Supplementary Information

A catechol-meter based on conventional personal glucose meter for portable detection of tyrosinase and sodium benzoate

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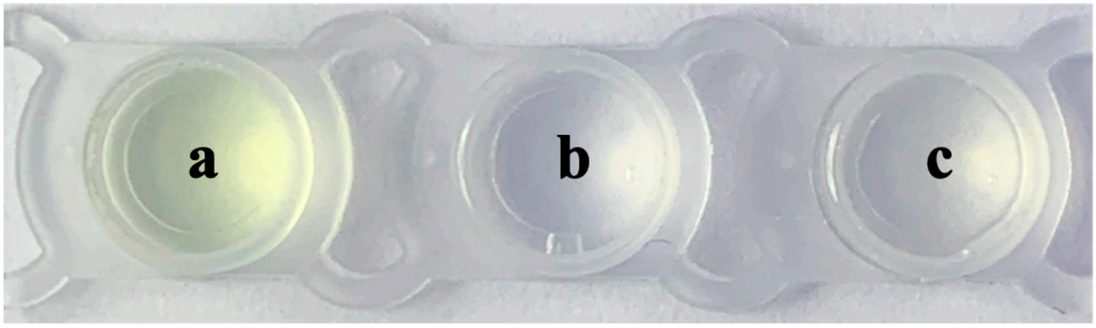

Figure S1. The color change of $K_3[Fe(CN)_6]$ solutions before (**a**) and 30 s after (**c**) addition of catechol (CA) (**b**).

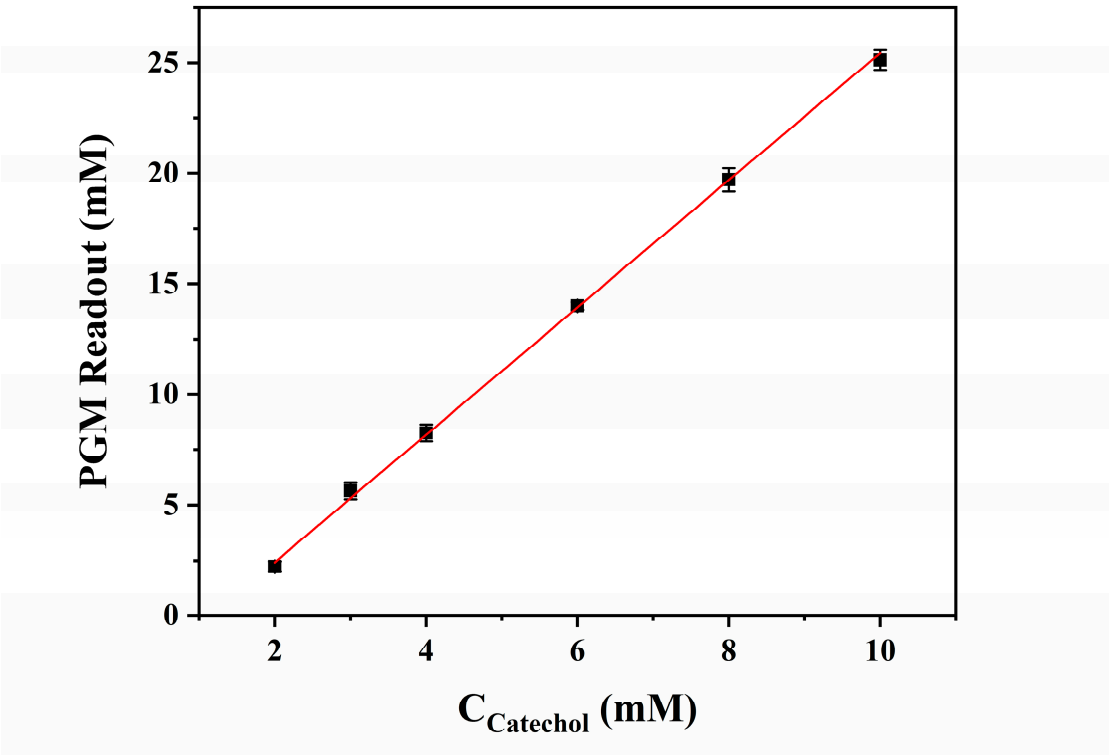

Figure S2. The calibration plot for CA determined by PGM (*n*=3).

