

SUPPORTING INFORMATION

**Disposable Face Masks for Non-Invasive Drug Detection: A Proof-of-Concept Study
with Cough Syrup Constituents**

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Table S1. Information of the Cough Syrup used in this Study.

Brand	Madame Pearl's Cough Syrup
Manufacturer	Luxembourg Medicine Co. Ltd
Origin	Hong Kong
Recommended dosage	One tablespoonful (15mL) 3 times daily and two tablespoonfuls (30mL) at bedtime for adult
Labelled concentration; w/v, %	
Codeine Phosphate	0.090
Ephedrine HCl	0.033
Guaiphenesin	0.704
Chlorpheniramine Maleate	0.0210

Table S2. Efficiency and Precision of Extracting Codeine, Ephedrine, Guaifenesin, and Chlorpheniramine in Mask Samples.

	Accuracy			Precision	
	Spiked, ng/mask	Found, ng/mask ^a	Recovery, %	Interday, %RSD ^a	Intraday, %RSD ^a
Cod	0.01	0.01 ± 0.002	98.3	7.0	6.4
	0.1	0.10 ± 0.01	95.7	9.3	6.6
	1	1.01 ± 0.08	101.1	6.1	8.0
Eph	0.01	0.009 ± 0.001	88.4	5.7	6.4
	0.1	0.09 ± 0.01	86.4	3.1	8.1
	1	0.97 ± 0.04	97.3	6.3	4.2
Guf	0.01	0.009 ± 0.003	90.8	5.6	5.8
	0.1	0.09 ± 0.01	91.5	8.1	9.3
	1	0.88 ± 0.07	88.1	7.1	7.1
Clp	0.01	0.01 ± 0.004	98.9	10.2	4.5
	0.1	0.09 ± 0.01	91.0	6.3	4.5
	1	0.97 ± 0.06	97.1	4.1	5.7

^a $n = 7$

Table S3. Tidal Volume, Breath Rate, and Total Sampling Volume of Volunteers Participated in this Study.

	V1	V2	V3	V4	V5	V6	V7
Breathing rate, breath/min	20.7 ± 2.3	9.7 ± 1.2	21.3 ± 2.5	13.3 ± 0.6	22.7 ± 1.2	15.0 ± 1.0	9.7 ± 0.6
Tidal volume, L/breath	0.17 ± 0.02	0.35 ± 0.03	0.26 ± 0.02	0.25 ± 0.02	0.15 ± 0.003	0.5 ± 0.04	0.5 ± 0.02
Total sampling volume, m ³	0.05 ± 0.01	0.05 ± 0.002	0.08 ± 0.002	0.05 ± 0.003	0.05 ± 0.003	0.11 ± 0.02	0.07 ± 0.002

* The data represent means $\pm$ SD for three independent experiments.

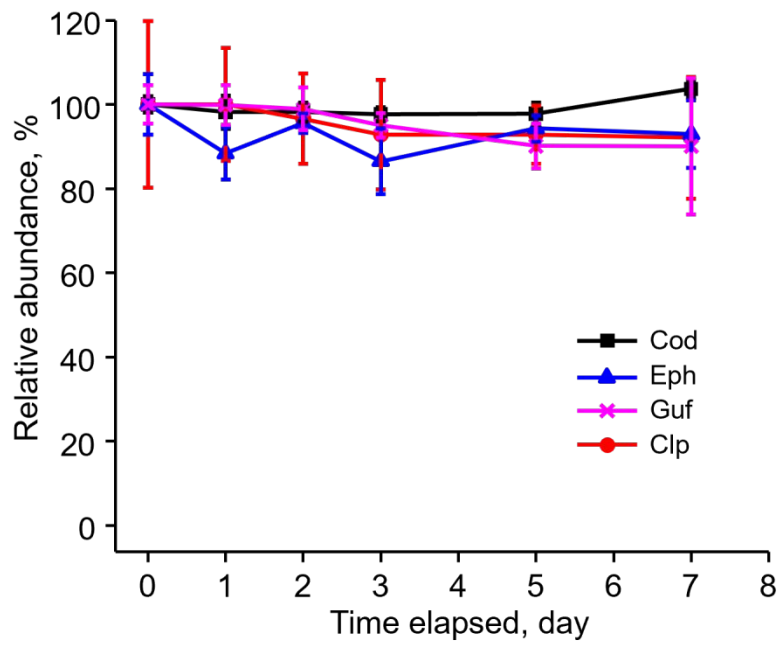


Figure S1. Relative abundance of drugs upon spiking to masks and storing at -20 °C for up to 7 days. Data represent mean value $\pm$ SD from three independent experiments.

