Spectrophotometric Determination of Promethazine Hydrochloride by In (111) .

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Abstract :

A simple, vapid and sensitive spectrophotometirc metho) determination of trace amounts of promethazine hydrochloric aqueous solution is described. The method is based on complication of promethazine hydrochloride with In(Ill) in presence of sodium hydroxide to form an intense product maximum absorption at 304nm. Beer's law is obeyed over concentration range of (2-20ug/m1) with molar adsorptively The optimum conditions for (5.006x 10 3 L.mol-1 .cm-1).
development are described and the proposed method has successfully applied for the determination of promote hydrochloride in bulk drug.

Introduction :

Promethazine hydrochloride ((2RS) - N , N - dimethyl -1- , 1 0 h- phenothiazine - 10 - yl) propan-2-amine hydrochloride (Illustration 1) is the one of phenothiazine derivatives which is widely used as antihistamine and antiemitic drug.

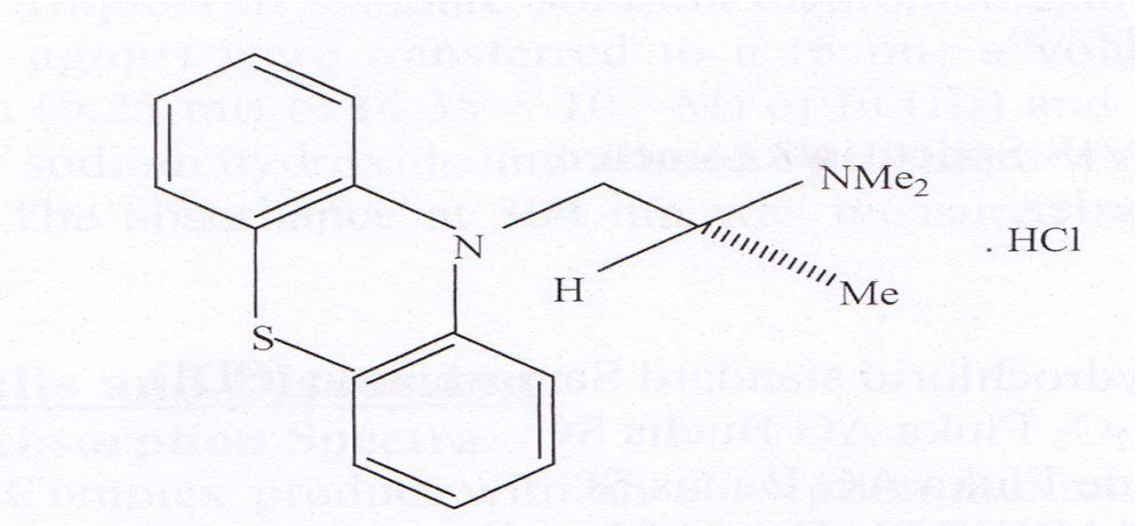


Illustration 1. composition of promethazine hydrochloride.
Several methods have been applied to detect promethazine, voltnmmetry(2,3) chromatography(4) such as chemiluminescence , voltammetry(2,3) , , fluorimetry7 t'urbidimetry8 capillary zone electrophoreses(5,6) , ,
Beside the
titrimetric and potentiometric titration methods (9.10).
spectrophotometric methods which included charge - transfer (1 1) and chjoranijic complex formation reactions by using chloranil(11) an in organic medium, or by extractive acid as t-acceptors reagents spectrophotometer acid reagents hydrochloride determination oxidation of promethazine by (16) in sulfuric acid medium .
determination using for in flow the addition dipicrylamine and picnic determination of promethazine of its by spectrophotometric depending on the injection analysis jecpoxidation at gold Ce IV , Or electroxidation spectrophotometer method for the determination of promethazine hydrochloride is proposed and is based on its oxidation by sodium hypochlorite and then coupling electrochemical determination of trace with sulfanilic acid , electrochemical determination of trace.

promethazine hydrochloride by a procreated glassy carbon electrode modified with DNA .
In this work, a spectrophotometer method for the determination of promethazine hydrochloride by In (111) in sodium hydroxide medium.
Experimental
Apparatus
Shimadzu UV- VIS Spectrophotometer.
UV-160 A Recorder.

