

**Supporting information**

# **Evaluating the removal of the antibiotic cephalixin from aqueous solutions using an adsorbent obtained from palm oil fiber**

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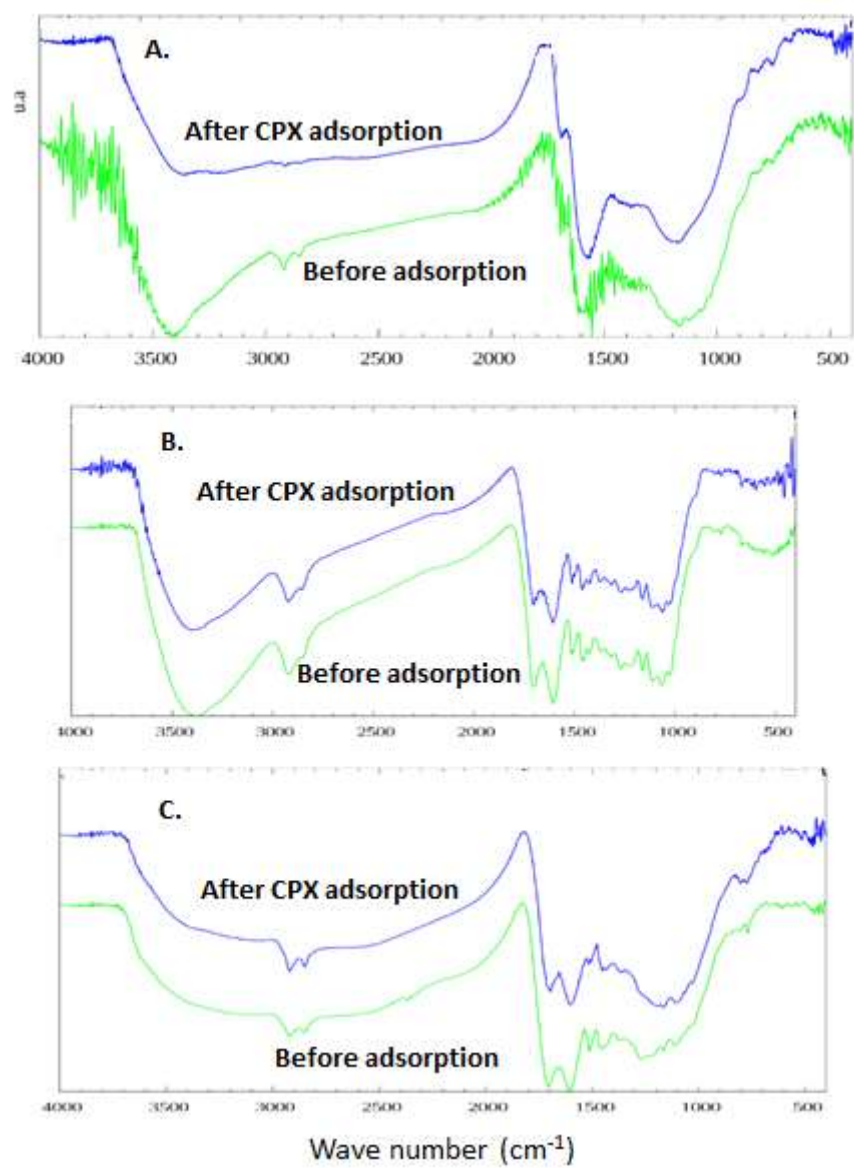
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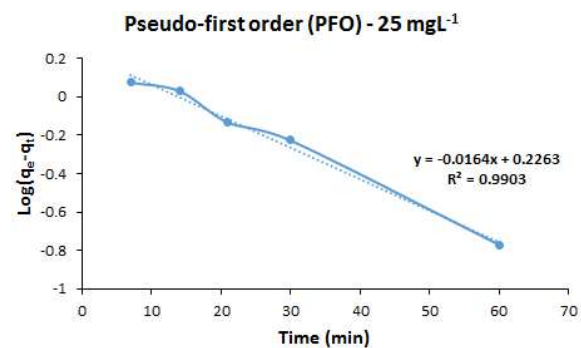