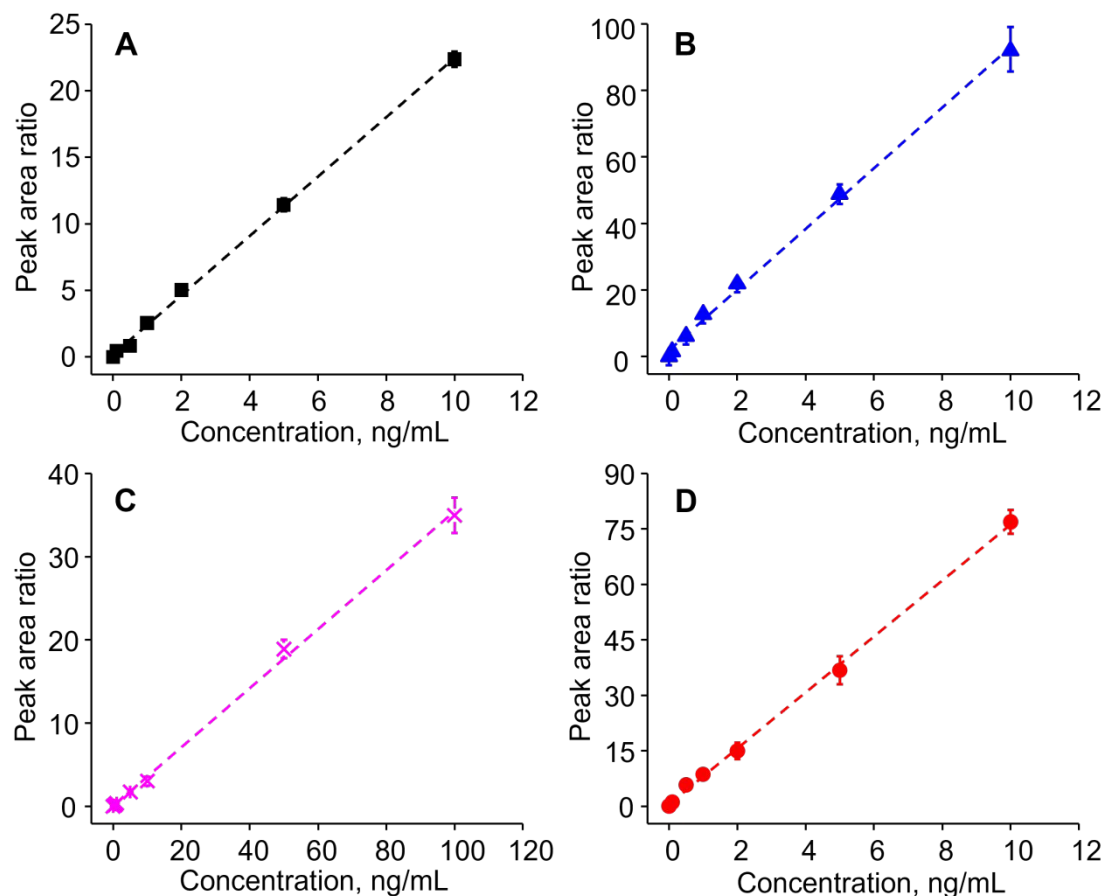


Figure S2. Calibration curves used for quantitative analysis of codeine (A), ephedrine (B), guaifenesin (C), and chlorpheniramine (D). Fitting the data by linear regression yielded lines with the following equations: Cod (A): $y = 2.23x + 0.15$ ($r^2 = 0.99$); Eph (B): $y = 9.11x + 1.89$ ($r^2 = 0.99$); Guf (C): $y = 0.35x + 0.01$ ($r^2 = 0.99$); Clp (D): $y = 7.56x + 0.52$ ($r^2 = 0.99$). Data represent mean value $\pm$ SD from three independent experiments.

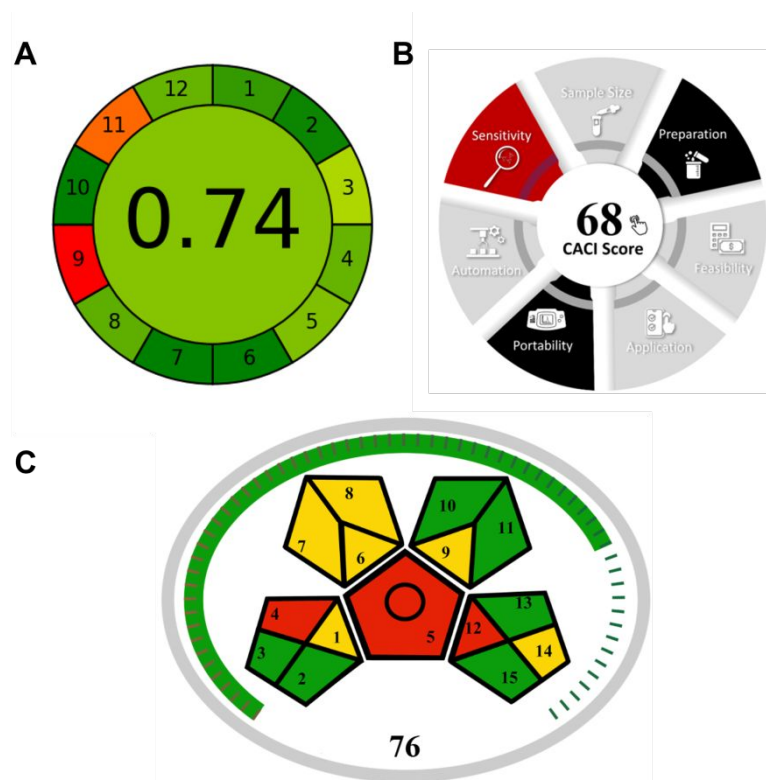


Figure S3. Assessment score of AGREE (A), CACI (B), and MoGAPI (C) for the developed face mask-based sampling method for drug analysis.