LITERATURE REVIEW

There are many methods available for the analysis of Histamine Antagonist. Those include both classical and instrumental methods. But more popular methods are:

- High Performance Liquid Chromatography
- UV-Visible Spectroscopy
- Thin layer Chromatography
- Variety of method was reported for antihistaminic agents in their combined dosage form

**Waliy A et al (1998)** was developed HPLC method for the determination of cetirizine HCl by a Bondapak-C18 column was used with a mobile phase consisting of acetonitrile:0.01 M ammonium dihydrogen phosphate (32:68, v:v) containing 0.1% w/v tetrabutyl ammonium hydrogen sulphate adjusted to pH 3 with phosphoric acid at a flow rate of 2 ml min-1 & detection wavelength 230 nm

**Arayne M et al (2005)** was developed RP-HPLC method for estimation of cetirizine HCl in Pharmaceutical Preparation. This estimation was carried out on column as U Bond pak 125 A C18 with a 1:1 (v/v) mixture of acetonitrile :water as mobile phase. The flow rate 2 mL/min and the analytes are monitored at 205 nm.

**Maithani et al(2010)** has developed RPHPLC method of cetirizine & ambroxol HCl in pharmaceutical preparation, This estimation was carried out at A Princeton C-8 column with mobile phase methanol :potassium dihydrogen phosphate (80:20)(v/v) & analyst monitor at 276 nm

**Bhatia N. et al (2010)** was developed UV Spectrophotometric method for simultaneous estimation of cetirizine HCl & ambroxol HCl Pharmaceutical Preparation. The method is based upon determination at 229nm & 243 nm using methanol as solvent

**I Singhvi et al (2009)** was developed UV spectrophotometric method for estimation of ketotifen in Pharmaceutical dosage form. The developed methods are based on formation of chloroform extractable colored complex of with 2-nitroso- napthol-4- sulphonic acid and rhodizonic acid. The extracted complex of drug with 2-nitroso- napthol-4- sulphonic acid (method-I), showed absorbance maxima at 436.5 nm and with rhodizonic acid (method-II), showed absorbance maxima at 489.5 nm.
Arayne M. et al (2009) was developed simultaneous UV Spectrophotometric for estimation of Montelukast sodium in Human serum & Pharmaceutical Preparation. The method is based upon determination at 283 nm using methanol as solvent.

D.J Patel et al (2010) was developed simultaneous UV Spectrophotometric for estimation of Montelukast sodium & bambuterol HCl in Pharmaceutical Preparation. The method is based upon determination at 322 nm & 266 nm using chloroform as solvent.

Choudhri V et al (2010) was developed simultaneous UV Spectrophotometric (Ratio derivative spectroscopy) for estimation of Montelukast sodium & Levocetirizine in Pharmaceutical Preparation. The method is based upon determination at 250.4 nm & 238.4 nm using methanol as solvent.

N Kanakdurga devi et al (2010) was developed RP-HPLC method for estimation of Montelukast in Pharmaceutical Preparation. This estimation was carried out on an inert Sil ODS3r (250 mm x 4.6 mm I.D) with a 90:10 (v/v) mixture of Methanol: Trifluroacetic acid as mobile phase. The flow rate 1 mL /min and the analytes are monitored at 310 nm.

Alsarra I et al (2004) was developed stability indicating HPLC method for determination of montelukast sodium in Human serum & pharmaceutical dosage form. This estimation was carried out on an symmetry C18 column (150 mm x 3.9 mm I.D) with a 70:30 (v/v) mixture of Acetonitrile: Potassium dihydrogen phosphate as mobile phase with PH 3.5 ± 0.1 adjusted with phosphoric acid. The flow rate 2 mL /min and the analytes are monitored at 345 nm.

Matsuda M et al (2001) was developed HPLC method for simultaneous determination of ebastine & its two metabolite, detection wavelength at 254 nm, with the stationary phase cyano column, with the mobile phase of acetonitrile:methanol:0.012M ammonium acetate buffer (20:30:48 v/v/v) at a flow rate 1.2 ml/min.

Prabu SL et al (2008) was developed RPHPLC method for the determination of ebastine in pharmaceutical formulation, the method used stationary phase Phenomenex RP-C18 column using a Mobile phase as methanol:water (90:10) and detection was carried out at 262 nm.
Ibrahim F et al (2011) was developed spectrofluorimetric methods for the determination of ebastine (EBS) in pharmaceutical preparations depending on reaction with its tertiary amino group. Method I involves condensation of the drug with mixed anhydrides (citric and acetic anhydrides) producing a product with intense fluorescence, which was measured at 496 nm after excitation at 388 nm. Method (IIA) describes quantitative fluorescence quenching of eosin upon addition of the studied drug where the decrease in the fluorescence intensity was directly proportional to the concentration of ebastine; the fluorescence quenching was measured at 553 nm after excitation at 457 nm.

