

## **Alum Sludge-Driven Electro-Phytoremediation in Constructed Wetlands: A Novel Approach for Sustainable Nutrient Removal**

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**Table.S1** wolf vitamin solution and Wolfe's Mineral Solution, respectively preparation recipes

<b>Ingredient</b>	<b>1 L</b>
Milli-Q H <sub>2</sub> O	800 ml
Biotin	2.0 mg
Folic Acid	2.0 mg
Pyridoxine hydrochloride	10.0 mg
Thiamine * HCl(Thiamine Hydrochloride)	5.0 mg
Riboflavin	5.0 mg
Nicotinic acid	5.0 mg
Calcium D- (+) - pantothenate	5.0 mg
Vitamin B12	0.1 mg
p-Aminobenzoic acid	5.0 mg
Thioctic acid	5.0 mg
Complete volume with Milli-Q H <sub>2</sub> O to	1000 ml

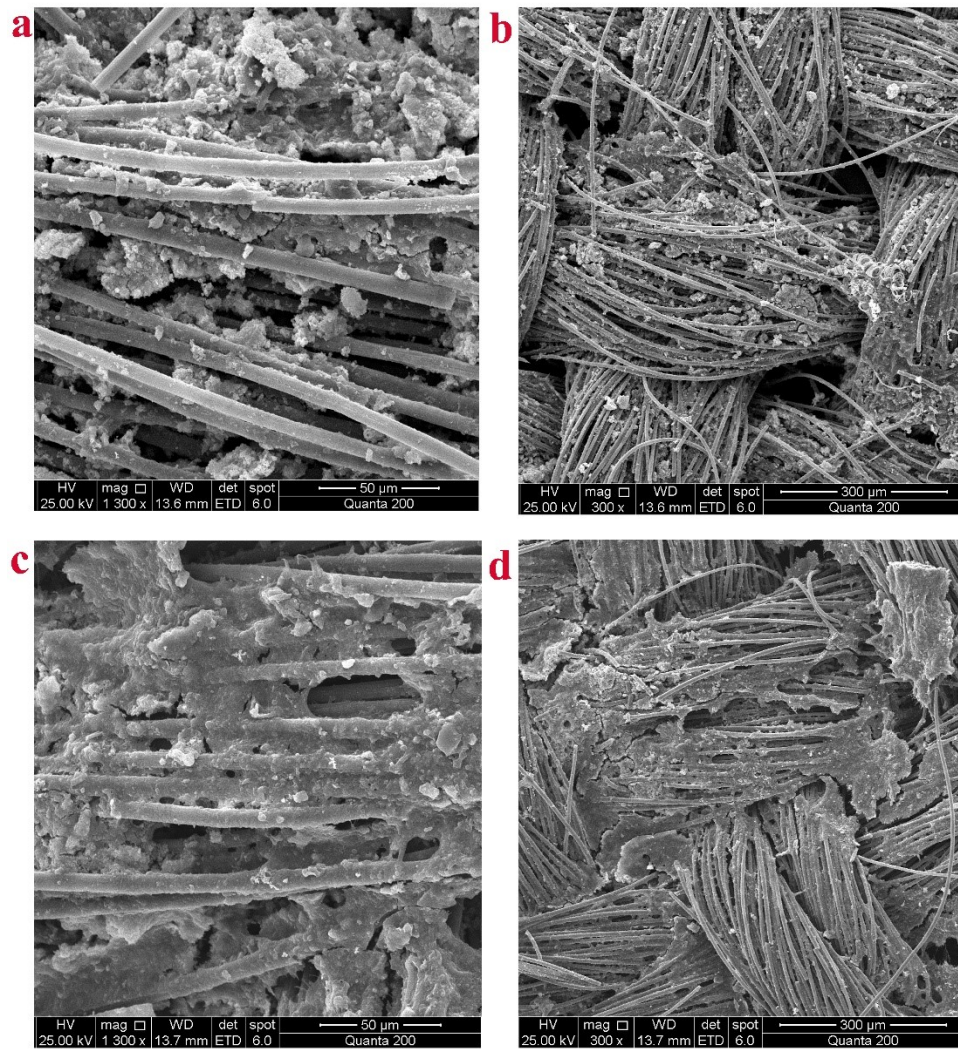
<b>Ingredients</b>	<b>The amounts added to 1 L of DW (g L-1)</b>
MgSO <sub>4</sub> . 7H <sub>2</sub> O	3
MnSO <sub>4</sub> . H <sub>2</sub> O	0.5
NaCl	1
FeSO <sub>4</sub> . 7H <sub>2</sub> O	0.1
CoCl <sub>2</sub> . 6H <sub>2</sub> O	0.1
CaCl <sub>2</sub>	0.1
ZnSO <sub>4</sub> . 7H <sub>2</sub> O	0.1
CuSO <sub>4</sub> . 5H <sub>2</sub> O	0.01
AlK (SO <sub>4</sub> 2). 12H <sub>2</sub> O	0.01
H <sub>3</sub> BO <sub>3</sub>	0.01
Na <sub>2</sub> MoO <sub>4</sub> . 2H <sub>2</sub> O	0.01
Distilled water	1 L

