.33	135.10	170.12	4.70 [d]
 Caffeic acid	1.42±0.36	154.50	180.16	4.38 [e]
 Luteolin	2.40±0.65	232.07	286.23	6.19 [f]
 Quercetin	2.07±0.72	240.08	302.24	6.89 [g]
 Catechin	0.49±0.38	244.14	290.27	8.16 [h]
 Epicatechin	0.49±0.38	244.14	290.27	8.16 [h]
 Chlorogenic acid	-0.36±0.43	296.27	354.31	3.36 [e]
 Rosmarinic acid	1.70±0.41	303.54	360.31	2.79 [g]
 Ferulic acid	1.64±0.36	172.03	194.19	4.70[e]

 Resorcinol	0.76±0.20	100.08	110.11	7.20 [c]
 Kaempferol	2.05±0.60	232.07	286.23	6.93 [g]

[a]Log P_{ow} (octanol-water partition coefficient) was obtained by using Scifinder and calculated using ACDLabs Freeware (http://www.acdlabs.com/home/).

[b]Molecular volume and weight were calculated from software of Molinspiration (http://www.molinspiration.com/).

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[g] H. Shival, D. Lichtenberg, E. Gazit, The molecular mechanisms of the anti-amyloid of phenols. Amyloid, 2007, 14, 73-87.

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Table S3. Comparison of binding capacity and preparation method of the proposed BA membrane with previously reported BA materials.

Supports	Preparation method	Analytes	Q_{max} (μmol g^{-1})	Ref.
Regenerated-celluose membrane	PEI as enlarged skeleton, three-step approach	Catechol	511	11
Ammoniated PGMA microsphere	SI-RAFT, three-step approach	Adenosine	99.2	27
Silica microsphere	ATRP and chain-end functionalization, four-step approach	Catechol	513.6	28
Graphene oxide	ATRP, four-step approach	Catechol	1111	30
Nylon 66 membrane	ATRP, two-step approach	Catechol	589.8	This work

Table S4. The analytical performance of UPLC for determination gallic acid, catechin, chlorogenic acid, epicatechin, caffeic acid, ferulic acid, rosmarinic acid, quercetin, luteolin and kaempferol.

Compounds	Lineal range (ug mL^{-1})	Linear equation	*r*	LOD(ng)	LOQ (ng)
Gallic acid	0.1-2.0	y=7352.2x+6498.7	0.9991	0.06	0.21
Catechin	0.1-2.0	y=5538.5x+283.13	0.9954	0.18	0.60
Chlorogenic acid	0.1-2.0	Y=16520x-732.66	0.9978	0.09	0.24
Epicatechin	0.1-2.0	Y=8025.8x+2362.4	0.9984	0.06	0.21
Caffeic acid	0.1-2.0	Y=36442x-2141.7	0.9981	0.18	0.60
Ferulic acid	0.1-2.0	Y=36397x-986.73	0.9994	0.06	0.18
Rosmarinic acid	0.1-2.0	Y=16582x+9063.6	0.9988	0.12	0.36
Quercetin	0.1-2.0	Y=40163x-1290	0.9993	0.20	0.60
Luteolin	0.1-2.0	Y=46208x-1095.5	0.9989	0.20	0.60
Kaempferol	0.1-2.0	Y=43449x-1213.6	0.9993	0.20	0.60

Table S5. Comparison between the proposed method and previously published methods for determination of polyphenols.

Number of analytes [a]	Number of *cis*-diol-containing polyphenols (Revovery, %)[a]	limit of detection [a]	Sample pretreatment	Instrument	Ref.
10	8 (91.2%-100.5%)	0.06-0.9 ng	Extraction of dilute tea sample with BA membrane	UPLC-UV	This work
15	1 (94.6%)	Not reported	Extraction with ether or ethyl acetate, derivatization with BSTFA+TMCS	GC-MS	1
11	10 (Not reported)	0.5-7.5 ng	Solid sample was ground and mixed with 70% aqueous methanol	HPLC-DAD	2
8	3 (75-80%)	8.6-29.0 ng [b]	Extraction of stored powder with 90% methanol containing 0.5% acetic acid	HPLC-MS	3
7	5 (63-95%)	1.0-3.0 ng	SPE of 250 mL of aqueous solution	HPLC-PAD	4
22	10 (78-100%)	0.25-15 ng	Extrusion of l kg of fruit for collecting juice, extraction of freeze-dried juice with methanol-water-acetic acid (30:69:1, v/v/v)	HPLC-DAD	5
5	4 (80.9-101.5%)	0.5-4 ng	In-tube SPME of juice sample	HPLC-UV	6

[a] Data were selected from Addition and Recovery Test. [b]It was calculated as signal-to-noise ratio equal to 10.

Reference

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