Ibrahim F et al. (2011) was developed accurate, simple, sensitive and selective reversed phase liquid chromatographic method has been developed for the determination of ebastine in its pharmaceutical preparations. The proposed method depends on the complexation ability of the studied drug with Zn2+ ions. Reversed phase chromatography was conducted using an ODS C18 (150 × 4.6 mm id) stainless steel column at ambient temperature with UV-detection at 260 nm. A mobile phase containing 0.025%w/v Zn2+ in a mixture of (acetonitrile/methanol; 1/4) and Britton Robinson buffer (65:35, v/v) adjusted to pH 4.2, has been used for the determination of ebastine at a flow rate of 1 ml/min. The calibration curve was rectilinear over the concentration range of 0.3 - 6.0 µg/ml with a detection limit (LOD) of 0.13 µg/ml, and quantification limit (LOQ) of 0.26 µg/ml.

Ivana S., et al. (2008) Simple, accurate and reproducible UV-spectrophotometric method was developed and validated for the estimation of phenylephrine hydrochloride in pharmaceutical nasal drops formulations. Phenylephrine hydrochloride was estimated at 291 nm in 1 mol⋅dm−3 sodium hydroxide (pH 13.5). Beer’s law was obeyed in the concentration range of 10–100 µg⋅cm−3 (r2 = 0.9990) in the sodium hydroxide medium. The apparent molar absorptivity was found to be 1.63×103 dm3⋅mol−1⋅cm−1. The method was tested and validated for various parameters according to the ICH (International Conference on Harmonization) guidelines. The detection and quantitation limits were found to be 0.892 and 2.969 µg⋅cm−3, respectively. The proposed method was successfully applied for the determination of phenylephrine hydrochloride in pharmaceutical nasal drops formulations. The results demonstrated that the procedure is accurate, precise and reproducible (relative standard deviation < 1 %), while being
simple, cheap and less time consuming, and hence can be suitably applied for the estimation of phenylephrine hydrochloride in different dosage forms.

- **Kazemipour M et al (2005)** was developed UV Spectrophotometric (derivative spectroscopy) for Estimation of Chlorpheniramine malate, phenylephrine HCl & phenyl propanolamine HCl in Pharmaceutical Preparation. The method is based upon determination at 265.3 nm, 286.5 & 220 using Water as a solvent.

- **Shaalan NH, et al (2010)** was developed first derivative UV method with zero crossing measurement, & also developed HPLC method for estimation of Phenylephrine and chlorpheniramine malate in binary mixture using a mobile phase methanol: water: acetonitrile (80:12:8 v/v/v) at 0.9 ml/min flow rate with UV detection at 270 nm.

- **Othman NS et al (2009)** was developed a simple and sensitive spectrophotometric method was developed for determination of phenylephrine-HCl in pharmaceutical preparations. The procedure is based on the oxidation of phenylephrine-HCl with Fe (III) in acidic medium to produce Fe (II), then reaction of Fe(II) with 2,2'-bipyridyl to produce a red complex which is water-soluble, stable, and has a maximum absorption at 523 nm against the reagent blank with a molar absorptivity of 7.1295×10^4 l.mol-1.cm-1. The variables affecting the intensity of complex were studied and optimized. Under the optimum conditions, the calibration graph was linear over the range 2.5-80 µg phenylephrine-HCl/25 ml (0.1-3.2 ppm), with a relative error of +0.79 to +0.82% and a relative standard deviation of ±3.44 to ±3.57% depending on concentration level.

- **Sawant R et (2011)** was developed methods for simultaneous estimation of phenylephrine hydrochloride and chlorpheniramine maleate in pure and solid dosage forms. First method employs the application of simultaneous equation and second, is a multi-wavelength spectrophotometric analysis method. Both methods utilize 0.1N NaOH as solvent. Simultaneous equation develops using 256.8 nm, 236.8 nm and 222.4 nm as the max of paracetamol, phenylephrine hydrochloride and chlorpheniramine maleate respectively. Calibration curves were linear over the concentration ranges of 0-35 µg/mL for all drugs.
Marín A et al (2002) was developed HPLC method for the simultaneous determination of Acetaminophen, phenylephrine and chlorpheniramine in pharmaceutical formulations such as capsules and sachets, including the separation of impurities and excipients has been developed and validated. The selectivity of the method was also tested to be used if phenylpropanolamine hydrochloride were employed instead of phenylephrine. Final chromatographic conditions were a gradient elution, being solvent A: phosphate buffer 40 mM at pH 6.0 and solvent B: acetonitrile. At t=0, the mobile phase consisted of 92% A and 8% B and it changed with a linear gradient during 8 min to 75% A and 25% B. At min 8, it changed to 30% A and 70% B for 5 min and at t=15 min, it returns to the initial conditions (92% A and 8% B) during 1 min remaining at this composition until t=20 min. UV detection was performed at 215 nm for phenylephrine and chlorpheniramine, because at this wavelength sensitivity was higher than in other more characteristic wavelengths and it was necessary for the detection of minor compounds. For acetaminophen 280 nm was employed. Validation parameters permit to consider the method adequate.