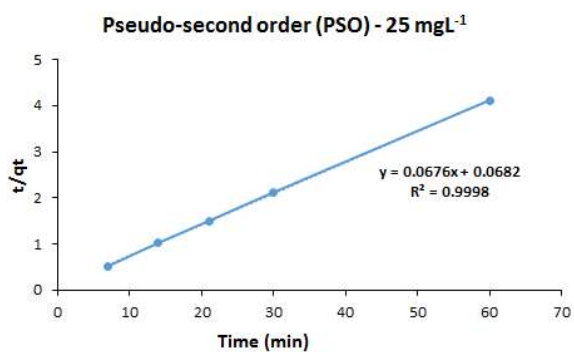
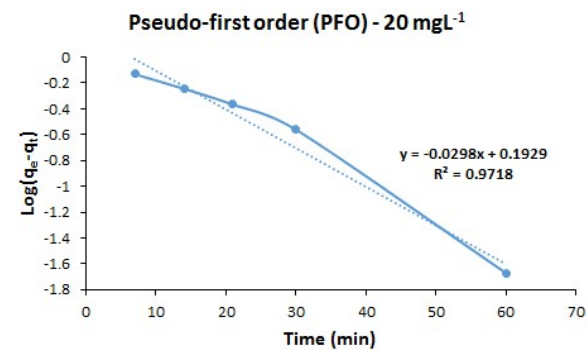
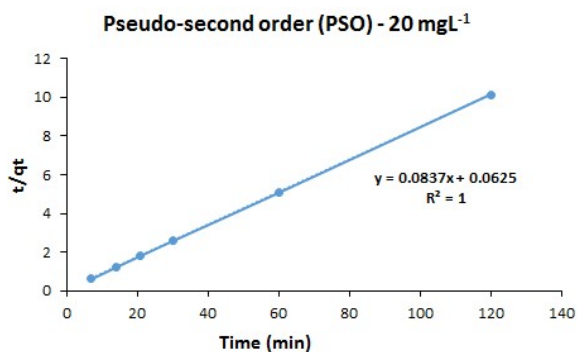
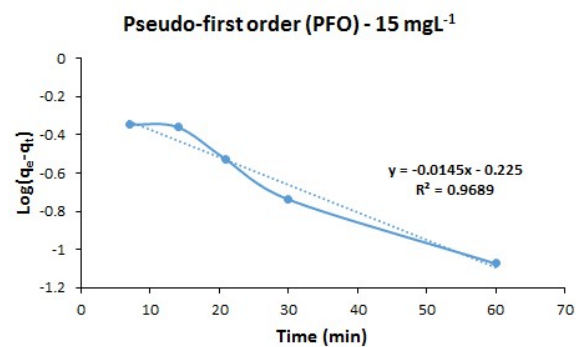
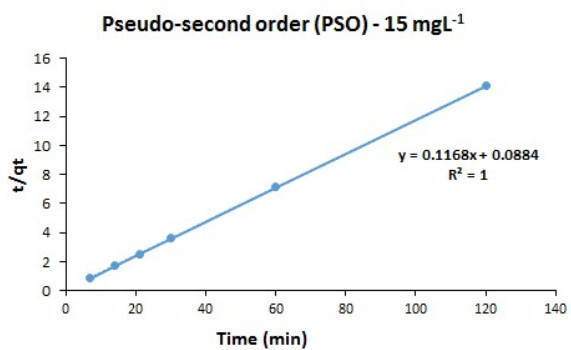
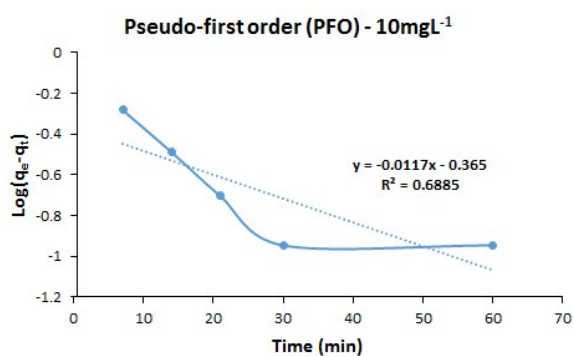
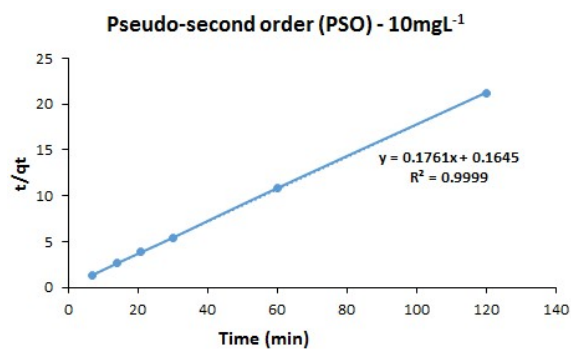
\*Corresponding authors

