

Data Availability for

Integration of paper-based analytical devices with digital microfluidics for colorimetric detection of creatinine

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Optical images and color intensities for the reagent concentrations optimization

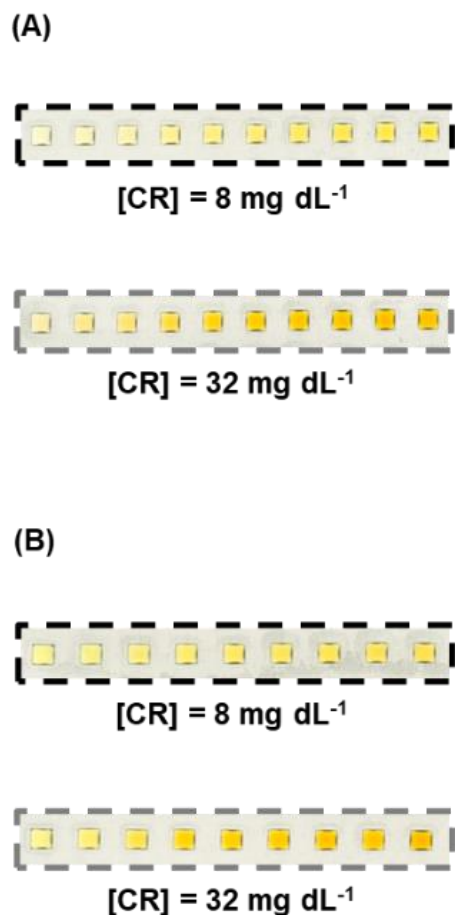


Fig. S1 Optical images recorded for the reagent concentrations optimization. (A) Microwells of the polyester plate of a replicate of the Jaffé reaction and graph of PA concentration variation by the corresponding color intensity, with PA variation from 1 to 10 mmol L⁻¹. (B) Microwells of the polyester plate of a replicate of the Jaffé reaction and graph of NaOH concentration variation by the corresponding color intensity, with NaOH variation from 50 to 450 mmol L⁻¹.

Data from Fig. 2A (main text)

[CR] = 8 mg dL⁻¹

[AP] (mmol L ⁻¹)	Color intensity				Average	Standard deviation
	1	2	3	4		
2	90.93	90.5	88.88	91.88	90.54	1.2
3	121.94	118.68	125.4	124.14	122.54	2.9
4	147.67	140.99	141.58	148.31	144.64	3.9
5	159.22	158.86	162.39	161.20	160.42	1.7
6	179.58	177.76	181.05	178.63	179.25	1.4
7	184.61	185.25	183.51	183.50	184.22	0.9
8	191.41	191.08	193.73	192.62	192.21	1.2
9	200.13	200.52	203.79	202.35	201.70	1.7
10	208.42	210.15	210.06	208.58	209.30	0.9

[CR] = 32 mg dL⁻¹

[AP] (mmol L ⁻¹)	Color intensity				Average	Standard deviation
	1	2	3	4		
2	144.49	147.33	145.70	147.81	146.335	1.5
3	196.86	196.07	200.36	207.07	200.09	5.0
4	231.56	229.83	229.22	229.57	230.04	1.0
5	241.60	241.66	242.17	243.84	242.32	1.0
6	248.53	247.97	248.91	250.38	248.95	1.0
7	251.81	252.31	252.05	252.55	252.18	0.3
8	252.82	252.94	252.89	253.26	252.98	0.2
9	253.77	253.59	253.74	253.81	253.73	0.1
10	254.39	254.36	254.35	254.48	254.39	0.1

Data from Fig. 2B (main text)

[CR] = 8 mg dL⁻¹

[NaOH] (mmol L ⁻¹)	Color intensity				Average	Standard deviation
	1	2	3	4		
50	119.26	118.35	119.22	115.78	118.15	1.6
100	126.06	123.28	122.97	125.15	124.36	1.5
150	143.29	141.65	146.04	146.26	144.31	2.2
200	160.62	154.95	159.84	159.11	158.63	2.5
250	167.08	168.37	163.75	165.33	166.13	2.0
300	175.69	171.81	171.76	174.81	173.52	2.0
350	183.27	176.94	178.86	179.00	179.52	2.7
400	183.09	182.72	184.58	185.03	183.85	1.1
450	188.78	185.48	188.53	188.89	187.92	1.6

