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Kinetic of the Adsorption of Citalopram (Anti-Anxiety) Drug onto Carbon Carbon Nanotube.

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ABSTRACT

The purpose of this research deals with the Kinetic of the adsorption of Citalopram (Anti-Anxiety) drug multi –wall carbon nanotube. The rate constant for the adsorption of Citalopram was determined using Lagergren rate equation. The adsorption process followed first order Kinetic. The result showed when concentration of drug increased in the temperature constant, Adsorption of drug on carbon nanotube increased.

Keywords: adsorption, citalopram, carbon nanotube.

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INTRODUCTION

Adsorption of material depends on the adsorbate-adsorbent interaction and system condition and has been investigated for their suitable for application in drugs adsorption control [1-10].

Two vital evaluation elements for an adsorption process operation unit are the mechanism and the reaction rate. Solute uptake rate determines the reliable time required for completing the adsorption reaction and can be enumerated from Kinetic analysis. In 1989, Legergren presented the first order rate equation for the adsorption of ocalic acid and malonic acid onto charcool (11).In order to distinguish Kinetics equation based on concentration of solution and adsorption capacity of solid, Legergren's first order the equation has been called Pseudo-first order [12-15]. Kinetics is concerned fundamentally with the details of the process whereby a system gets from an initial state to final state and the time required. For the translation, hence it gives ideal about the mechanism of adsorption.

EXPERIMENTAL

Apparatus

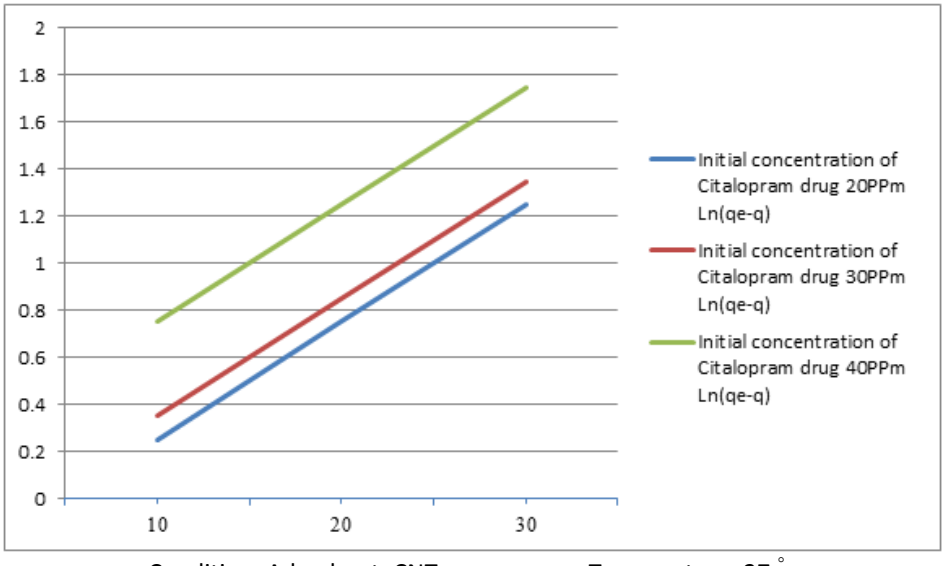
In this research we used Ultraviolet-Visible spectroscopy method to determine the concentration of Citalopram. We used shaker-incubator apparatus Infers model for solution stirring process, during equilibrium adsorption and at the 10, 20, 30 minutes, then filtrated and could measure the solution concentration with UV-VIS.

The effect of Initial Concentration

The first prepared 20, 30, 40 PPm of the Citalopram drug. Their adsorptions were measured with UV-VIS. Then they added to 0.1g multi –wall carbon nanotube(MCNTS) and at the 10, 20,30 minutes agitation with shaker-incubator they filtered. Then, the adsorption of the filtered solution was measured with spectrophotometer.

RESULT AND DISCUSSION

The study of Kinetic of adsorption of Citalopram, Legergren rate equation is significant as it provides valuable insights into the reaction. Table and figure1 shows Kinetic modeling for the adsorption of Citalopram on carbon nanotube.



Condition: Adsorbent: CNT Temperature: 27 ° c

Figure 1: Kinetic modeling for the adsorption of Citalopram on CNT using Legergren equation

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Table1: Kinetic modeling for the adsorption of Citalopram on CNT using Legergren equation

Time in minute	Initial concentration of Citalopram drug 20PPm $Ln(q_e-q)$	Initial concentration of Citalopram drug 30PPm $Ln(q_e-q)$	Initial concentration of Citalopram drug 40PPm $Ln(q_e-q)$
10	0.25	0.35	0.75
20	0.75	0.85	1.25
30	1.25	1.35	1.75

Condition: Adsorbent: CNT Temperature: 27 $^{\circ}$ c

The rate constant for the adsorption of Citalopram on adsorbents was determined using Legergren equation [16].

$$Ln(q_e-q)= ln\ q_e-kt$$

Where q and q_e=constant of Citalopram adsorbed at time and at equilibrium time.
K= rate constant of adsorption in time^{-1}. The data are given in table 1. Lagergren plots of log (q_e-q) VS. time (t) were linear showing the applicability of the equation to the adsorption process.

The adsorption of Citalopram was found to be dependent on constant time the initial concentration of the adsorbate. The model of Lagergren fit progressively well with increasing sorbate concentration. The process of adsorption was found to follow first order Kinetics.

REFERENCES

[1] M Vadi and et al. Nano Sci Nano Technol 2014;8(10):380-386
[2] M Vadi and et al. J Modern Drug Disc Drug Del Res 2014; 2(3)
[3] M Vadi and et al. Oriental J Chem 2014;30(1):233-236
[4] M Vadi and et al. Oriental J Chem 2014;30(1): 265-269
[5] M Vadi and et al. Oriental J Chem 2014; 29(2):419-425
[6] M Vadi. Asian J Chem 2013;25(6):3431-3433
[7] M Vadi. Asian J Chem 2013;25(10): 5467-5469
[8] M Vadi and et al. Oriental J Chem 2012;28(3):1285-1289
[9] M Vadi and et al. Oriental J Chem 2012;28(1):343-348
[10] M Vadi and et al. Oriental J Chem 2011;27(3):973-978
[11] S Lagergren, Zur theorie der sogenannten adsorption geloster slotte 1898;24(4): 1-39
[12] Y Ho and et al. Proc Saf Environ Prot 1998;16B:332-340
[13] Y Ho and et al. Proc Saf Environ Prot 1998;76B:183-191
[14] Y Ho and et al. Chem Eng J 1998;70:115-124
[15] Y Ho. Canadian J Chem Eng 1998;76:822-827
[16] RP Srinivasa and et al. Indian J Chem 2007;46A:284-289