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REMOVAL OF HEAVY METAL POLLUTANT NI (II) USING THE LEMON LEAVES AS LOW COST METHOD

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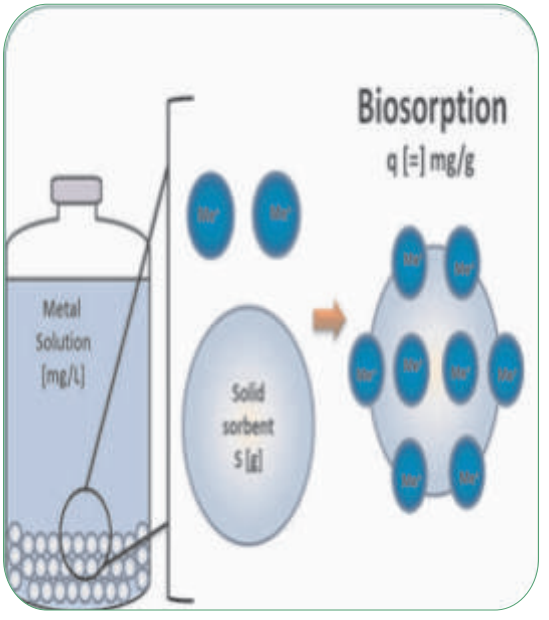

ABSTRACT

To adopt appropriate method and to develop suitable technique either to prevent metal pollution or to reduce up to low cost level. Various physical and chemical methods like precipitation electrolysis as in reverse osmosis permit pure water and to stop salty. The use of low cost adsorption in the waste water treatment is recommended as they are relatively cheaper and available locally. Heavy metal pollutants seriously interfere with bio environmental process there by poisoning the life on planet(1).

KEYWORDS :*Heavy metal pollutant, lemon leaves , DMG etc.*

INTRODUCTION

Water is an important part of our environment. All the living creators depend upon the water in one way or the other but there are instances that civilization have disappear due to shortage of water or due to water born diseases. Today water has become essential commodity for the development of industries and the agriculture. The quality of water is now the concern of scientist in all counties of the world. The recent decision of WHO emphasizes that water given to people should meet high requirements of modern hygiene and It must be free from toxic substances and pathogenic microorganism(2,3).

To adopt appropriate methods and to develop suitable technique either to prevent the metal pollution or to reduce it to very low levels". Various physical and chemical methods like precipitation. Electro dialysis, as in reverse osmosis, a semi permeable membrane permit pure water to pass, but stop salts. The use of low cost adsorption in the wastewater treatment is recommended since they are relatively cheaper and available locally. In the present research the focus is on to adsorb Ni (II) on lemon leaves powder (LLP). WHO has prescribed a maximum concentration of Ni (II) in drinking water as 0.1 – 0.2 mg/lit. (4,5)

MATERIAL AND METHOD :-

Dimethyl Glycoxime Method:

Principle:

$Ni^{2+} + 2H_2DMG \rightarrow Ni(HDMG)_2 + 2H+$

Nickel reacts with DMG in the presence of an alkaline oxidizing agent to form a characteristic red color complex which is measured visually or photo metrical(6,7).

Reagents:

1.Nickel stock solution :

Dissolve 447.9 mg nickel sulphate,

$NiSO_4$. $6H_2O$. in distilled water and Volume make up to 1000 ml in volumetric flask.
1.00ml = 100 µg Ni

2.Nickel working solution :

Pipette 10.0ml. Nickel stock solution in to a 100 ml volumetric flask and Volume make up to mark with distilled water.
1.00ml = 10µg Ni

3.HCl, approximately 0.5 N Dilute 50 ml conc. HCl to 1000 ml with distilled water.

4.Sodium citrate ($Na_3 C_6H_5O_7$ $2H_2O$) solution :

Dissolve 125 gm sodium – citrate, in 500ml distilled water.

5.Iodide solution (I_2 + KI), approximately 0.05N:

Dissolve 20 gm potassium iodide, (KI) in 5.0 ml. distilled water. Dissolve in this solution 6.4 gm iodine. Dilute the solution to 1000ml.

6.Dimethyl glyoxime solution :

Dissolve 1 gm dimethyl glyoxime in 100 ml conc. Ammonia solution add 100 ml distilled water. Filter necessary.

7. Additional reagents for the removal of interferences of dilute Nh3 solution :

i)Dilute with 10 ml distilled water.
ii)Chloroform.