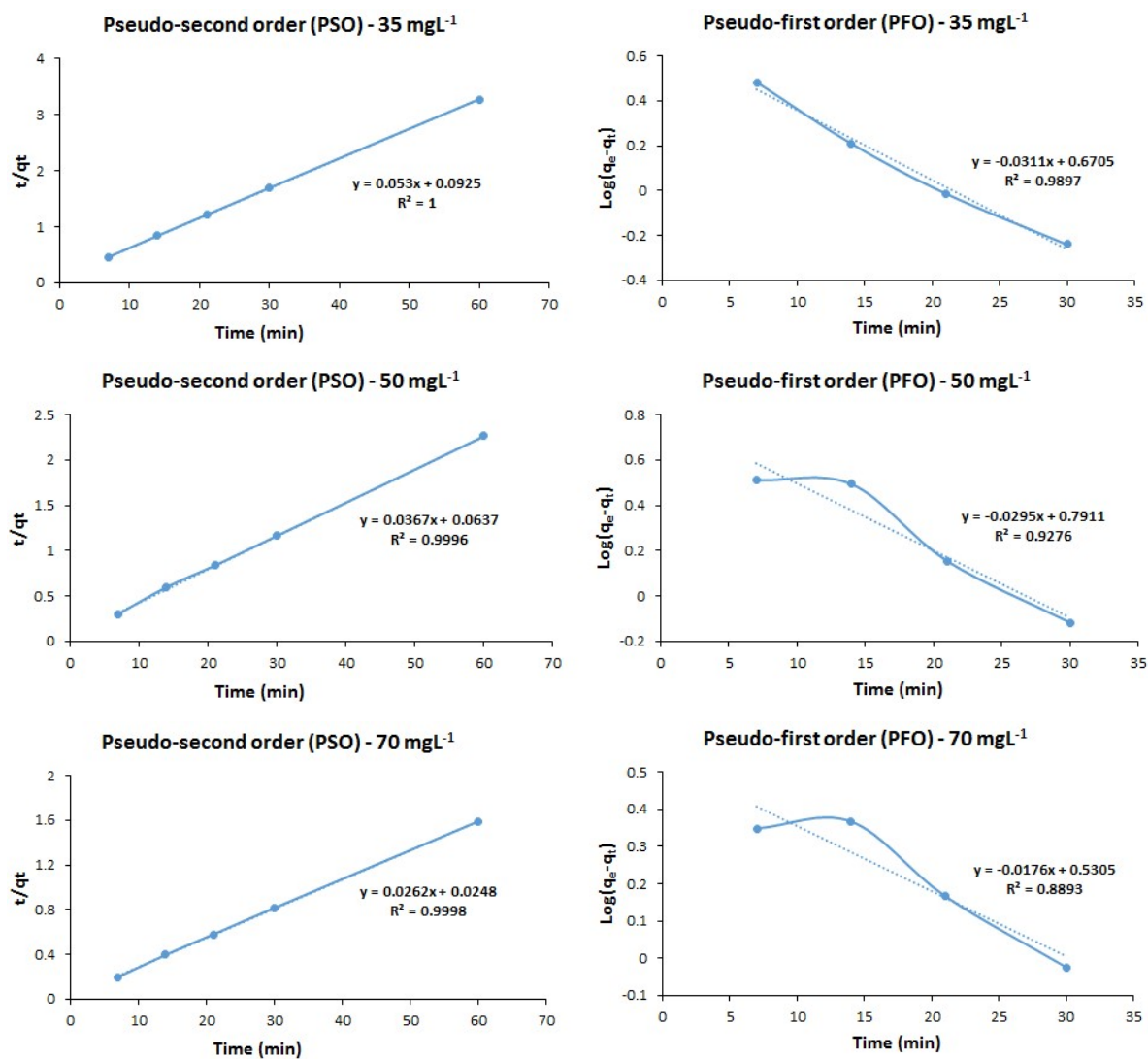
E-mail address: nyacelas@udem.edu.co (Nancy Acelas)