**Table. S2** The phosphate buffer solution prepared in this study (50 mM)

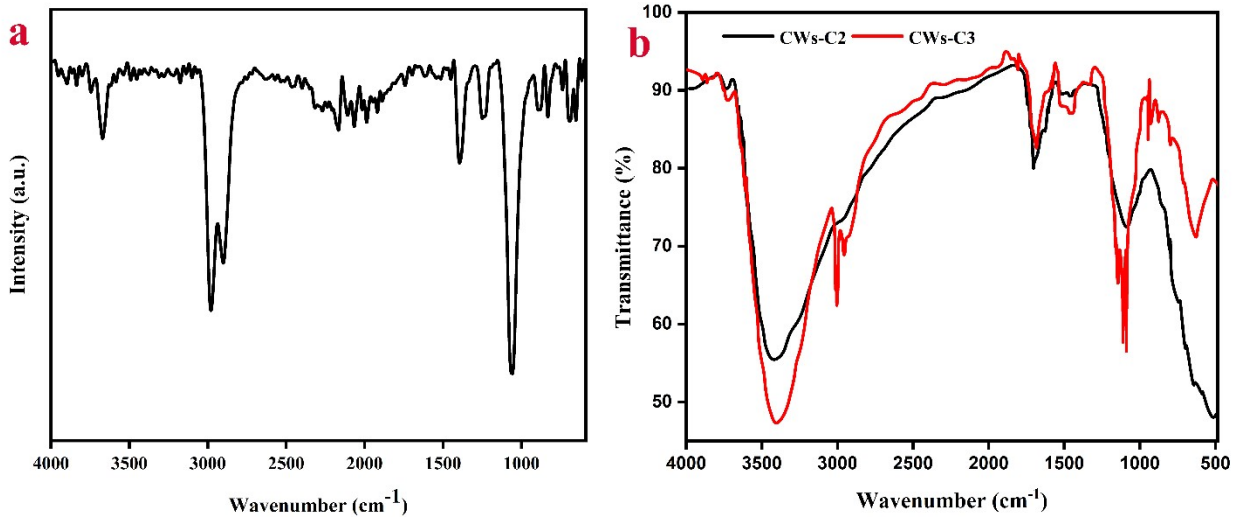
<b>Ingredient</b>	<b>g/L</b>
<i>Ammonium chloride (NH<sub>4</sub>Cl)</i>	<i>0.31</i>
<i>Potassium chloride (KCl)</i>	<i>0.13</i>
<i>Sodium phosphate monobasic dehydrate (Na<sub>2</sub>HPO<sub>4</sub>·2H<sub>2</sub>O)</i>	<i>2.77</i>
<i>Sodium phosphate dibasic dodecahydrate (Na<sub>2</sub>HPO<sub>4</sub>·12H<sub>2</sub>O)</i>	<i>11.54</i>

**Table S3.** The properties of biochar doped on the electrodes.

<b>Samples</b>	<b>BET (m<sup>2</sup> g<sup>-1</sup>)</b>	<b>Total Porosity (cm<sup>3</sup> g<sup>-1</sup>)</b>
<b>Biochar obtained from coconut shell fiber</b>	856	1.2



**Fig. S1** The observation images of biofilm formed ACC in (a-b) CWs-C2; and (c-d) CWs-C3 systems



**Fig. S2** FTIR spectra of (a) Biochar; and (b) alum sludge in the CWs-C2 and CWs-C3 reactors