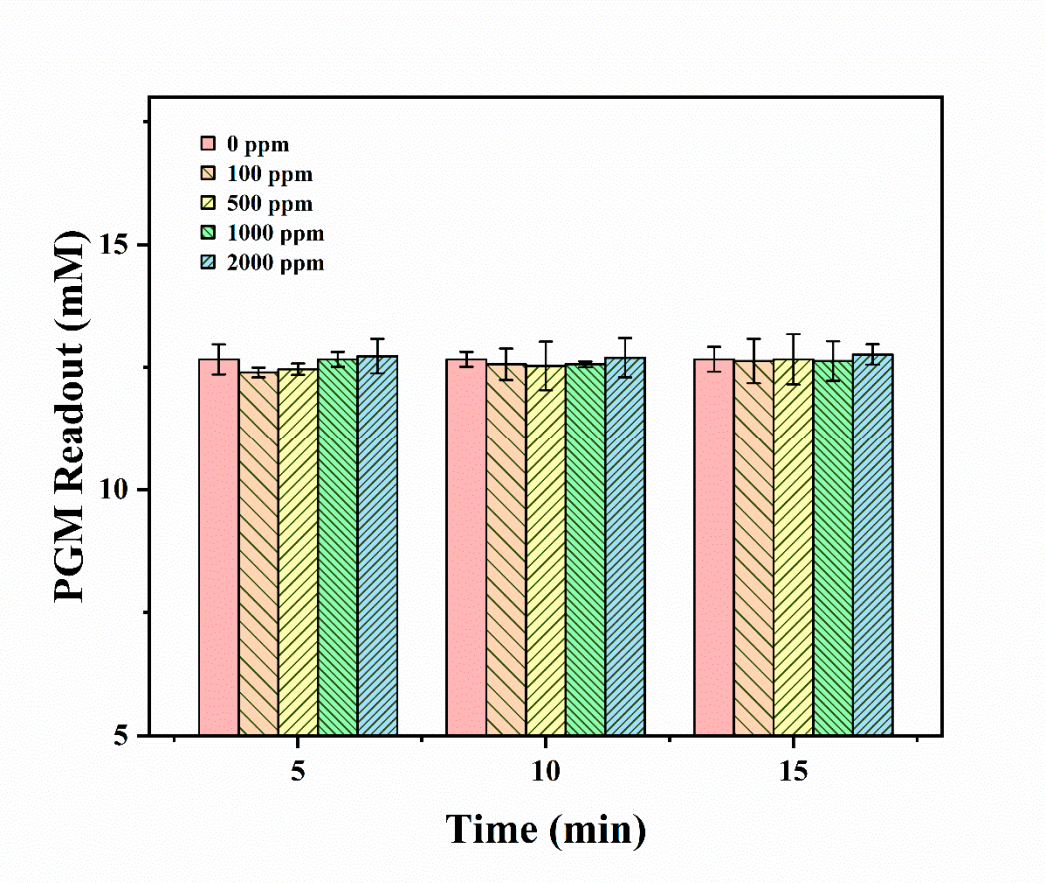

Figure S3. Effect of sodium benzoate (SBA) concentration with different incubation time on the PGM readout of CA (*n*=3). Conditions: 15.0 mM of CA, 0–2000 ppm of SBA, incubation time of 5.0, 10.0, and 15.0 min, respectively. All the concentrations are final concentration.

