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LETTER TO THE EDITOR

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Abstract A research paper's contribution exists not only in its originality and creativity but also in its continuity and development for research that follows. However, the author easily ignores it. Citation error and quotation error occurred very frequently in a scientific paper. Numerous researchers use secondary references without knowing the original idea from authors. Sulaymon et al. (Environ Sci Pollut Res 20:3011–3023, 2013) and Spiridon et al. (Environ Sci Pollut Res 20:6367–6381, 2013) presented wrong pseudo-second-order models in *Environmental Science and Pollution Research*, vol. 20. This comment pointed the errors of the kinetic models and offered information for citing original idea of pseudo-second-order kinetic expression. In order to stop the proliferation of the mistake, it is suggested to cite the original paper for the kinetic model which provided greater accuracy and more details about the kinetic expression.

Keywords Pseudo-second-order model · Adsorption · Kinetics · Secondary references · Citation errors · Quotation errors

In *Environmental Science and Pollution Research*, vol. 20, two articles, entitled "Competitive biosorption of lead, cadmium, copper, and arsenic ions using algae" (Sulaymon et al. 2013) and "Phenol removal from wastewater by adsorption on zeolitic composite" (Spiridon et al. 2013), presented the equation of "pseudo-second-order model" and cited secondary references. Both equations cannot be found in the cited reference and are not correct.

Responsible editor: Philippe Garrigues

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In the paper by Sulaymon et al. (2013), authors noticed that "while the linearized form of the pseudo-second-order equation is as follows (Fu and Viraraghavan 2002):"

$$\frac{t}{q_t} = \frac{1}{k_2 \cdot q_e} + \frac{t}{q_e}$$

In the paper by Spiridon et al. (2013), authors noticed that "the pseudo-second-order model is represented by Eq. (11) (Alzaydien and Manasreh 2009):"

$$\frac{t}{q_t} = \left(\frac{1}{k_2} q_e^2\right) + \frac{1}{q_e} t \tag{11}$$

The pseudo-second-order kinetic expression for the adsorption systems of divalent metal ions using sphagnum moss peat has been presented (Ho 1995). The pseudo-second-order kinetic model has a nonlinear form $q_t = \frac{q_e^2\, kt}{1+q_e\, kt}$ and four linear forms such as $\frac{t}{q_t} = \frac{1}{kq_e^2} + \frac{1}{q_e} t$, $\frac{1}{q_t} = \left(\frac{1}{kq_e^2}\right)\frac{1}{t} + \frac{1}{q_e}$, $q_t = q_e - \left(\frac{1}{kq_e}\right)\frac{q_t}{t}$, and $\frac{q_t}{t} = kq_e^2 - kq_e q_t$ (Ho 2006a). The model was also used in numbers of adsorption systems in subsequent years (Ho 2005). A review of second-order models for adsorption systems gave more details (Ho 2006b).

One common mistake is to cite papers that are devoid of the original information, but have used the original information of others to develop their own arguments (Taylor and Brown, 2001). A number of researchers pointed out that the rates of citation and quotation errors are unacceptably high in journals, which significantly diminishes the value of the reference list (Roach et al. 1997; Siebers 2000). The reference section was of great importance to the researchers who were interested in a publication's paper and would like to follow the study or gain further useful information in this specialty (Ho 2004). Authors should make serious efforts to check the accuracy of the references cited in their manuscripts. They should also read the original article before quoting it, rather than citing from

abstracts or cross-references (Gupta et al. 2005). It has also been strongly urged that the peer review of citation and quotation accuracy should be strengthened (Lee and Lee 1999). In my view, Sulaymon et al. and Spiridon et al. should have cited the original paper for the pseudo-second-order model and thereby provided greater accuracy and information details about the kinetic expression they employed.

References

Alzaydien AS, Manasreh W (2009) Equilibrium, kinetic, and thermodynamic studies on the adsorption of phenol onto activated phosphate rock. Int J Phys Sci 4:172–181

Fu Y, Viraraghavan T (2002) Removal of Congo Red from an aqueous solution by fungus *Aspergillus niger*. Adv Environ Res 7:239–247

Gupta P, Yadav M, Mohta A, Choudhury P (2005) References in Indian pediatrics: authors need to be accurate. Indian Pediatr 42:140–145

Ho YS (1995) Adsorption of heavy metals from waste streams by peat. Ph.D. thesis. University of Birmingham, Birmingham, UK

Ho YS (2004) Citation review of Lagergren kinetic rate equation on adsorption reactions. Scientometrics 59:171–177

Ho YS (2005) Comment on "Adsorption of naphthalene on zeolite from aqueous solution" by C.F. Chang, C.Y. Chang, K.H. Chen, W.T. Tsai, J.L. Shie, and Y.H. Chen. J Colloid Interface Sci 283:274–277

Ho YS (2006a) Second-order kinetic model for the sorption of cadmium onto tree fern: a comparison of linear and nonlinear methods. Water Res 40:119–125

Ho YS (2006b) Review of second-order models for adsorption systems. J Hazard Mater 136:681–689

Lee SY, Lee JS (1999) A survey of reference accuracy in two Asian dermatologic journals (the *Journal of Dermatology* and the *Korean Journal of Dermatology*). Int J Dermatol 38:357–360

Roach VJ, Lau TK, Kee WDN (1997) The quality of citations in major international obstetrics and gynecology journals. Am J Obstet Gynecol 177:973–975

Siebers R (2000) The accuracy of references of three allergy journals. J Allergy Clin Immunol 105:837–838

Spiridon OB, Preda E, Botez A, Pitulice L (2013) Phenol removal from wastewater by adsorption on zeolitic composite. Environ Sci Pollut Res 20:6367–6381

Sulaymon AH, Mohammed AA, Al-Musawi TJ (2013) Competitive biosorption of lead, cadmium, copper, and arsenic ions using algae. Environ Sci Pollut Res 20:3011–3023

Taylor DMD, Brown AFT (2001) Analysis of the study design and manuscript deficiencies in research articles submitted to *Emergency Medicine*. Emerg Med Australas 13:444–450