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ORAL CONTROLLED RELEASE PHENYLPROPRANOLAMINE ION EXCHANGE RESINATE BEADS

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ABSTRACT

Treating with ion exchange resin has chemically modified Phenylpropranolamine hydrochloride to form an oral controlled release beads using ions exchange chromatography. A strong cation exchange resin was utilized for the loading of drug and the drug resinates were evaluated for various physical and chemical parameters. UV-Visible spectroscopy and pH paper test confirmed the reaction carried out on Phenylpropranolamine hydrochloride.

Key words: *Pseudomonas aeruginosa*, metal complexes, Phenylhydrazone.

INTRODUCTION

Phenylpropanolamine hydrochloride (α-(1-amino ethyl) benzene methanol hydrochloride), a largely acting sympathomimetic drug with an acting similar to that of CNS stimulants. It is given orally as the hydrochloride salt for the symptomatic treatment of nasal congestion and it is frequently used in mixed preparation for relief of cough and cold symptoms. Its usual dose upto 25 mg 3 or 4 times daily orally[1]. Amberlite IR120, a strong cation exchange resin is non-toxic and safe for human consumption and also active at entire pH range (0 to 14). The average particle size range of resin is 120 m and therefore is suitable for formulation of physical stable and esthetically acceptable oral dosage form. The drug resinate complex was prepared with an objective to minimize the release of drug in the gastric fluid . the drug molecule attached to the resin are released by exchanging with appropriate charge ion in gastro-intestinal tract followed by diffusion of free drug molecule out of the resin. The following reaction represents the preparation and exchange reaction affecting drug release *in vivo*.

Preparation

RESIN-SO_3H + Phenylpropranolamine HCL = HCL+RESINSO_3. Phenylpropranolamine.H

Exchange in body

RESIN-SO_3. Phenylpropranolamine.H + NaCL = Phenylpropranolamine. HCl + RESIN-SO_3Na

A strong acid risen must be used to minimized exchande of drug by hydrogen ion, to avoid excessive drug release in the gastric fluid[2].

MATERIAL AND METHODS

A strong cation exchange resin (Amberlite IR 120) was purchased from Merck limited Delhi. Phenylpropanolamine, ethanol was obtained from department of pharmacy, Barkatullah Univesity, Bhopal.

Loading of drug on ion exchange resin

Preparation of drug-resinate was carried out by ion exchange column chromatography. The ion exchange resin was taken in a china dish and ethanol was added to in order to establish

equilibrium and complete swelling. Then the column was packed with ion exchange resin. Accurately weighed 2g of Phenylpropanolamine hydrochloride was dissolved in 100 ml of ethanol and passed through the top of the column with the help of pipette. The drug-resinate was then washed with dematerialized water to remove contaminating ions. The drug to form beads.

pH paper test

The pH of the solutions of before loading and after loading were determined in which the result obtained are shown in Table-1.

Estimation of percentage entrapment of drug

It was determined by eluting the drug in 0.1 M HCl. 2 g of drug-resinate was stirred with 100 ml of 0.1 M HCl. The solution was filtered and after suitable dilution drug content was determined spectrophotometrically at λ_{max} of 250nm[3].

Table - 1: Observation Table for pH estimation

Solution	pH	Result
Before loading	7.4	Neutral
After loading	1.0	acidic

RESULTS AND DISCUSSION

The process for preparing phenylpropanolamine resinate was optimized with respect to methodology, drug resin proportion and time for loading. Loading was tried out by column chromatography method. The 50.60% w/w was successfully loaded on the resin as shown in Fig. 1. The dissolution test of drug resinate using water as a solvent shown no release of drug in it, thus proposing the phenylpropanolamine resin complex an effective controlled release oral dosage form. It is thus proposed that the phenylpropanolamine resin complex can be useful scaffold synthesis method in combinatorial ion exchange chemistry.

Table -1 indicates that the eluent obtained is acidic in nature, while the drug being salt shows neutral pH. It proves the loading of the drug on the resin, since it follows the following reaction:

$$\underset{\text{Resin}}{RESIN\text{-}SO_3H} + \underset{\text{Salt}}{Phenylpropanolamine.HCl} = \underset{\text{Acid}}{HCl} + \underset{\text{Drug-resinate}}{RESIN\text{-}SO_3.Phenylpropanolamine.H}$$

Determination of drug loading

The drug eluent was sufficiently diluted and absorbance was determined at lmax of 250 nm. The actual absorbance of 25 µg/ml of phenylpropanolamine hydrochloride was found to be 0.0915 l. The following formula was incorporated for determining the percentage of drug loaded.

$$\%\text{Drug retained} = \frac{\text{Absorbance after loading solution}}{\text{Absorbance of 25 µg/ml solution of standard Phenylpropranolamine hydrochloride}} \times 100$$

Therefore,

% Drug loaded = 100 - % drug retained in eluent

Hence, Table -2 shows the percentage of drug loading was determined.

Table - 2: Linearity data for solution after loading

S. No.	Time interval for sample taken (25 µg/ml)	Absorbance at λ 250 nm
1.	After ½ hrs	0.0885
2.	After 1 hr	0.0804
3.	After 1½ hrs	0.0755
4.	Final 4½ hrs.	0.0452

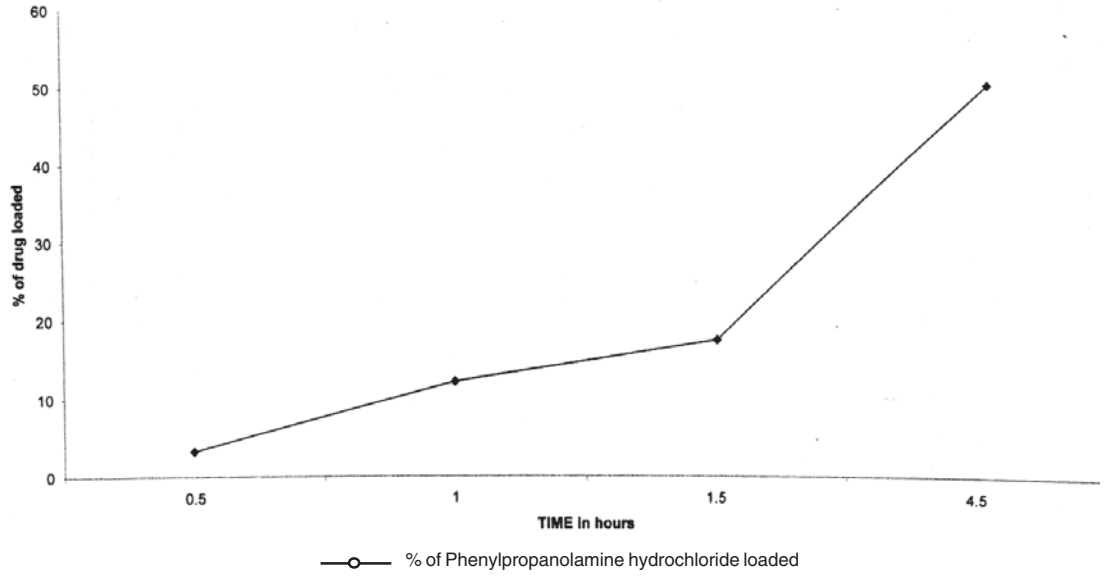

Fig. - 1: % of Phenylpropanolamine hydrochloride loaded

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