[CR] = 32 mg dL⁻¹

[NaOH] (mmol L ⁻¹)	Color intensity				Average	Standard deviation
	1	2	3	4		
50	132.95	127.82	125.79	124.51	127.77	3.7
100	157.79	156.20	153.87	155.92	155.94	1.6
150	195.33	206.06	201.51	202.61	201.38	4.5
200	232.63	229.17	232.70	231.11	231.40	1.7
250	242.92	241.77	242.46	243.89	242.76	0.9
300	247.58	247.29	247.39	248.97	247.81	0.8
350	249.85	249.53	249.12	249.85	249.59	0.3
400	251.82	251.11	251.66	251.24	251.46	0.3
450	250.96	251.22	251.87	251.63	251.42	0.4



Fig. S2 Optical images showing the captured data for the optimization of time and type of mixture. (A) PADS and graph of the variation of the mixing time in the circular model by the corresponding color intensity and (B) PADS and graph comparing the circular and linear mixture in 45 s by the corresponding color intensity.

Data from Fig. 3A (main text)

Mixing time (s)	Color intensity				Average	Standard deviation
	1	2	3	4		
15	51.25	51.32	47.3	44.72	48.65	3.2
30	46.17	44.81	45.98	50.28	46.81	2.4
45	54.61	56.77	56.9	54.76	55.76	1.2
60	54.77	57.95	54.95	56.34	56.00	1.5

Data from Fig. 3B (main text)

Mix type	Color intensity				Average	Standard deviation
	1	2	3	4		
Linear	41.02	47.55	45.66	38.91	43.28	4.0
Circular	54.61	56.77	56.9	54.76	55.76	1.2

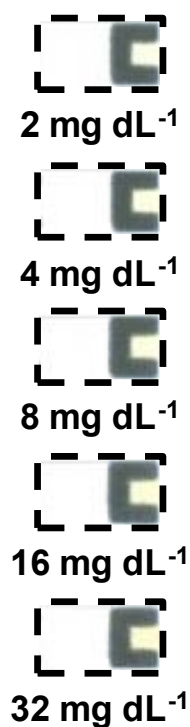


Fig. S3 Optical images showing typical resulting images for colorimetric assays performed on DMF-PADs for different concentrations of creatinine.

Data from Fig. 4 (main text)

[CR] (mg dL ⁻¹)	log [CR] (mg dL ⁻¹)	Color intensity				Average	Standard deviation
		1	2	3	4		
2	0.30	28.26	29.09	25.75	26.80	27.47	1.5
4	0.60	34.91	33.86	33.36	35.21	34.33	0.9
8	0.90	39.25	36.59	39.05	41.14	39.01	1.9
16	1.20	48.78	46.21	48.68	50.23	48.47	1.7
32	1.50	56.65	54.75	47.34	53.19	52.98	4.0

Data from Fig. 5 (main text)
DMF

[CR]*	Color intensity			Average	Standard deviation	Log [CR]	[CR]* diluted	[CR]*	Recovery (%)
	1	2	3						
30	39.17	37.85	36.57	37.86	1.3	0.77	5.9	31.6	105
75	45.95	47.12	45.99	46.35	0.7	1.16	14.3	76.4	102
150	52.53	53.55	54.57	53.55	0.7	1.48	30.3	161.8	108
225	54.81	58.27	59.15	57.41	2.3	1.66	45.3	241.9	107
300	60.38	61.51	55.3	59.06	3.3	1.73	53.9	287.3	96

* mg dL⁻¹

UV-Vis

[CR]*	Absorbance			[CR]*	Average	Standard deviation	Recovery (%)
	30 s	5 min	Difference				
Control		0.2709	0.4565	0.1856			
30	1	0.1955	0.2480	0.0525	28.3	29.3	1.9
	2	0.2177	0.2700	0.0523	28.2		
	3	0.1783	0.2369	0.0586	31.6		
75	1	0.2504	0.3926	0.1422	76.6	74.5	2.8
	2	0.2609	0.3933	0.1324	71.3		
	3	0.2252	0.3653	0.1401	75.5		
150	1	0.2702	0.5565	0.2863	154.3	152.9	6.0
	2	0.2756	0.5471	0.2715	146.3		
	3	0.2412	0.5348	0.2936	158.2		
225	1	0.3158	0.7281	0.4123	222.1	222.3	2.3
	2	0.3062	0.7231	0.4169	224.6		
	3	0.2896	0.6982	0.4086	220.2		
300	1	0.3516	0.8921	0.5405	291.2	285.6	6.8
	2	0.3526	0.8687	0.5161	278.1		
	3	0.3167	0.8504	0.5337	287.6		

