

ARTICLE

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## ***In situ* voltammetric analysis of 2,4-dichlorophenoxyacetic acid in environmental water using a boron doped diamond electrode and an adapted unmanned air vehicle sampling platform**

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### **Electronic Supplementary Information**

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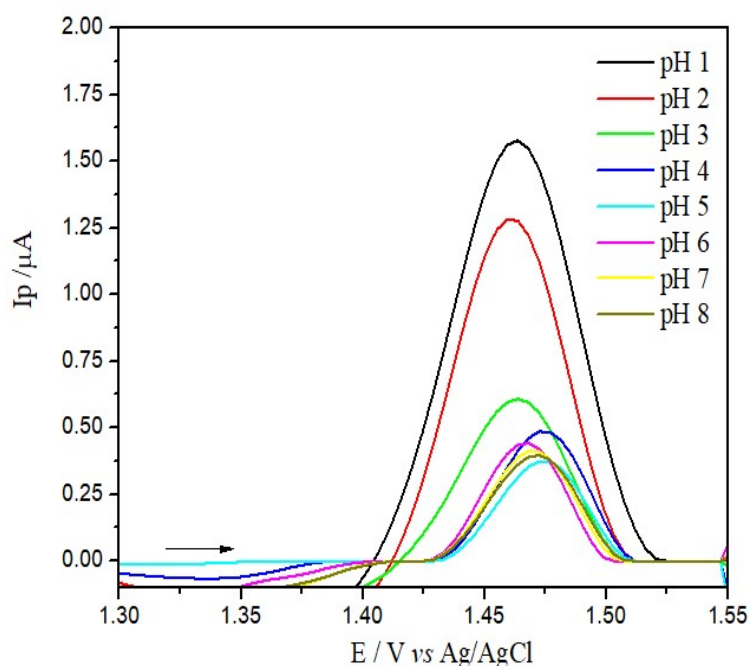


Figure 1S. Study of the pH of the supporting electrolyte using a solution of  $0.5 \text{ mol L}^{-1} \text{ Na}_2\text{SO}_4$  at a concentration of  $10.48 \text{ } \mu\text{mol L}^{-1}$  of 2,4-D. SWV parameters:  $f = 60 \text{ Hz}$ ,  $a = 70 \text{ mV}$ ,  $\Delta E_s = 5 \text{ mV}$ . The pH were regulated with  $\text{H}_2\text{SO}_4$  and  $\text{NaOH}$  solutions, both at  $0.5 \text{ mol L}^{-1}$ .

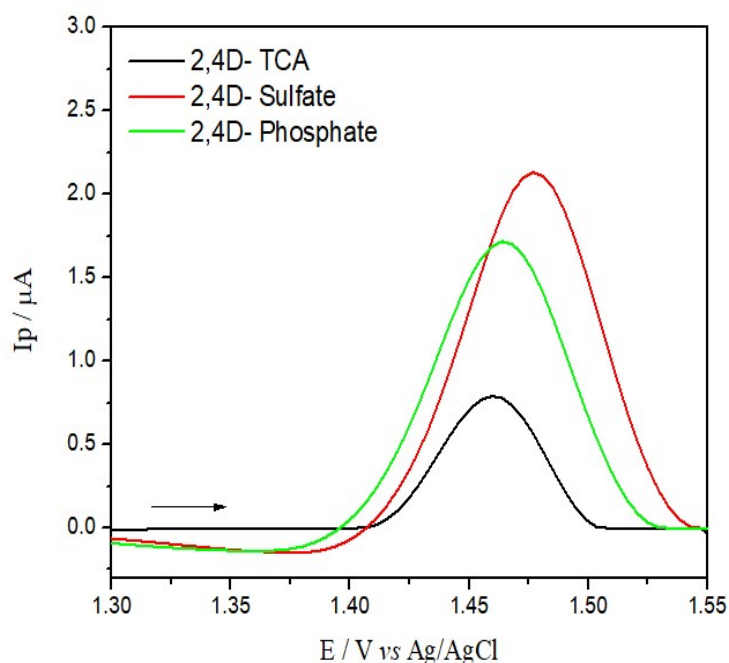


Figure 2S. SW voltammograms obtained from  $10.48 \text{ } \mu\text{mol L}^{-1}$  of 2,4-D for trichloroacetic acid, sodium sulfate and phosphate buffer electrolytes (all  $0.5 \text{ mol L}^{-1}$  with pH adjusted to 2.0 using ). SWV parameters:  $f = 60 \text{ Hz}$ ,  $a = 70 \text{ mV}$ ,  $\Delta E_s = 5 \text{ mV}$ .

