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Research paper

Comments on the paper "Simultaneous removal of mixed contaminants by organoclays — Amoxicillin and Cu(II) from aqueous solution"

Yuh-Shan Ho

Water Research Centre, Asia University, Taichung 41354, Taiwan

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Recently, Jin et al. (2014) published the paper entitled "Simultaneous removal of mixed contaminants by organoclays — Amoxicillin and Cu(II) from aqueous solution". In Section of 2.4.2. Adsorption kinetics, authors noticed "The first-order kinetic model (Ahmaruzzaman, 2008; Li et al., 2009) is given as:

$$\frac{1}{q_1} = \frac{k_1}{q_e t} + \frac{1}{q_e} \quad (1)$$

where q_e and q_t are the amounts (mg/g) of AMX or Cu(II) sorbed on sorbent at equilibrium and at various times t, respectively, and k_1 is the rate constant (min^{-1}) of the first-order model for the adsorption process."

This equation cannot be found in the cited references and is not correct. The units of parameters in the equation also could not agree each other. Thus results in "Simultaneous removal of mixed contaminants by organoclays — Amoxicillin and Cu(II) from aqueous solution" might not be correct. In 1898, Lagergren firstly presented the first order rate equation for the adsorption of oxalic acid and malonic acid onto charcoal (Lagergren, 1898). In order to distinguish kinetics equation based on concentration of solution and adsorption capacity of solid, Lagergren's first order rate equation has been called pseudo-first order since 1998 (Ho and McKay, 1998a, 1998b). Details of the Lagergren rate equation for adsorption reactions were published in 2004 (Ho, 2004). The most popular form used is:

$$\log(q_e - q_t) = \log(q_e) - \frac{k}{2.303} t \quad (2)$$

q_e and q_t (mg/g) are the adsorption capacities at equilibrium and at time t respectively. k (1/min) is the rate constant of pseudo-first order adsorption. In recent years, the same mistake can be found in *Water Science & Technology* (Huang et al., 2015), *International Journal of Biological Macromolecules* (Zhang et al., 2014), *Carbohydrate Polymers* (Zhou et al., 2014), *Chemical Engineering Journal* (Zhu et al., 2014; Esmaeli et al., 2013), *Desalination and Water Treatment* (Salman et al., 2013), and *Separation Science and Technology* (Liu et al., 2013). However only a few related comments were accepted in *Food Chemistry* (Ho, 2014a), *Journal of Molecular Liquids* (Ho, 2014b), and *Journal of Environmental Sciences-China* (Ho, 2014c).

In order to stop the proliferation of the mistake of the pseudo-first order model, a comment has been made (Ho, 2009). Citing the original paper not only respects the work of the authors who presented a novel research idea but also discussed this idea in detail in the body of their paper (Ho, 2014a, 2014b, 2014c). In my view, Jin et al. should have cited the original paper for the pseudo-first order kinetic model and thereby provided greater accuracy and information details about the kinetic expression they employed.

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E-mail address: ysho@asia.edu.tw.

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