

## Electronic Supplementary Material

### A fast response TLC-SERS substrate for on-site detection of hydrophilic and hydrophobic adulterants in botanical dietary supplements

Qingxia Zhu <sup>a</sup>, Yongbing Cao <sup>b\*</sup>, Dan Li <sup>cd</sup>, Fang Fang <sup>c</sup>, Feng Lu <sup>c\*</sup>, Yongfang Yuan <sup>a\*</sup>

<sup>a</sup> Department of Pharmacy, Shanghai 9th People's Hospital, Shanghai JiaoTong University School of Medicine, Shanghai, 201999, China. E-mail: nmxyyf@126.com

<sup>b</sup> Institute of Vascular Disease, Shanghai TCM-Integrated Hospital, Shanghai University of Traditional Chinese Medicine, Shanghai 200082, China. E-mail: ybcao@vip.sina.com

<sup>c</sup> Department of Pharmaceutical Analysis, School of Pharmacy, Second Military Medical University, Shanghai, 200433, China. E-mail: 13917563512@163.com

<sup>d</sup> Department of Pharmacy, Shanghai Chang Hai Hospital, Second Military Medical University, Shanghai, 200433, China.

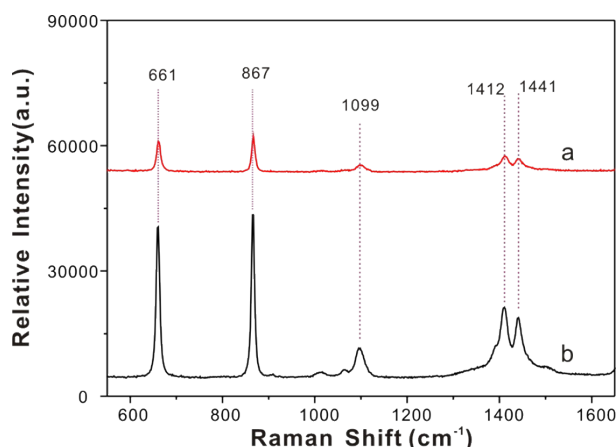


Fig. S1 (a) Blank SERS spectrum of DMF 2:1 silver colloid, and (b) Raman spectrum of DMF solvent.

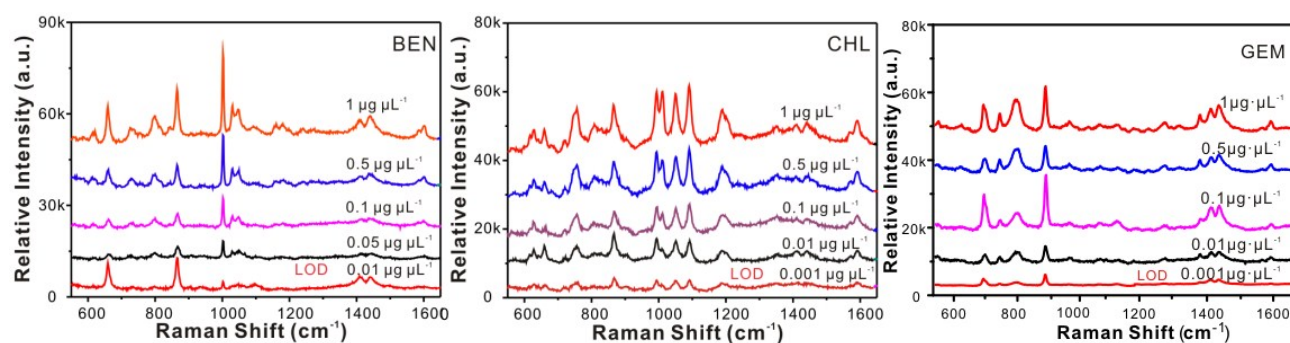
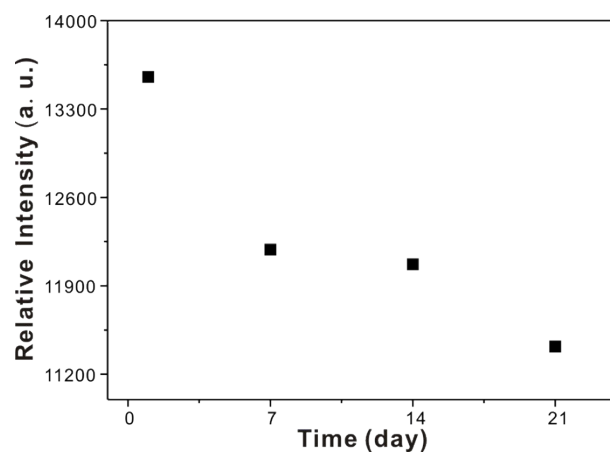
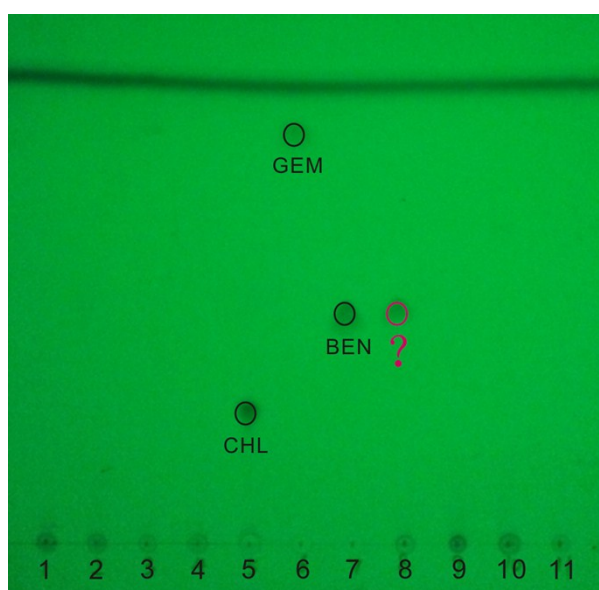