Reagents
Promethazine hydrochloric standard samara- lraq (SDl).
Indium oxide lo2o3 Fluka AG Buchs SG.
Sodium hydroxide Fluka AG Buchs SG.
Hydrochloric acid RIEDEL-DEHAEN AG.

Promrthazine Hydrochloride (1000ug/mI) A stock solution of (1000ug/m1) of promethazine hydrochloride was prepared by dissolving of (0.1 gm) in distilled water and then made up to (100m1) in a volumetric flask with the same solvent.-the working solution of (100ugm1) was prepared by simple dilution of stock solution and kept protected from sun light in ambient bottle.

Indium (111) (1000ug/ml) A stock solution of (1000ugm1)of In 111 was prepared by dissolving of (0.1209 gm) of Indium oxide In2O3 in hydrochloric abide concentration and diluted to (100m1) in a volumetric flask in distilled water. The working solution of (100ugm1) was prepared by simple dilution of stock solution and kept protected.

Sodium Hydroxide (0.1M)
This solution was prepared by dissolving of (0.4 gym) of sodium hydroxide in distilled water and diluted to (100 m1) in a volumetric flask with the same solvent.

Hydrochloric Acide (0.1M)
This solution was prepared by dissolving of (2.07 ml) of hydrochloric acid concentration (%37) and diluted to (250 ml) in a volumetric flask in distilled water.

Recommended procedure Aliquots of standard solution of promethazine hydrochloride : 2-20 ug/ml) were transferred to a (5 ml) a volumetric flask to which (0.25ml)of(4.35x10-4M) of In (111) and (0.1 m1) of (0.1 M of sodium hydroxide and diluted by distilled water.

The absorbable at 304 nm was measured against a reagent blank.
Results and Discussions
- Absorption Spectra
Complex product with an absorption maximum at 304nm is formed when promethazine hydrochloride was allowed to

react with In (111) in basic medium of sodium hydroxide. Figure 1 shows the absorption spectra of product formed and of the regent blank.

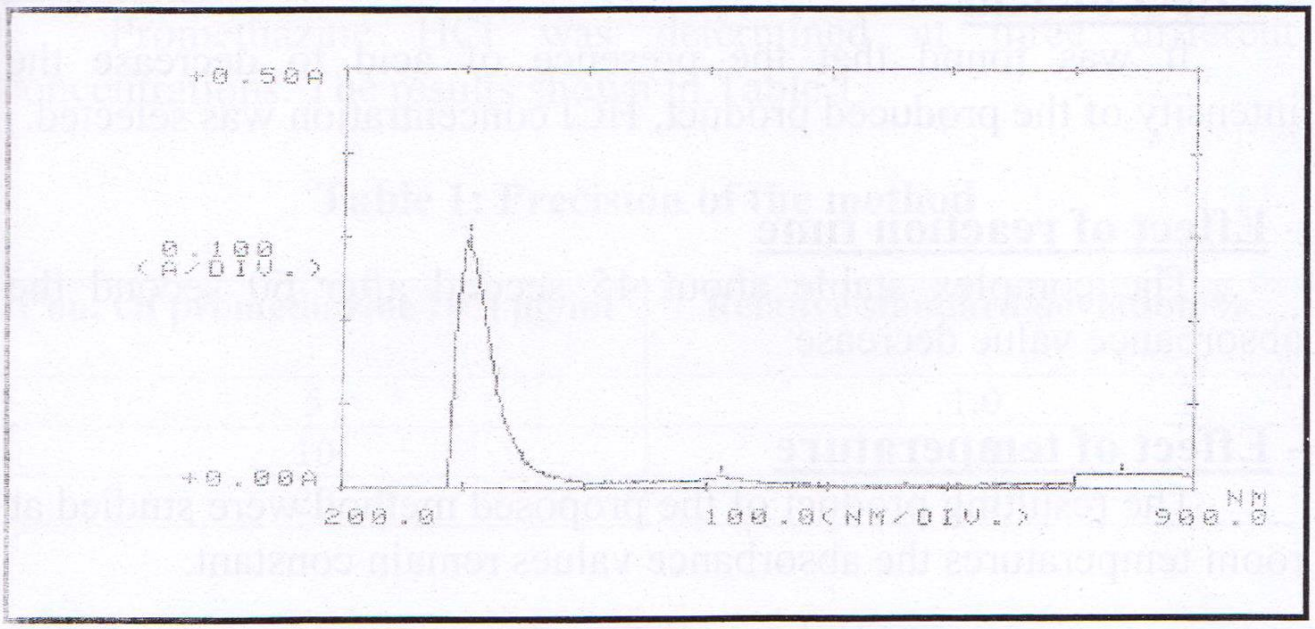


Figure 1: Absorption spectra of 20 µg promethazine. HCl with In (III) against reagent blank.