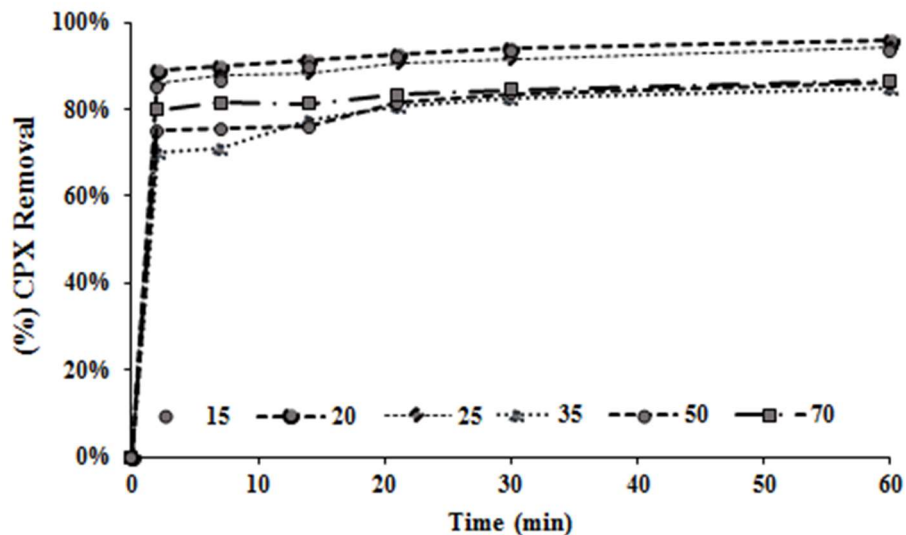
**Figure S1.** FTIR spectrum for adsorbent materials before and after CPX removal A.  $\text{F}_{\text{Zn}}$ ; B.  $\text{F}_{\text{HA}}$ ; C.