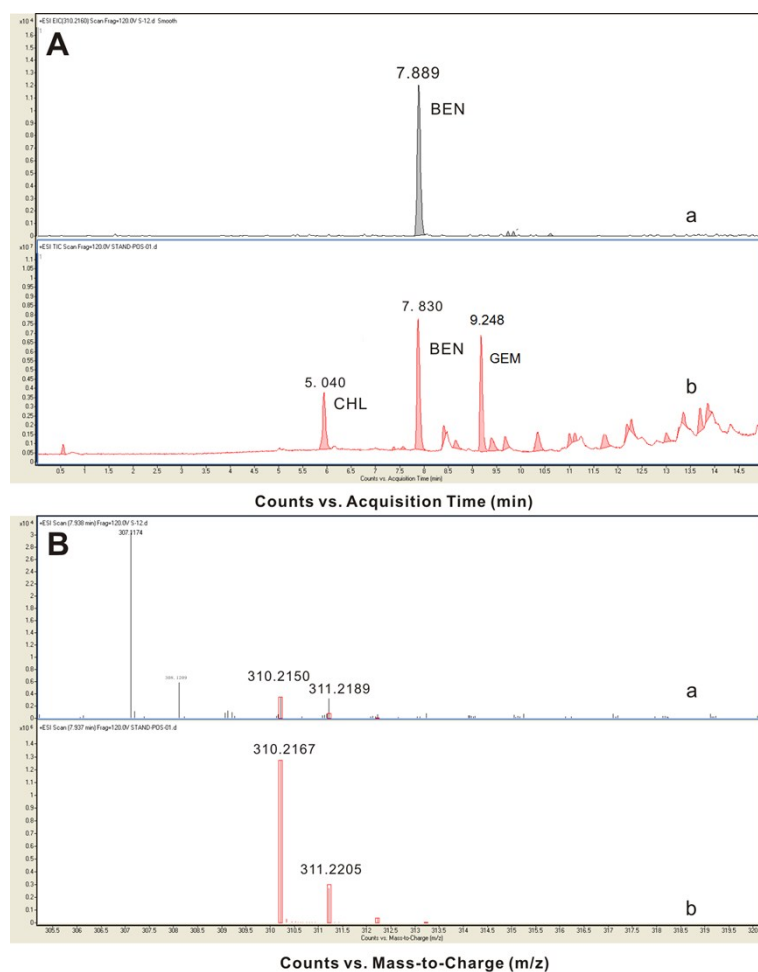
Fig. S2 (a) SERS spectra of different analytes with different concentrations using DMF 2:1 silver colloid.



**Fig. S3** SERS intensity of CHL at 1091 cm<sup>-1</sup> detected by Lee-Meisel colloid changing with time (day).



**Fig. S4** Results from TLC analysis of ten real samples developed with dichloromethane-methanol-water 9:1:0.1 (v: v: v), 1-4 (samples 1-4), 5-7 (references CHL, GEM, BEN), 8-11 (samples 5-8).



**Fig. S5** (A) HPLC spectra of sample 5 (a) and standards of CHL, DIP, BEN (b); (B) MS spectra of sample 5 (a) and standard of BEN (b)

**Table S1** Composition of reactants used.

Colloids	Mass of AgNO <sub>3</sub> (mg)	Mass of PVP (mg)	Mass ratio of AgNO <sub>3</sub> to PVP
DMF 1:1	8.5	8.5	1:1
DMF 2:1	17.0	8.5	2:1
DMF 3:1	25.5	8.5	3:1
DMF 4:1	34.0	8.5	4:1

**Table S2** Validation of BEN in sample 5 by UPLC-QTOF/MS.

Name	Identification formula	Mass	Error (ppm)
	[M+H] <sup>+</sup>		
BEN standard	C <sub>21</sub> H <sub>28</sub> NO	310.2167	-0.58
Sample 5	C <sub>21</sub> H <sub>28</sub> NO	310.2153	4.01