

10.1071/EN18072_AC

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Environmental Chemistry 2018, 15(7), 403-410

Supplementary Material

Mobile phone-based colorimetric analysis for determining nitrite content in water

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Table S1. The study of LEDs light positions on I_R , I_G , I_B and I_{RGB} values of the standard nitrite solutions in the range of 0.0 – 1.0 mg N L⁻¹, using a coarse white paper, 7 cm camera distance, 7 LEDs flashlights

Intensity of color for different LEDs position		Concentration of nitrite (mg N L ⁻¹)				
		0.0	0.2	0.4	0.8	1.0
Overhead	I_R	196±1	199±0	189±1	166±1	160±2
	I_G	132±2	34±1	0±0	0±0	0±0
	I_B	80±1	106±1	109±1	100±2	104±2
	I_{RGB}	408±3	339±1	299±1	266±2	264±4
Sides	I_R	192±1	183±1	180±0	166±3	145±1
	I_G	128±1	25±1	0±0	0±0	0±0
	I_B	74±1	85±1	96±1	97±2	83±1
	I_{RGB}	393±2	293±3	276±1	263±5	228±2
Rear	I_R	254±0	252±5	255±0	116±2	255±0
	I_G	252±2	253±1	255±0	0±0	255±0
	I_B	233±1	255±0	255±0	44±0	255±0
	I_{RGB}	739±2	760±5	510±0	415±2	510±0
Overhead-sides	I_R	195±1	195±1	182±1	162±1	144±1
	I_G	133±1	35±1	0±0	0±0	0±0
	I_B	79±1	101±1	99±1	96±1	87±1
	I_{RGB}	408±2	332±3	281±1	259±1	231±1

Table S2. Effect of the LEDs positions on sensitivity and R² for R, G, B and RGB colors, using a coarse white paper, 7 cm camera distance, 7 LEDs flashlights, and the standard nitrite solutions in the range of 0.0 – 1.0 mg N L⁻¹

LEDs position	Red		Green		Blue		RGB	
	Sensitivity	R ²	Sensitivity	R ²	Sensitivity	R ²	Sensitivity	R ²
Overhead	-42	0.934	-106	0.593	14	0.233	-134	0.855
Sides	-42	0.932	-99	0.553	11	0.195	-131	0.767
Rear	-63	0.178	-116	0.179	-82	0.137	-306	0.680
Overhead-sides	-52	0.955	-107	0.595	3	0.014	-157	0.877

Table S3. Effect of camera distance on sensitivity and R² for red color intensity, using 7 LEDs flashlights placed at overhead-sides position, a coarse white paper and the standard nitrite solutions in the range of 0.0 – 1.0 mg N L⁻¹

Studied parameter	Camera distance (cm)			
	1 – 6	7	8	9
Sensitivity	–	-58	-60	-38
R ²	–	0.971	0.974	0.877

Table S4. Effect of surface inside the box on the red color intensity for the standard nitrite solutions in the range of 0.0 – 1.0 mg N L⁻¹, using 7 cm camera distance and 7 LED flashlights placed at overhead-sides position

Concentration of nitrite (mg N L ⁻¹)	Types of inside surface			
	Black	Glossy white	Coarse white	Brown cardboard
0.0	126±5	189±1	195±1	126±2
0.2	106±4	189±1	195±1	138±1
0.4	143±3	178±0	182±1	148±2
0.8	84±1	165±0	162±1	102±1
1.0	96±3	139±1	144±1	91±0

Table S5. Effect of inside surface on sensitivity and R² for red color intensity, using 7 LEDs flashlights placed at overhead-sides position, 7 cm camera distance, and the standard nitrite solutions in the range of 0.0 – 1.0 mg N L⁻¹

Studied parameter	Types of inside surface			
	Black	Glossy white	Coarse white	Brown cardboard
Sensitivity	-36	-47	-52	-45
R ²	0.405	0.895	0.955	0.604

