Electronic Supplementary Material (ESI) for Analytical Methods.
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SUPPLEMENTARY MATERIAL

Figure S1. Mean of calibration curves to quantify formaldehyde by proposed SIA method

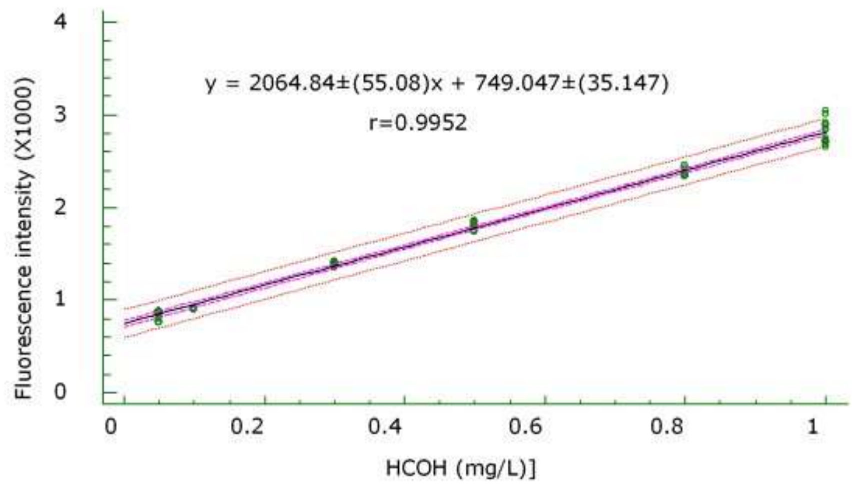

Table S1. Cook's distance study to verify homocedasticity of the data of the mean of calibration curves

Fila	*Distancia de Cook*
47	0.190815
48	0.281808
50	0.124959
51	0.0845689

Table S2. Linear equation and error in each standard of formaldehyde for weighted regression line, no -weighted regression line and a non-parametric adjustment (Theil method) based on the residual graph.

	Adjustment		
Concentration [mg/L]	Equation		
	No-weighted	Weighted	Theil
	y=2033.51x+731.64	y=2036.84x+775.45	y=2058.57x+703.14
0.1	97.05 %	75.38 %	109.71 %
0.5	98.68 %	94.22 %	100.25 %
0.6	93.20 %	89.46 %	94.37 %
0.8	92.89 %	90.04 %	93.49 %

Table S3. Significance test for accuracy at different concentration of formaldehyde from calibration curve. H_0: there is no statistically significant difference between the experimental mean and the true value

Concentration of formaldehyde [mg/L]	$t_{experimental}$	$t_{critical}$	Decision
0.1	0.61	4.3	Accept H_0
0.5	1.94	2.78	Accept H_0
0.6	12.10	3.18	Reject H_0
0.8	11.58	3.18	Reject H_0

Table S4. Reported values of the errors of the materials and instruments used in the built of calibration curves and the experimental values obtained

Material or instrument	Reported value	Distribution	Experimental value
Analytical balance	0.10 mg	Rectangular	$5.77x10^{-5}$ g
Burette 25.0 mL	0.10 mL	Triangular	$4.08x10^{-5}$ L
Pipette 4.0 mL	0.01 mL	Triangular	$4.08x10^{-6}$ L
Pipette 10.0 mL	0.02 mL	Triangular	$8.16x10^{-6}$ L
Flask 5.0 mL	0.02 mL	Normal	$0.02x10^{-5}$ L
Flask 10.0 mL	0.02 mL	Normal	$0.02x10^{-5}$ L
Micropipette 10-100 µL	0.56 %	Triangular	$2.26x10^{-8}$ L
Micropipette 200 -1000 µL	0.03 %	Triangular	$2.45x10^{-8}$ L