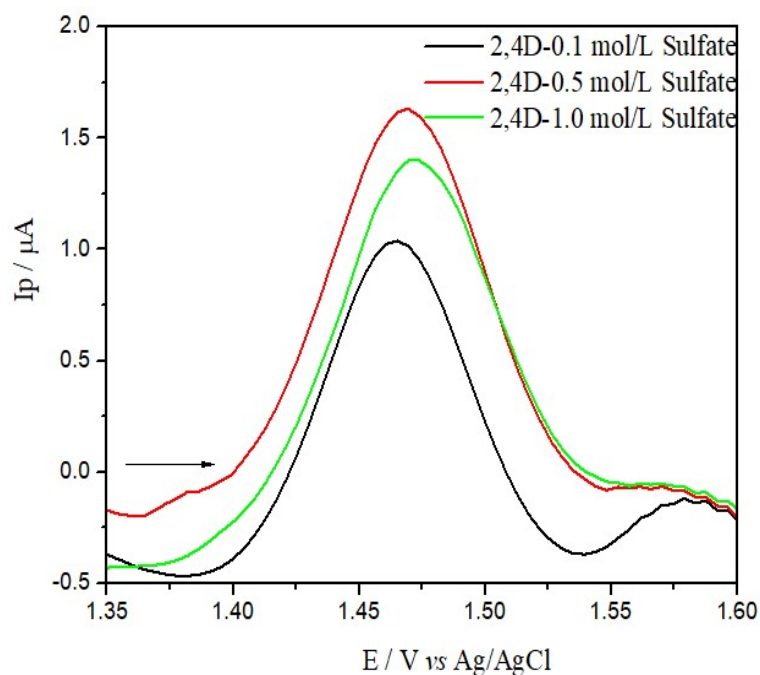


Figure 3S. SWV voltammograms of  $10.48 \mu\text{mol L}^{-1}$  of 2,4-D in sodium sulfate with different concentrations ( $0.1 \text{ mol L}^{-1}$ ,  $0.5 \text{ mol L}^{-1}$  and  $1.0 \text{ mol L}^{-1}$ ), pH was adjusted to 2.0 using  $0.5 \text{ mol L}^{-1}$  sulfuric acid. SWV parameters used:  $f = 60 \text{ Hz}$ ,  $a = 70 \text{ mV}$ ,  $\Delta E_s = 5 \text{ mV}$ .

Table 1S. SWV parameters investigated for detection of 2,4-D with BDDE.

SWV Parameters	Studied range	Value selected
$a$ (mV)	10-100	100
$\Delta E_s$ (mV)	1-10	10
$f$ (Hz)	10-200	200

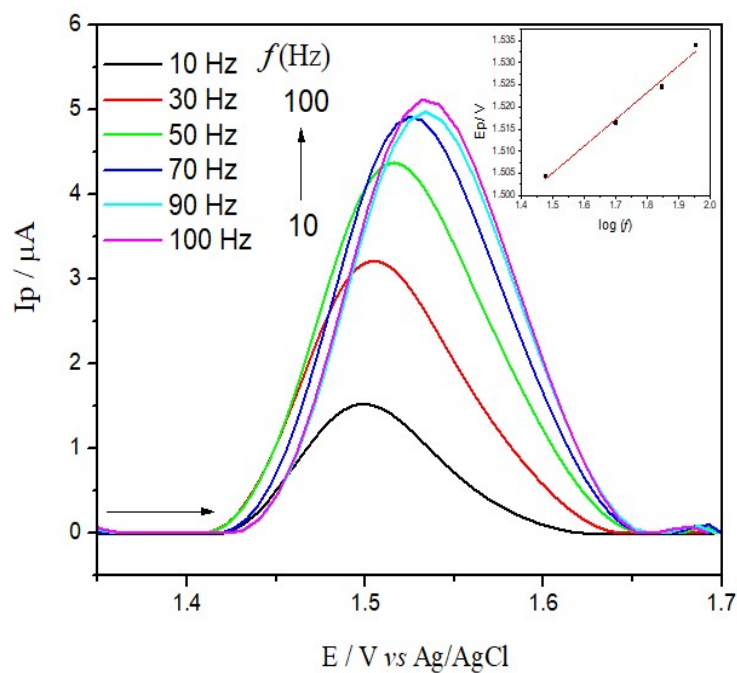


Figure 4S. SW voltammograms obtained from of  $10.43 \mu\text{mol L}^{-1}$  of 2.4-D in sodium sulfate  $0.5 \text{ mol L}^{-1}$ .  $f$  (Hz) = 10, 30, 50, 70, 90, 100 Hz,  $\alpha = 70 \text{ mV}$ ,  $\Delta E_s = 6 \text{ mV}$ . Insertion: Graphic of  $E_p$  vs  $\log f$ . pH was adjusted to 2.0 using  $0.5 \text{ mol L}^{-1}$  sulfuric acid.

Table 2S. Relative error values obtained in interfering studies.