Optimum conditions obtained by using the standard spectrophotometric method

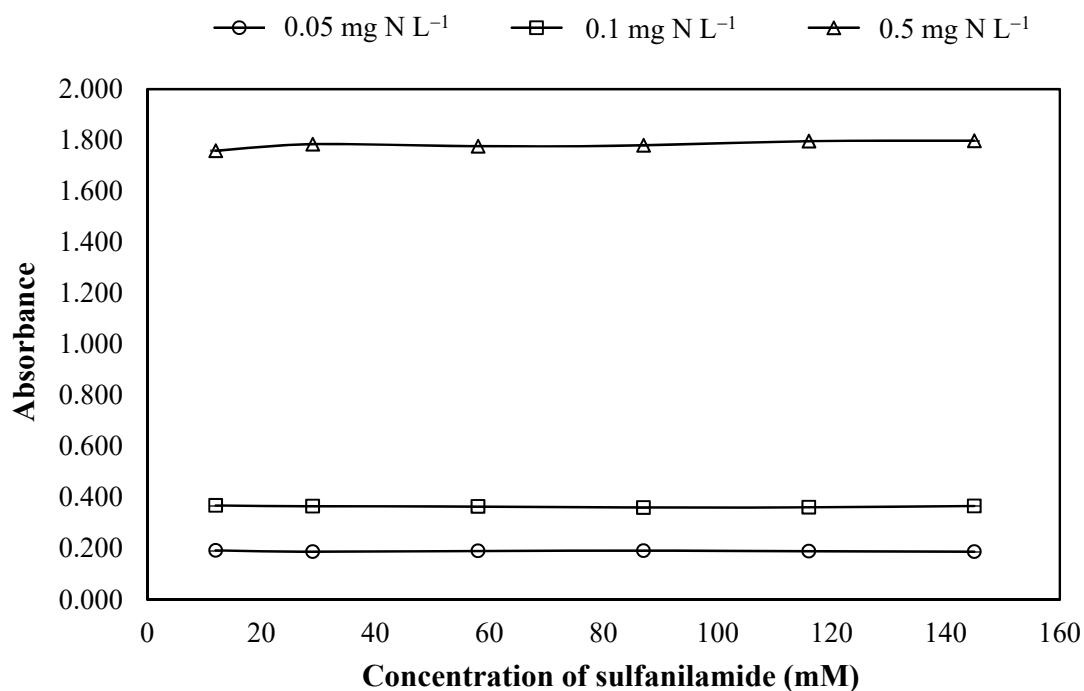


Fig. S1. Sulfanilamide concentration versus absorbance for the colored product of three concentrations of the standard nitrite solutions, using 3.9 mM NED, 1.2 M HCl, sample volume of 15 mL, reaction time for 10 min and detection wavelength at 543 nm. Error bars are the s.d. of means from triplicates.

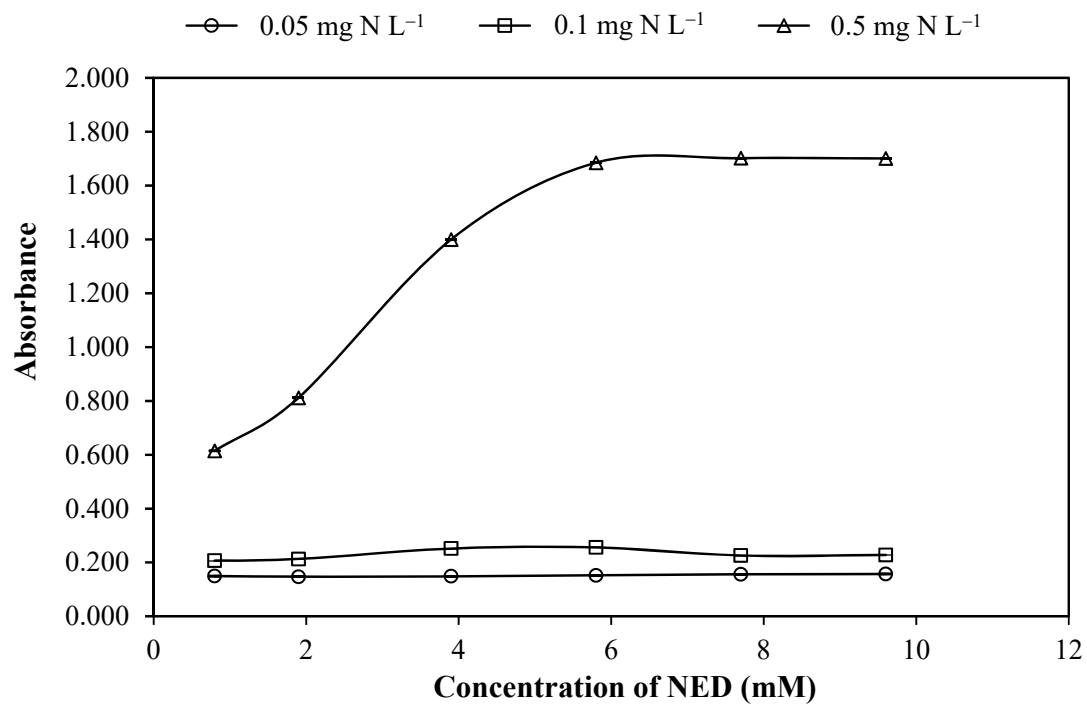


Fig. S2. NED concentration versus absorbance for the colored product of three concentrations of the standard nitrite solutions, using 12 mM sulfanilamide, 1.2 M HCl, sample volume of 15 mL, reaction time for 10 min and detection wavelength at 543 nm. Error bars are the s.d. of means from triplicates.

