

Supplementary Information

A Paper-Based Analytical Device for Rapid Colorimetric Detection of Aluminium in Aerosol Antiperspirants

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Table S1 Data from the analytical curves shown in Fig. 4 include the signal mean and standard deviation.

Concentration (mg L ⁻¹)	Added nanoparticles			
	AgNP (mean $\pm$ SD)	MWCNT (mean $\pm$ SD)	GO (mean $\pm$ SD)	None (mean $\pm$ SD)
0	25.15 $\pm$ 0.44	47.71 $\pm$ 0.72	56.25 $\pm$ 2.35	23.75 $\pm$ 1.18
1	26.49 $\pm$ 0.94	52.61 $\pm$ 1.22	58.41 $\pm$ 1.73	28.63 $\pm$ 1.13
2	27.40 $\pm$ 1.14	56.83 $\pm$ 1.22	65.14 $\pm$ 2.82	35.05 $\pm$ 3.26
3	27.66 $\pm$ 0.55	60.55 $\pm$ 1.29	65.67 $\pm$ 1.18	42.38 $\pm$ 2.11
4	28.39 $\pm$ 0.64	66.28 $\pm$ 2.14	69.09 $\pm$ 2.83	47.25 $\pm$ 2.11
5	29.09 $\pm$ 0.28	71.62 $\pm$ 0.71	70.67 $\pm$ 2.12	49.69 $\pm$ 2.57
6	29.65 $\pm$ 1.46	74.80 $\pm$ 0.68	72.70 $\pm$ 1.70	51.78 $\pm$ 1.46

A complete description of the AGREE tool, including scoring by parameter, measurement mode, and other information, can be found in the article related to the tool's development.⁷ Here are the 12 principles of Green Analytical Chemistry that the tool evaluates:

Principle 1. Direct Analytical Techniques Should Be Applied to Avoid Sample Treatment

Principle 2. Minimal Sample Size and Minimal Number of Samples Are Goals

Principle 3. In Situ Measurements Should Be Performed

Principle 4. Integration of Analytical Processes and Operations Saves Energy and Reduces the Use of Reagents

Principle 5. Automated and Miniaturized Methods Should Be Selected

Principle 6. Derivatization Should Be Avoided

Principle 7. Generation of a Large Volume of Analytical Waste Should Be Avoided and Proper Management of Analytical Waste Should Be Provided

Principle 8. Multianalyte or Multiparameter Methods Are Preferred versus Methods Using One Analyte at a Time

Principle 9. The Use of Energy Should Be Minimized

Principle 10. Reagents Obtained from Renewable Source Should Be Preferred

Principle 11. Toxic Reagents Should Be Eliminated or Replaced

Principle 12. The Safety of the Operator Should Be Increased

Table S2 Comparison of the method developed in this work with others for determining aluminium in antiperspirant samples.

Paper	Method ^a	LOD (mg L ⁻¹)	LOQ (mg L ⁻¹)	Recovery (%)
1	Solution - SDIC	0.013	0.046	80 – 109.6
2	FI-UV/VIS	0.017	0.03	102.4
3	ICP - OES	0.02 (mg/kg)	0.06 (mg/kg)	81 - 115
4	CSPE - DRS	0.18	0.18	-
5	LLME – HPLC – UV/VIS	1.24	3.74	96 - 101
6	PAD - DRS	3.06	10.2	92.2 – 103.4
This work	PAD - SDIC	0.52	1.56	91.7 – 105.9

^a SDIC = Smartphone digital image colorimetry; FI = Flow injection; UV/VIS = Ultraviolet/visible spectrophotometry; ICP – OES = Inductively coupled plasma optical emission spectroscopy; CSPE = Coupled colorimetric solid-phase extraction; DRS = Diffusive reflectance spectroscopy; LLME = Liquid-liquid extraction; HPLC = High-performance liquid chromatography; PAD = Paper analytical device.

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