λ nm

Study of the optimum reaction conditions The effect of various parameters on the absorption intensity of the dye formed was studied and the reaction conditions are optimized.

- Effect of In 111

When various concentrations of In (111) solution were added to fixed amount of the drug solution, (0.25 ml) of (4.35 x 10-4 M) solution was found enough to give a maxiumam absorption and was considered to be optimum for concentration range of (2-20 ug/ml) of promrthazine hydrochloride .

- Effect of base It was found that the presence of a base led to increase the intensity of the produced product, NaOH was selected which was found that (0.1 m1) of this base give high sensitivity which selected in subsequent experiments.

- Effect of acid It was found that the presence of acid to decrease the intensity of the produced product, HCI concentration was selected.
- Effect of reaction time The complex stable about 45 absorbable value decrease.

second after 60 second the - Effect of temperature The resulting product of the proposed method were studied at room temperatures the absorbable values remain constant.

- Effect of order of addition To obtain optimum results the order should be followed addition base and In (111) .
of addition of drugs

Calibration Graph

Employing the conditions described in the procedure, a linear calibration graph for promethazine HCI is obtained (Figure 2), which shows that Beer's law is obeyed over the concentration 'ange of (2-20 ug/ml) with correlation coefficient of (0.997) and molal absorptivity (5 006 x 103 L mol-l cm-1)

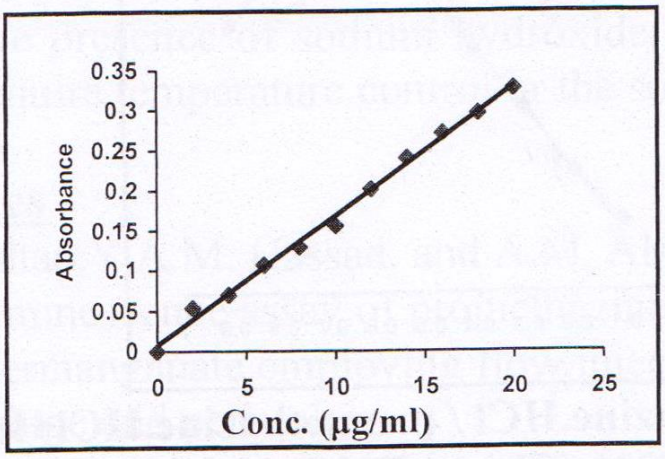


Figure 2: Calibration graph of promethazine hydrochloride.

Precision

Promethazine HCl was determined at three different concentrations. The results shown in Table 1.

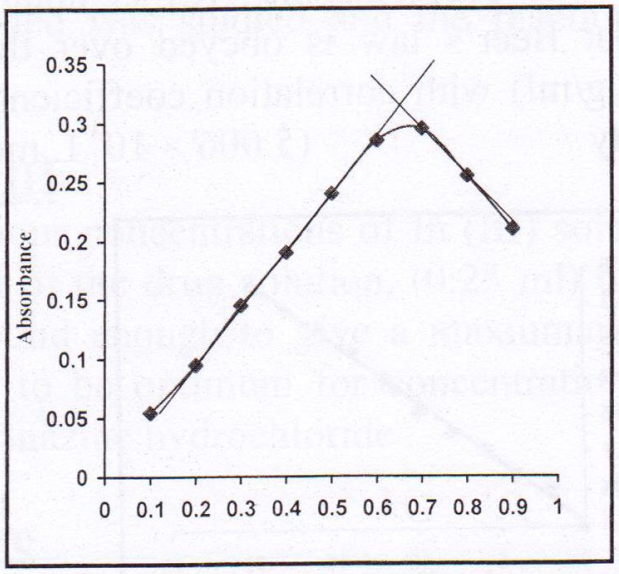
Table 1: Precision of the method

Con. Of promethazine HCl µg/ml	Relative standard deviation %
5	1.0
10	0.8
20	1.0

Structure of the Dye:

The stoichciometry of the compex between promethazine HCl and In (III) was investigated using Job's method and mole ratio

method, the results obtained (Figure 3) show that 1:2 In (III) to drug complex was formed at 304 nm.