Procedure to determine uncertainty

$$\frac{u_{C_{HCOH}}}{C_{HCOH}} = \sqrt{\left(\frac{u_{C_{HCl}}}{C_{HCl}}\right)^2 + \left(\frac{u_{V_{gastado\ HCl}}}{V_{gastado\ HCl}}\right)^2 + \left(\frac{u_{PM_{HCOH}}}{PM_{HCOH}}\right)^2 + \left(\frac{u_{V_{alícuota\ HCOH}}}{V_{alícuota\ HCOH}}\right)^2} \quad \textbf{(1)}$$

Uncertanty of the stock solution of formaldehyde

$$\frac{u_{C_{HCOH}}}{C_{HCOH}} = \sqrt{\left(\frac{u_{C_{HCl}}}{C_{HCl}}\right)^2 + \left(\frac{u_{V_{gastado\ HCl}}}{V_{gastado\ HCl}}\right)^2 + \left(\frac{u_{PM_{HCOH}}}{PM_{HCOH}}\right)^2 + \left(\frac{u_{V_{alícuota\ HCOH}}}{V_{alícuota\ HCOH}}\right)^2}$$

- $u_{C_{HCl}}$

$$C_{HCl} = \frac{C_{NaOH} V_{gastado\ NaOH}}{V_{alícuota\ HCl}} \qquad \frac{u_{C_{HCl}}}{C_{HCl}} = \sqrt{\left(\frac{u_{C_{NaOH}}}{C_{NaOH}}\right)^2 + \left(\frac{u_{V_{gastado\ NaOH}}}{V_{gastado\ NaOH}}\right)^2 + \left(\frac{u_{V_{alícuota\ HCl}}}{V_{alícuota\ HCl}}\right)^2}$$

$$C_{NaOH} = \frac{m_{BFK}}{PM_{BFK} V_{gastado\ NaOH}} \qquad \frac{u_{C_{NaOH}}}{C_{NaOH}} = \sqrt{\left(\frac{u_{m_{BFK}}}{m_{BFK}}\right)^2 + \left(\frac{u_{PM_{BFK}}}{PM_{BFK}}\right)^2 + \left(\frac{u_{V_{gastado\ NaOH}}}{V_{gastado\ NaOH}}\right)^2}$$

$$u_{m_{BFK}} = \frac{1x10^{-4}}{\sqrt{3}} \qquad u_{PM_{BFK}} = \sqrt{(8u_C)^2 + (5u_H)^2 + (4u_O)^2 + (u_K)^2}$$

$$u_{V_{gastado\ NaOH}} = \frac{1x10^{-4}}{\sqrt{6}}$$

- $u_{V_{gastado\ HCl}}$

$$u_{V_{gastado\ HCl}} = \frac{1x10^{-4}}{\sqrt{6}}$$

- $u_{PM_{HCOH}}$

$$u_{PM_{HCOH}} = \sqrt{(u_C)^2 + (2u_H)^2 + (u_O)^2}$$

- $u_{V_{alícuota\ HCOH}}$

$$u_{V_{alícuota\ HCOH}} = \frac{1x10^{-5}}{\sqrt{6}}$$

Table S5. Significance test of the recovery values for different kind of analyzed water. $t_{critical}$ = 4.30

	tcritical	
Sample	Level low (0.2 mg/L)	Level high (0.8 mg/L)
Bottled water 1	3.92	2.88
Bottled water 2	0.77	0.08
Bottled water 3	2.41	1.23
Tap water 1	3.40	0.24
Tap water 2	0.13	1.06
Tap water 3	0.48	0.44

Table S6. Significance test from bias in water samples to demonstrated of truthfulness of the SIA method. $t_{critical} = 4.30$

	Level low (0.2 mg/L)		Level high (0.8 mg/L)	
Sample	bias	T_{exp}	bias	T_{exp}
Bottled water 1	0.0537	3.92	0.0215	0.54
Bottled water 2	0.0320	0.77	-0.1945	2.10
Bottled water 3	-0.0223	2.41	-0.0405	1.23
Tap water 1	-0.0253	3.41	0.0158	0.24
Tap water 2	-0.1035	3.70	-0.0930	1.06
Tap water 3	0.0102	0.48	-0.0273	0.44