$\text{S}_{\text{Zn}}$



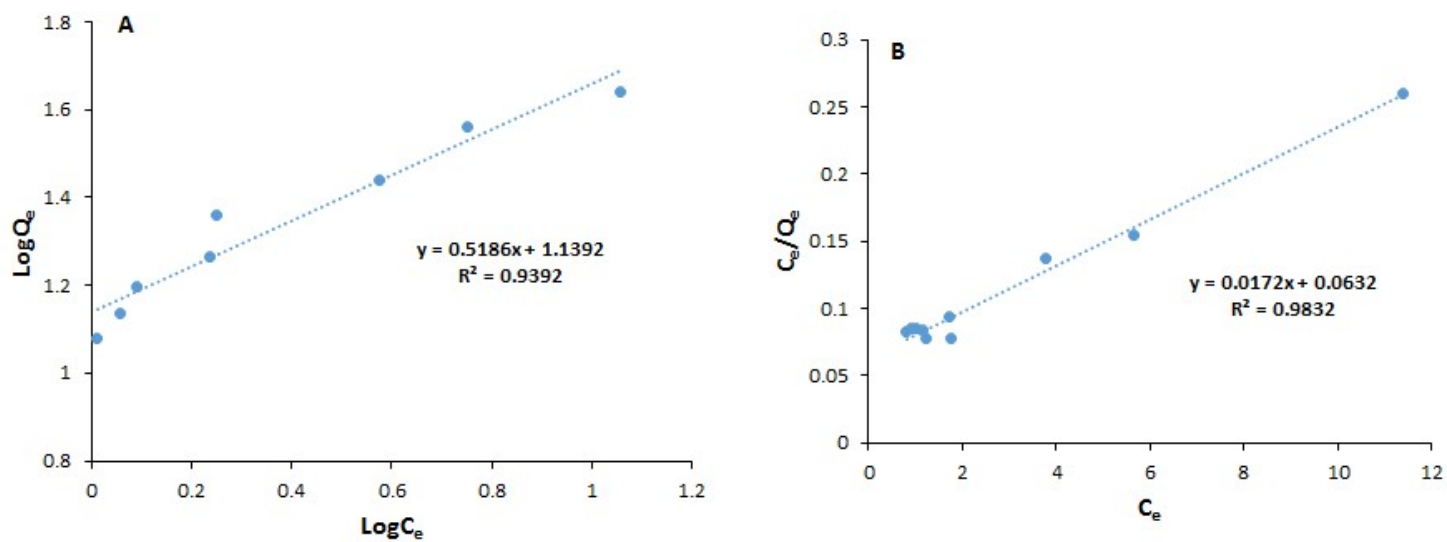


**Figure S2.** Lineal equation adjusted for the pseudo-first (PFO) and pseudo-second (PSO) kinetics models at different CPX concentrations.



**Figure S3.** Effect of the initial concentration of CPX on the removal percent removal on  $F_{Zn}$ . [Experimental conditions: adsorbent doses:  $1.6\text{gL}^{-1}$ ; pH: natural]