* mg dL⁻¹

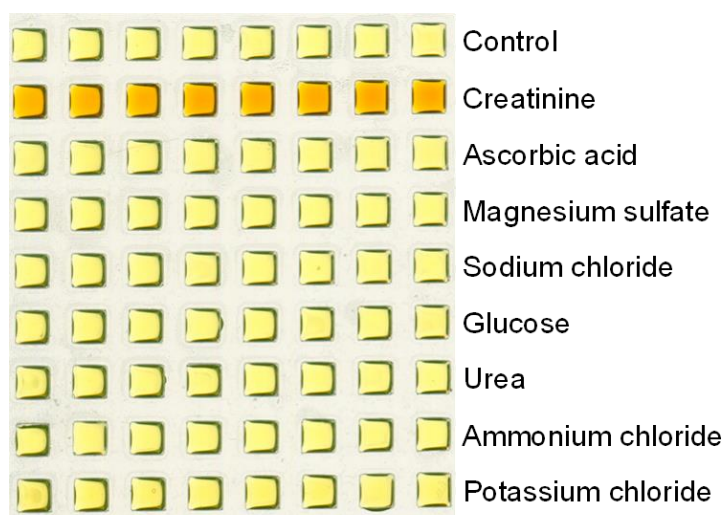


Fig. S4 Optical images for the selectivity study.

Raw data for the interfering study (see Fig S6 in the ESI)

Interferers	Color intensity								Average	Standard deviation
	1	2	3	4	5	6	7	8		
Control	255.0	255.0	255.0	255.0	254.8	254.7	254.5	254.7	254.8	0.2
Creatinine	255.0	255.0	255.0	255.0	254.8	254.7	254.5	254.7	254.8	0.2
Ascorbic acid	143.3	143.6	142.7	147.6	147.3	148.6	149.9	150.0	146.6	3.0
Magnesium sulfate	142.3	141.8	144.1	145.1	145.8	146.4	147.3	146.1	144.9	2.0
Sodium chloride	142.3	142.6	142.7	144.3	145.0	145.3	145.3	146.6	144.3	1.5
Glucose	152.2	151.0	151.8	149.3	142.9	148.4	150.8	151.3	149.7	3.0
Urea	154.6	152.7	150.3	152.0	144.0	142.5	142.2	140.9	147.4	5.5
Ammonium chloride	161.9	151.4	149.0	147.6	144.9	145.1	146.5	144.4	148.8	5.8
Potassium chloride	173.6	167.5	162.4	159.0	162.9	161.1	157.1	159.7	159.2	5.3

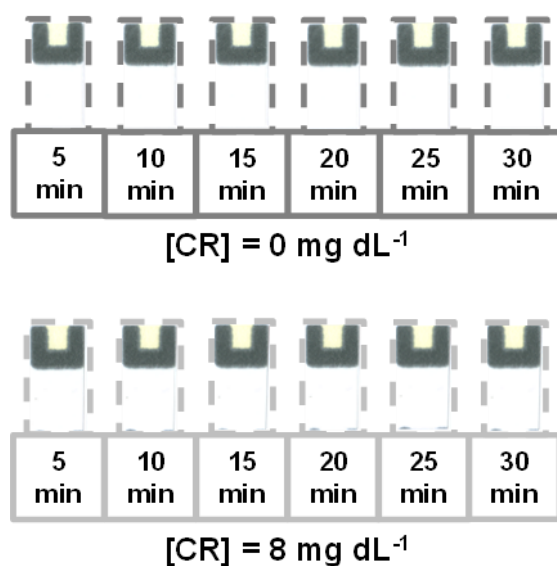


Fig. S5 Optical images recorded on PADs for the image acquisition time optimization.

Data from Fig. S7 (ESI)

[CR] = 0 mg dL⁻¹

Image acquisition time (min)	Color intensity				Average	Standard deviation
	1	2	3	4		
5	24.71	24.15	27.99	29.62	26.62	2.6
10	25.28	24.26	27.47	27.68	26.17	1.7
15	25.46	24.81	27.85	27.78	26.47	1.6
20	26.12	24.95	28.61	28.52	27.05	1.8
25	26.13	25.15	29.24	29.34	27.46	2.1
30	26.48	25.12	29.72	29.72	27.76	2.3

[CR] = 8 mg dL⁻¹

Image acquisition time (min)	Color intensity				Average	Standard deviation
	1	2	3	4		
5	39.25	36.59	39.05	41.14	39.01	1.9
10	39.33	36.28	38.31	39.8	38.43	1.6
15	39.83	36.99	38.56	40.79	39.04	1.6
20	40.3	37.28	38.5	41.25	39.33	1.8
25	40.46	36.99	38.65	41.42	39.38	2.0
30	40.2	36.85	38.34	41.42	39.20	2.0