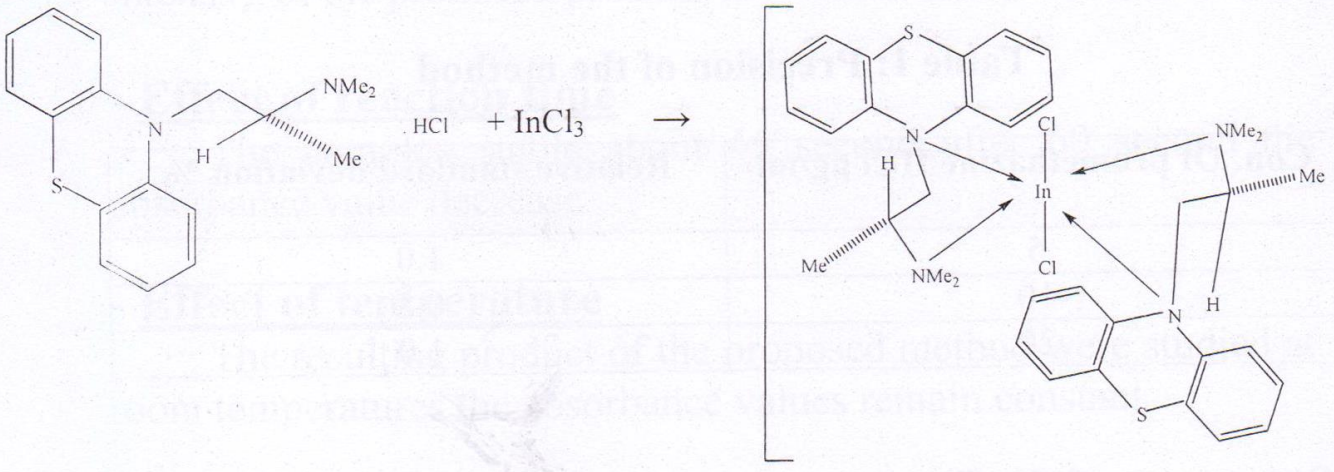


Job's [promethazine.HCl / promethazine.HCl+In (III)]

Figure 3: Job's plot method of promethazine. HCl –In (III) in sodium hydroxide medium.

Therefore the formation of the product probably occurs as follows (IIIustration 2):

$$In_2O_3 + 6HCl \rightarrow 2InCl_3 + 3H_2O$$



IIIustration 2. Probable product formation pathway.

The product formed was water soluble, the stability constant was calculated by comparing the absorbance of a solution containing stoicheiometric amount of promethazine HCl and In

III with that of solution containing the optimum amount of In 111) (0.25 ml of 4.35 x 10-4m .

Conclusion

A simple, rapid, precise and sensitive spectrophotometric method has been developed for the determination of trace amounts ofpromethazine HCI in aqueous solution based on its reaction with ln 111 in the presence of sodium hydroxide.-the proposed method does not require temperature control or the solvent extraction step.

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طريقة طيفية لتقدير البروميثازين بواسطة الانديوم الثلاثي

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الخلاصة

تم وصف طريقة طيفية سهلة وسريعة وحساسة لتقدير كميات ضئيلة من عقار البروميثازين هيدروكلورايد في المحلول المائي . تعتمد الطريقة على تكوين معقد البروميثازين هيدروكلورايد مع الانديوم (III) بوجود هيدروكسيد الصوديوم لتكوين ناتج ذائب في الماء ويمتلك اقصى امتصاص عند الطول الموجي 304 نانومتر. وجد ان قانون بير ينطبق ضمن التراكيز (2-20) مايكروغرام / مللتر وبلغت قيمته الامتصاصية المولارية (5.001 x 10 لتر /مول . سم) . تم دراسة الظروف المثلى لتكوين المعقد وطبقت الطريقة بنجاح في تقدير البروميثازين هيدروكلورايد في حالته النقية.