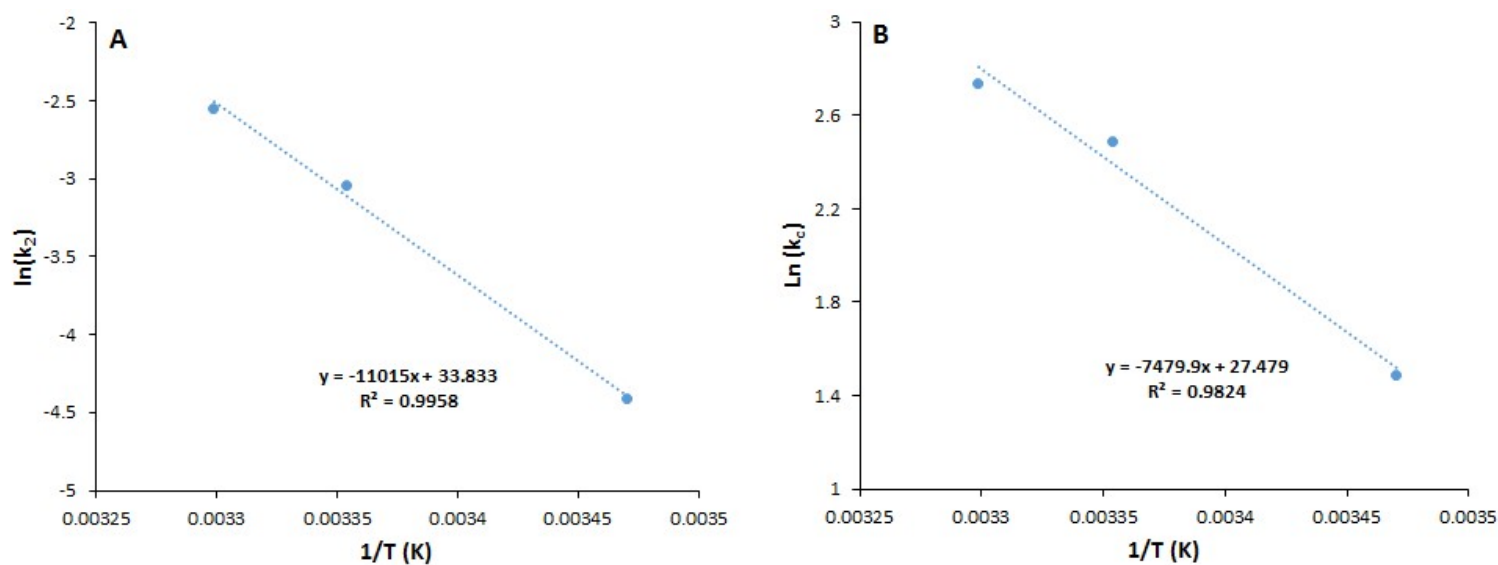
Figure S3 shows the effect of the initial concentration of CPX on the percentage removal on  $F_{Zn}$ . It can be seen that the removal percentage of CPX increased remarkably with an increase in the initial concentration. During the initial step there was a high adsorption rate which was related to the driving force and high concentration Vs the huge amount of active sites. After some time the equilibrium state was reached and there was a low adsorption rate due to the decrease of CPX molecules and binding sites. Similar explanations has been mentioned elsewhere [25][26].



**Figure S4.** A) Freundlich and B) Langmuir isotherm models for the adsorption of CPX onto  $F_{Zn}$  [20  $\text{mgL}^{-1}$ , 180 min].

**Table S1.** Parameters of isotherm models for the adsorption of CPX onto  $F_{Zn}$  [20  $\text{mgL}$ , 180 min]

<b>Langmuir</b>	
$Q_m$ ( $\text{mg g}^{-1}$ )	57.47
$k_L$ ( $\text{L mg}^{-1}$ )	0.2857
$R_L$	0.1470
$\Delta Q_e$ (%)	0.36
$R^2$	0.984
<b>Freundlich</b>	
$k_F$ ( $\text{mg g}^{-1}$ )	13.02
$n_F$	1.79
$\Delta Q_e$ (%)	13.55
$R^2$	0.940



**Figure S5.** Thermodynamic parameters of CPX adsorption on palm fiber adsorbent **A)**  $E_a$  and **B)** Gibbs, Enthalpy and Entropy.

**Table S2.** Composition of simulated wastewater (pH:6.5) and simulated aged urine (pH:8.5)

Composition WWTP	mg L <sup>-1</sup>	Composition Aged Urine	g L <sup>-1</sup>
NaHCO <sub>3</sub>	96	Na <sub>2</sub> SO <sub>4</sub> Anh.	2.3
NaCl	7	NaH <sub>2</sub> PO <sub>4</sub> Anh.	2.1
CaSO <sub>4</sub> .2H <sub>2</sub> O	60	NaCl	3.6
Urea	6	KCl	4.2
KCl	4	CH <sub>3</sub> COONa	10.21
K <sub>2</sub> HPO <sub>4</sub>	28	(NH <sub>4</sub> ) <sub>2</sub> CO <sub>3</sub>	26.59
CaCl <sub>2</sub> .2H <sub>2</sub> O	4		
Peptone	32		
MgSO <sub>4</sub> .7H <sub>2</sub> O	125		
Meat extract	22		