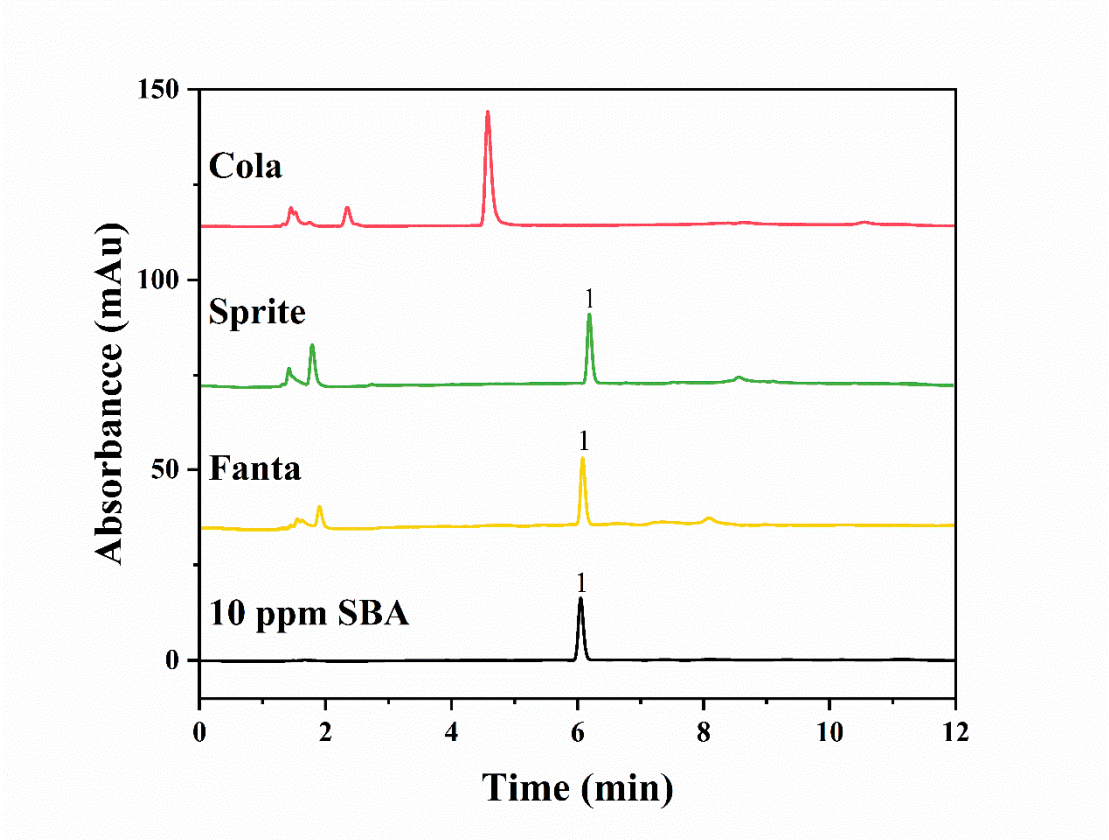

Figure S4. HPLC chromatograms of SBA (10 ppm) and three carbonated beverages (Cola, Sprite, and Fanta) diluted 12, 15, and 20 times, respectively. 1, SBA.

Table S1. Some reported tyrosine-based biosensors for the TYR determination.

Methods	Materials	Line range	LOD	References
Fluorescence	Lucigenin probe	0.67–67.0 U/mL	0.54 U/mL	[1]
Fluorescence	Ag&Mn:ZnInS QDs	0.5–2.5 U/mL	0.09 U/mL	[2]
Electrochemistry	WVFY-modified bio-FETs	10 fM–1 nM	1.9 fM	[3]

QDs: quantum dots; WVFY: tetrapeptide tryptophan–valine–phenylalanine–tyrosine; bio-FETs: field-effect transistor-based biosensors; LOD: limit of detection.

Table S2. Comparisons of the developed PGM-based method with the reported methods for the TYR determination.

Methods	Line range (U·mL^{-1})	LOD / LOQ (U·mL^{-1})	Cost	Operator	References
Colorimetry	–	10 / –	High	Highly trained	[4]
Fluorescence	0–800	5	High	Highly trained	[5]
Fluorescence	0–80	2.76 / –	High	Highly trained	[6]
Electrochemistry	2–50	0.83 / –	High	Highly trained	[7]
Electrochemistry	3.76–27.68	0.52/ –	High	Highly trained	[8]
PGM	1.0–103.3	– / 1.0	Low	Minimally trained	This work

LOD: limit of detection; LOQ: limit of quantitation.

Table S3. Recovery studies of TYR in normal human serum detected by the PGM-based method.

Sample	Spiked tyrosinase (U/mL)	Found tyrosinase (U/mL)	Recovery (%)	RSD (n = 3, %)
Normal human serum	0[a]	–	–	–
	26.38	27.64 ±0.74	104.8	2.7
	52.75	51.91 ± 0.98	98.4	1.9
	79.13	77.49 ± 0.37	97.9	0.5

[a] There is no TYR or its content lower than the quantification limit of the PGM-based method.

Table S4. Comparisons of the developed PGM-based method with reported methods for the SBA determination.

Methods	Analytes	Line range (ppm)	LOD / LOQ (ppm)	References
CIC-CD	BA	0.25–20	4.1 / 12.6	[9]
IC-CD	BA	-	16.5 / 54.5	[10]
DLLME-SERS	SBA	10–500	0.56 / –	[11]
Paper-based	BA	100–700	73.6	[12]
MCA system	SBA	500–5000	50 / –	[13]
PGM-based	SBA	6.25–1000	– / 6.25	This work

CIC-CD: Capillary ion chromatography with conductivity detection; IC-CD: Ion chromatography with conductivity detection; DLLME-SERS: Dispersive liquid-liquid microextraction combined with surface enhanced Raman scattering; MCA: Microfluidic colorimetric analysis

Table S5. The PGM readout of the three beverages spiked with SBA.

Spiked (ppm) (*n*=3)	PGM Readout (mM)		
	Cola	Sprite	Fanta
0	12.1 ± 0.20	17.9 ± 0.12	16.6 ± 0.10
50	15.1 ± 0.10	20.4 ± 0.06	18.8 ± 0.15
100	16.2 ± 0.06	21.2 ± 0.15	19.9 ± 0.15
200	17.5 ± 0.10	22.2 ± 0.06	20.9 ± 0.06
Background readout	6.2 ± 0.25	11.0 ± 0.15	9.5 ± 0.36

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