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Letter to the Editor

Comments on the paper "Removal of Cu (II) by loofah fibers as a natural and low-cost adsorbent from aqueous solutions"

Keywords:
Adsorption
Kinetics
Pseudo-first order kinetic model

Recently, Tang et al. [1] published the paper entitled "Removal of Cu (II) by loofah fibers as a natural and low-cost adsorbent from aqueous solutions". In the Section 2.3.3. Kinetic study, authors mentioned "pseudo-first-order equation" and cited a reference Annadurai et al. [2].

$$\frac{1}{q_t} = \frac{k_1}{q_e} \cdot \frac{1}{t} + \frac{1}{q_e} \tag{1}$$

where q_t (mg/g) is the amount of adsorbed Cu(II) at any time and k_1 (min^{-1}) is the equilibrium rate constant of pseudo-first-order adsorption.

However Eq. (1) is not correct. Units of parameters in the equation also cannot agree with each other. This equation could not be found in the reference. Thus results in "Removal of Cu (II) by loofah fibers as a natural and low-cost adsorbent from aqueous solutions" might not be correct. Indeed, in 1898, Lagergren presented the first order rate equation for the adsorption of ocalic acid and malonic acid onto charcoal [3]. 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 [4,5]. Details of Lagergren rate equation for adsorption reactions were published in 2004 [6]. The most popular form used is:

$$\log(X - x) = \log(X) - \frac{k}{2.303} t \tag{2}$$

Authors also noticed that "The pseudo-second-order kinetic model was given as follows".

$$\frac{t}{q_t} = \frac{1}{k_2 q_e^2} + \frac{t}{q_e} \tag{3}$$

In fact Eqs. (1) and (3) are the same. From Eqs. (1) and (3), k_1 could be obtained as follows:

$$k_1 = \frac{1}{k_2 q_e}. \tag{4}$$

Again units of parameters in Eq. (4) cannot agree with each other.

Although the pseudo-first-order equation is well known, wrong equation, Eq. (1), is still duplicated in the literatures and in this paper. The same mistake could be also found in *Food Chemistry* [7]. Results calculated by the wrong model would not be accepted if only the form of model is corrected in this paper. Thus new results by corrected model are needed for new discussion. In order to stop the proliferation of the mistake of the pseudo-first order model, a comment has been made [6]. 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 [8]. Greater emphasis and responsibility must be placed on authors to check the accuracy of cited references in their submitted manuscripts [9]. Reviewers should also take the responsibility for this section of the manuscript. Finally the journal editors have to insist on reference accuracy in article accepted for publication [10].

In my view, Tang et al. should have cited the original paper for the pseudo-first order kinetic models and thereby provided greater accuracy and information details about the kinetic expression they employed.

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