In this experiments a stock solution of Nickel was prepared by dissolving an appropriates, amount of nickel salt ($NiSO_4$, $6H_2O$) in de ionized distilled water with different concentration Ni (II) solution of different concentration. All the glassware and polypropylene flasks to be used in experiments were overnight immersed in 10% (V/v) HNO_3 and rinsed with DDW for several time. Before and after the experiments Ni (II) contents in the solution was determined by UV- Spectrophotometer (Systronics – 118) at ?max = 232 nm. The PH of working solution was adjusted to desired values with 0.1 N HCl and 0.1N NaOH using digital PH meter (Equiptronic model 610).

RESULT AND DISCUSSION :-

The nickel removal (%) at any instant of time and the amount of nickel absorbed were determined by the following equation:

% Removal of Ni (II) removal = [(Co – Ce) / Co] × 100

Amount of absorbed (Qe) = [(Co – Ce) / M] × 100

Where, Co and Ce are initial and remaining concentration (mg/L) of nickel. M is mass of adsorbent in gm.

1) Effect of contact time:

The effect of contact time is important factors on removal of Nickel. The contact time increases with increase in the adsorption percentage up to 300 min. afterwards it decreases. (fig.1)

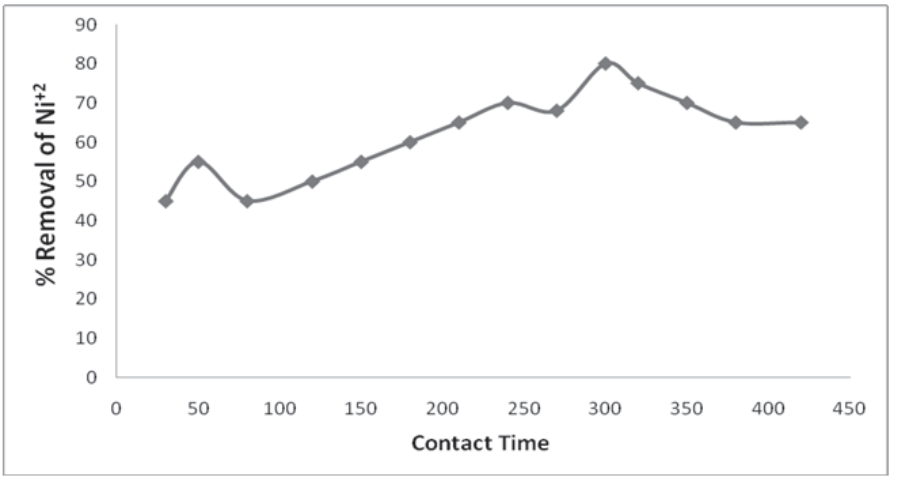

Fig. : 1 % Removal of Ni^{+2} Vs contact time.

2) Effect of PH :

The P^H of solution affects the degree of ionization and the extent of adsorption. Increase in hydrogen ion concentration also results in neutralization of negative charge at the surface of the adsorbent there by reducing hindrance to diffusion and making available more of the active surface of the adsorbent. The % removal of nickel was studied at optimum time 300 min. and optimum adsorbent dose 600 mg.

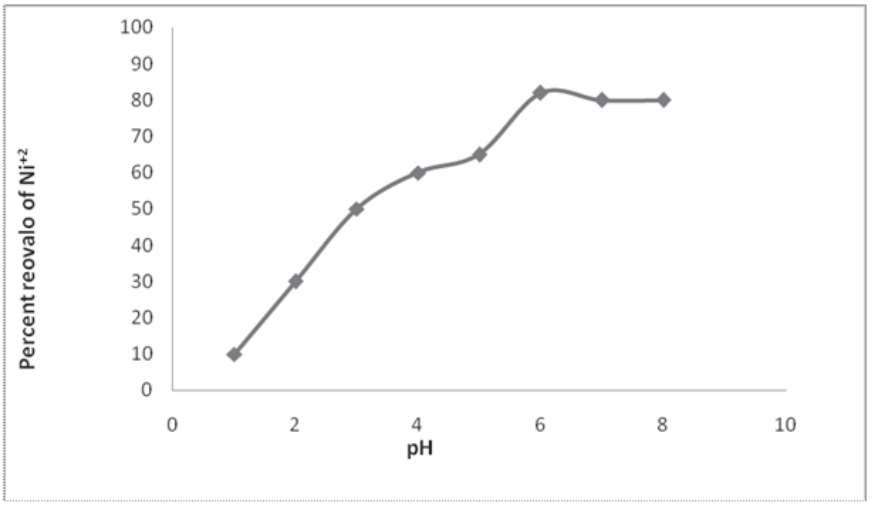

Fig. 2 % Removal of Ni^{+2} Vs PH

3) Effect of adsorbent dosage:

The effect of different adsorbent dosage of lemon leaves powder (LLP) on nickel removal was studied at optimum time 5 Hrs. it was observed that as the adsorbent dosage is increased from 100 to 600 mg,

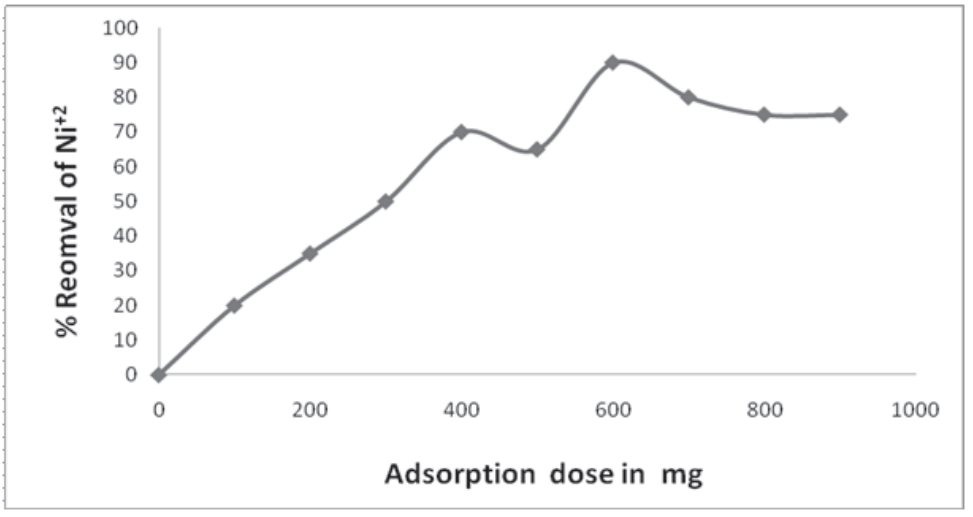

Fig. 3 % Removal of Ni^{+2} Vs Adsorption Dose.

4) Effect of concentration:

The effect of concentration on adsorption of solute is dependent factors such as, P^H, temperature, ionic strength of solution, particle size and dosage etc. Several investigations have reported similar observation from the data obtained from removal of Ni (II) using Lemon Leaves Powder (LLP) as adsorbent.

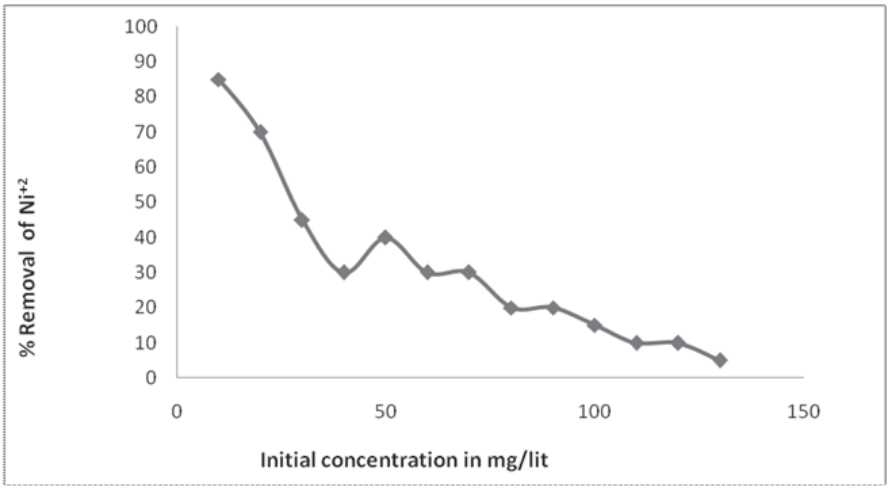

Fig. 4 % Removal of Ni^{+2} Vs Initial Concentration

The Ni (II) concentration taken as 10-130 mg/L with optimum adsorbent dosage of 600 mg, optimum P^H 5.9 and for optimum contact time of 300 min. it is observed that the percentage removal of Ni(II) is decreasing simultaneously

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