Relative error (%)			
$\text{K}^+$	$\text{Cu}^{2+}$	$\text{Cl}^-$	$\text{NO}_3^-$
0.98	2.37	3.24	2.89

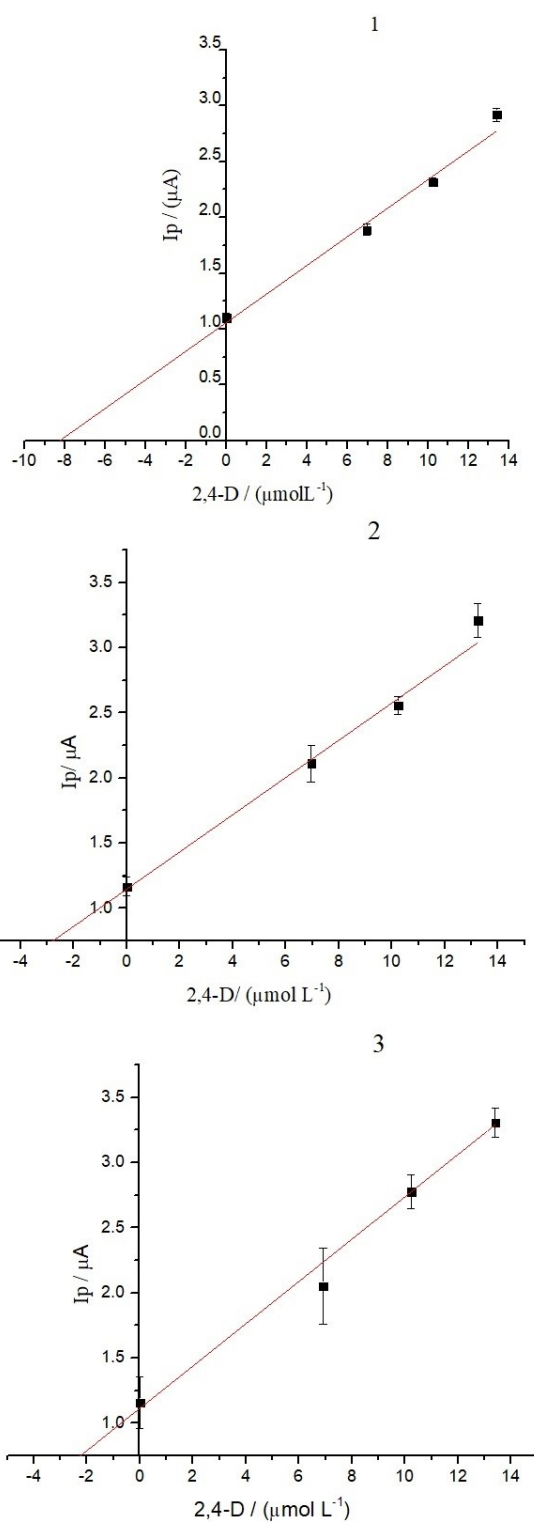


Figure 5S. Standard addition curves for quantification of 2,4-D in spiked water samples (1, 2 and 3) collected using adapted UAV with *in situ* analysis by SWV. SWV parameters:  $f = 60$  Hz,  $a = 70$  mV,  $\Delta E_s = 5$  mV.

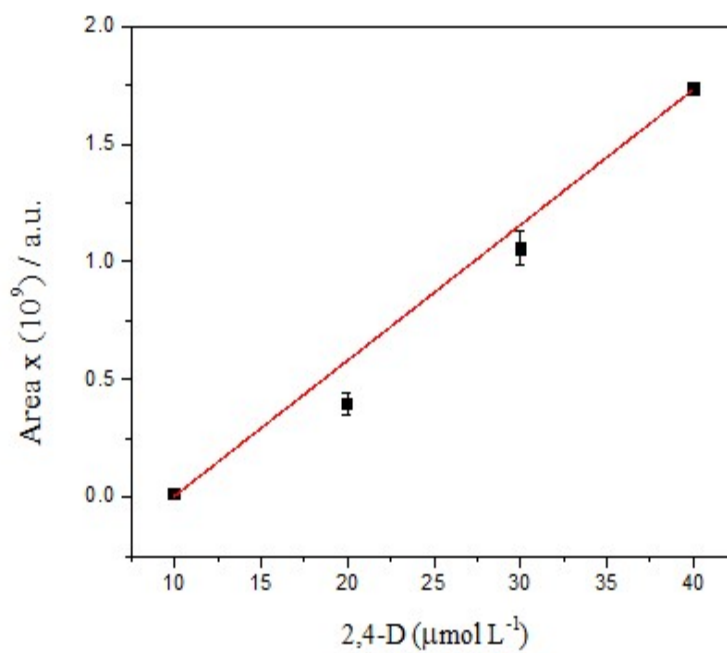


Figure 6S: Analytical curve for detection of 2,4-D in water using the GC-MS method. The measures were performed in triplicate.