

SUPPLEMENTARY MATERIAL

Phenolic compound	Permissible concentration limit	
Phenol	1 µg/L	0.010 µM
Nonylphenol	2.0 µg/L	0.009 µM
Pentachlorophenol	1 µg/L	0.004 µM
Total cresol	200 µg/L	1.85 µM
BPA	4 µg/kg bw/day (Tolerable daily intake)	

Table S1. Permissible concentration limits for different phenolic compounds. Data are taken from EPA website <https://www.epa.gov>.

Table S2 Relevant working parameters for the optical sensors for the determination of phenolic compounds in environmental applications discussed in the present paper.

Phenolic compound	Optical technique	Sensitivity	Linear range	LOD	Response time	Ref.
Bisphenol A	Absorption spectroscopy	0.1/ppm	0.23-5 ppm	0.23 ppm	10 min	24
	Reflectance spectroscopy					26
	Color intensity		Up to 25 µg/L	0.86 (± 0.1) µg/L	6-17 min	69
	Fluorescence spectroscopy		0.5–100 µg/L	0.06 µg/L		77
	Fluorescence spectroscopy		2 nM -100 nM	1.86 nM 0.45 ng mL ⁻¹	~400 s	81
	Fluorescence spectroscopy		0.0005-1.0 ng/mL (ppb)			82
	SPR		1 fM -1 nM	330 ± 70 aM		84
	SPR		0.1-2000 mM			86
	Fluorescence spectroscopy		3×10 ⁻⁹ -5×10 ⁻⁶ g mL ⁻¹	1.7×10 ⁻⁹ g mL ⁻¹	~3 min	87
	SPR		0.1-4 nM	0.02 nM	4 min	97
	Fluorescence spectroscopy		10 - 600 pM.	1.69 pM	~10 min	88
	SERS			3 nM		108
	SERS	50 (µg L ⁻¹) ⁻¹	2 - 100 µg L ⁻¹	1 µg L ⁻¹	30 min	110
	SERS		0.01-1 ng mL ⁻¹	2.8 pg mL ⁻¹	15 min	111
	SERS		Up to 10 µM L ⁻¹	~10 ⁻⁷ M		112
	SERRS			~0.1 ppb (0.1 µg/kg)		114

Catechol	Absorption spectroscopy		0.5–8.0 mM	0.33 mM	10 min.	53
	Time course absorption spectroscopy	$0.521 \pm 0.016 \text{ Min}^{-1} \text{ mM}^{-1}$	Up to 0.2 mM	0.6 μM	3 min	59
	Absorption spectroscopy		Up to 118 μM	11 μM	30 min	63
	Color intensity		Up to 25 $\mu\text{g/L}$	0.86 (± 0.1) $\mu\text{g/L}$	6-17 min	69
	SPR	$0.032 \text{ nm } \mu\text{M}^{-1}$		11 μM		71
	SPR		$6.0 \times 10^{-6} - 2.0 \times 10^{-4} \text{ M}$	$2.5 \times 10^{-6} \text{ M}$		96
Phenol	Absorption spectroscopy		0.02-012 mM		4-5 min	23
	Transmission spectroscopy	$0.195 \times 10^{-3} (\text{mg L})^{-1}$		$40 \mu\text{g L}^{-1}$		37
	Fiber Bragg grating	$-0.0492 \text{ nm (mgL}^{-1})^{-1}$	$7.5 \mu\text{g L}^{-1}-100 \text{ mg L}^{-1}$	$7.5 \mu\text{g L}^{-1}$ (79.7 nM)	$\sim 395 \text{ s}$	38
	Absorption spectroscopy		9.79- 750 mM	0.109 mM		54
	Colorimetric assay	1.78	Up to 100 mgL^{-1}		3 h	66
	Absorption spectroscopy	1.78 Abs mM^{-1}	2.5–70.0 μM	1 μM	15 min	67
	Color intensity		Up to 25 $\mu\text{g/L}$	0.86 (± 0.1) $\mu\text{g/L}$	6-17 min	69
	SPR	$0.012 \text{ nm } \mu\text{M}^{-1}$		38 μM		71
	SPR	$0.00234^\circ \mu\text{M}^{-1}$	0-20 μM	1 μM		72
	SPR	$0.00193^\circ \mu\text{M}^{-1}$	Up to 100 μM	1 μM		73
	Reflection spectroscopy	$0.294 \times 10^{-3} (\text{mg L})^{-1}$	10-100 mg L^{-1}	$30 \mu\text{g L}^{-1}$	$\sim 70 \text{ min}$	94

	NIR fluorescence spectroscopy		Up to 25 $\mu\text{M L}^{-1}$	0.05 $\mu\text{M L}^{-1}$		100
	Raman spectroscopy		50-500 mg L^{-1}	25 mg L^{-1}		107
	SERS			$1.9 \times 10^{-10} \text{ M}$		113
	SERS			$10^{-5}-10^{-6} \text{ M}$.		118
<i>p</i> -aminophenol	Reflectance spectroscopy		0.5–5.5 ppm	0.109 ppm	5 min	25
Resorcinol	Time-course absorption spectroscopy	$0.075 \pm 0.001 \text{ Min}^{-1} \text{ mM}^{-1}$	Up to 1.4 mM	4.5 μM	3 min	59
<i>m</i> -cresol	Absorption spectroscopy	1.73 Abs mM^{-1}	2.5–100.0 μM	1 μM	15 min	67
	Color intensity		Up to 25 $\mu\text{g/L}$	0.86 (± 0.1) $\mu\text{g/L}$	6-17 min	69
	SPR	0.022 nm μM^{-1}		17 μM		71
<i>p</i> -cresol	Colorimetric assay		Up to 100 mgL^{-1}		3h	66
	Absorption spectroscopy	0.31 Abs mM^{-1}	12.5–400.0 μM	3 μM	15 min	67
	Color intensity		Up to 25 $\mu\text{g/L}$	0.86 (± 0.1) $\mu\text{g/L}$	6-17 min	69
4-chlorophenol	Absorption spectroscopy	2.04 Abs mM^{-1}	2.5–50.0 μM	0.9 μM	15 min	67
	SPR	0.016 nm μM^{-1}		25 μM		71
<i>o</i> -diphenol	Absorption spectroscopy	0.184 Abs $\text{min}^{-1}\text{mM}^{-1}$	Up to 350 μM	23 μM	2 min	68
	Fluorescence spectroscopy		Up to tens of μM	3 μM	2 min	68

Hydroquinone	SPR		7.0×10^{-7} - 1.0×10^{-4} M	5.3×10^{-7} M		96
	Photo luminescence	$0.021 \mu\text{M}^{-1}$	$12 - 57.5 \mu\text{M}$	50 nM		102
Pyrogallol	SPR		6.0×10^{-7} - 1.0×10^{-4} M	3.2×10^{-7} M		96
<i>p</i> -nitrophenol	Photo luminescence	$0.04918 \mu\text{M}^{-1}$	$3 - 96 \mu\text{M}$	$4.09 \mu\text{M}$		103
Thiophenol	NIR fluorescence spectroscopy	$0.0939 \mu\text{M}^{-1}$	$0-10 \mu\text{M}$	$0.22 \mu\text{M}$	3 min	93