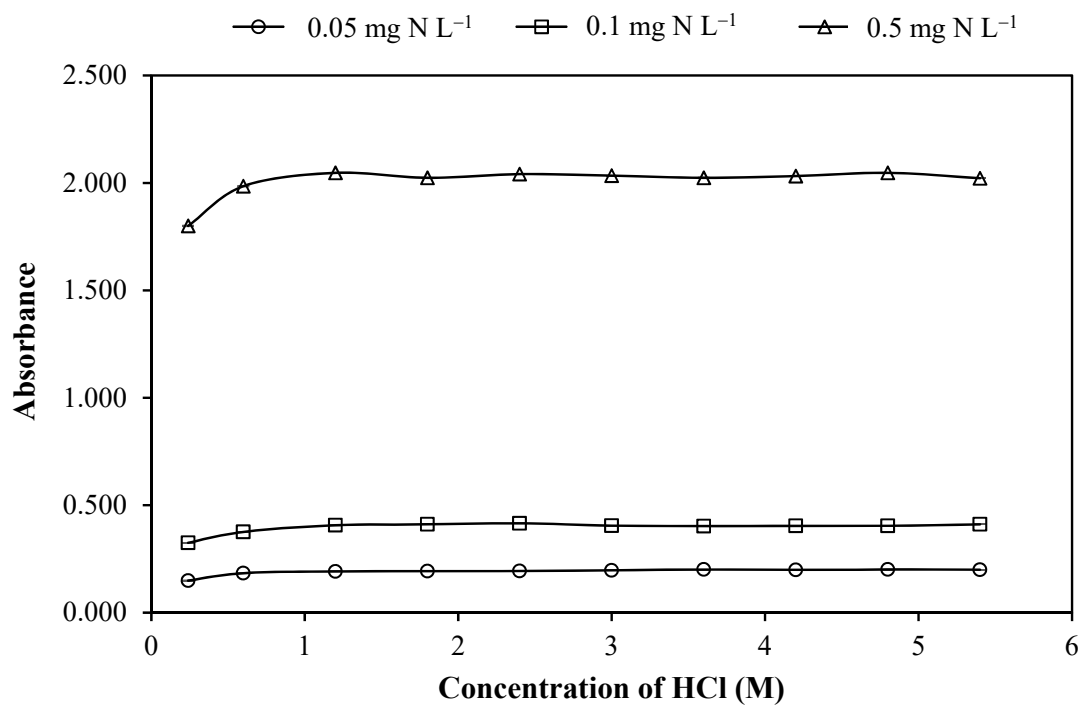


Fig. S3. Hydrochloric concentration versus absorbance for the colored product of three concentrations of the standard nitrite solutions, using 12 mM sulfanilamide, 5.8 mM NED, sample volume of 15 mL, reaction time for 10 min and detection wavelength at 543 nm. Error bars are the s.d. of means from triplicates.

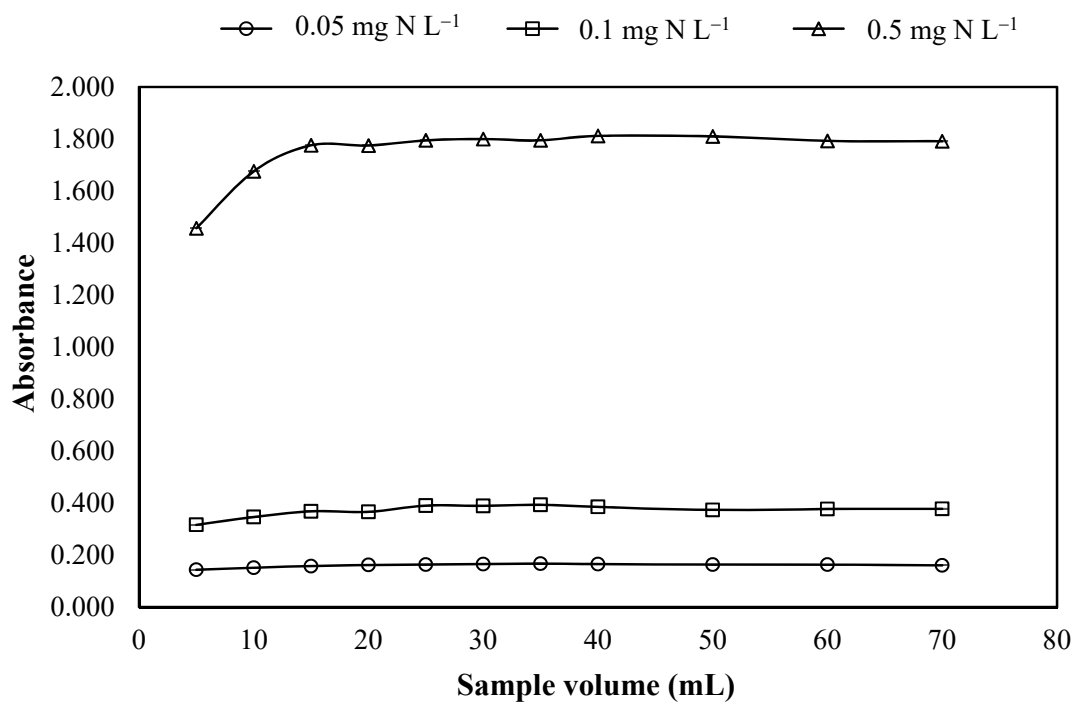


Fig. S4. Sample volume versus absorbance for the colored product of three concentrations of the standard nitrite solutions, using 12 mM sulfanilamide, 5.8 mM NED, 1.2 M HCl, reaction time for 10 min and detection wavelength at 543 nm. Error bars are the s.d. of means from triplicates.