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Estimation of bulk drug and their formulations by analytical reagents by various methods. A review

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ABSTRACT

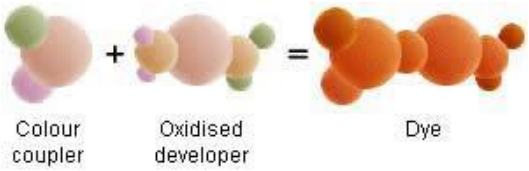
The aim of present work is to find out a simple, specific, and spectrophotometric Methods which were developed for the detection of different pharmaceutical dosage forms using analytical and chemical reagents in bulk drug and their pharmaceutical formulation. The developed methods have been explained with the principle & reaction in detail .The method were ascertained by actual determination of fixed concentration of the drug with in Beer -Lambert range .Hence in present work different reagents like MBTH, PDAB, 2,6-dichloroquinone, Folin ciocalteaus, 1,10-phenanthroline, 2,3,5-triphenyl tetrazolium are enlisted along with their estimated drugs.

Keywords: Colorimetric/Spectrophotometric method, Beer's Law, MBTH, PDAB, 2,6-dichloroquinone, Folin Ciocalteaus, 1,10-phenanthroline, 2,3,5-triphenyl tetrazolium**.**

INTRODUCTION

Chromogen and its formation

Any substance found in organic fluids that forms colored compounds when oxidized (or) a colored compound that can be converted into a dye. During development the developing agent oxidises in a reaction with the exposed silver halides. The oxidised developer then further reacts with a coupler to form a dye.



Beer-Lambert law (or Beer's law)

It is the linear relationship between absorbance and concentration of an absorbing species. The general Beer-Lambert law is usually written as:

$A = a(\lambda) * b * c$

Where A is the measured absorbance, a (λ) is a wavelength-dependent absorptivity

Coefficient, **b** is the path length, and **c** is the analyte concentration.

When working in concentration units of molarity, the *Beer-Lambert law* is written as:

$A = \varepsilon * b * c$

Where Ɛ is the wavelength-dependent molar absorptivity coefficient with units of M-1 cm-1.

Data are frequently reported in percent transmission (I/I0 * 100) or in absorbannce [A = log (I/I0)].

The latter is particularly convenient.

PRINCIPLE

There are number of reagents which are mainly used in the quantitative and qualitative determination of various pharmaceuticals. When FC reagent reacts with drug in the presence or reducing agents like $sncl_2$, ascorbic acid hydrazine, which have characteristic intense blue color[1,2].

MBTH first reacts with aldehyde to from azine. MBTH, it is oxidized to another species which combines with the azine to form formazon. By using the limiting MBTH, the amount of aldehyde can be tested. Less aldehyde - more blue color More aldehyde - less blue color.When Phenolic compounds reacts with Gibbs reagent, coupling reaction may occur.The first step of reaction is formation of the corresponding quinine imines. Quinone imines are condensation products of quinine chloroimines with phenols in aqueous alkaline media leading to the formation of coloured compounds.2,3,5-triphenyltetrazolium chloride (TTC) by the cited drugs in slightly alkaline medium leading to formation of a highly colored formazan derivative which leads to blue colour[.5] The coupling of Esomeprazole with 1,10 phenanthroline Orange colored solution was obtained. The proposed methods were applied for the determination of Esomeprazole in bulk and dosage forms. The primary amine group which reacts present in the structure of drug with the carbonyl group in the PDAB reagents and the forms Schiffs base which can be measured colorimetrically. The principle in the formation of Schiffs base is a nucleophilic addition reaction. Here the nucleophile is amine group[3,6].

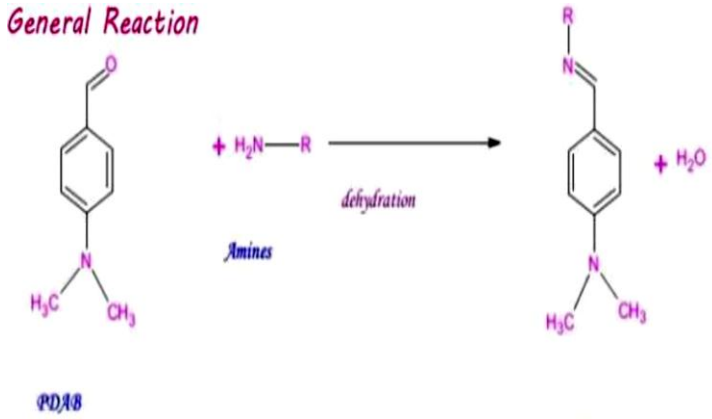
Absorbance measurements were made at 483 nm. Under the proposed conditions, these methods are applicable over the concentration range of 4 – 50 µg ml-1 with molar absorpitivities ranging from 5.208 x 103 – 1.217 x 104 L.mol-1.cm-1.The results obtained demonstrated that the proposed method is equally accurate, precise and reproducible as the reported methods thus it is recommended for quality control and routine analysis where time, cost effectiveness and high specificity of analytical techniques are of great importance.[4]

REAGENTS AND THEIR CHROMOGENS

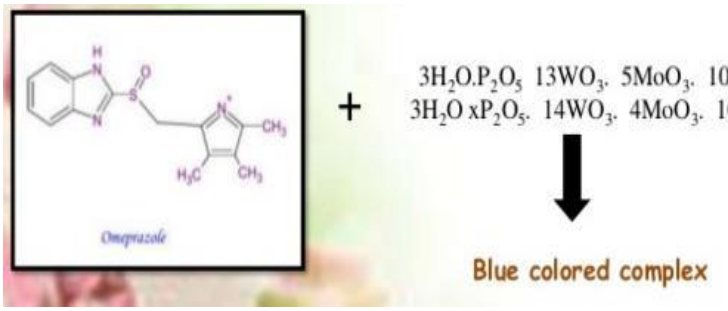
- MBTH(3-methyl-2-benzothiazolinone hydrazone hydrochloride) : Green coloured product
- PDAB (*para*-Dimethyl amino benzaldehyde): Clear bright yellow
- 2,3,5-triphenyl tetrazolium: Red colored product
- 2,6-dichloro quinone : Yellow crystals
- Folin ciocalteau : Blue coloured product
- 1,10-phenanthroline : White crystalline

REACTIONS

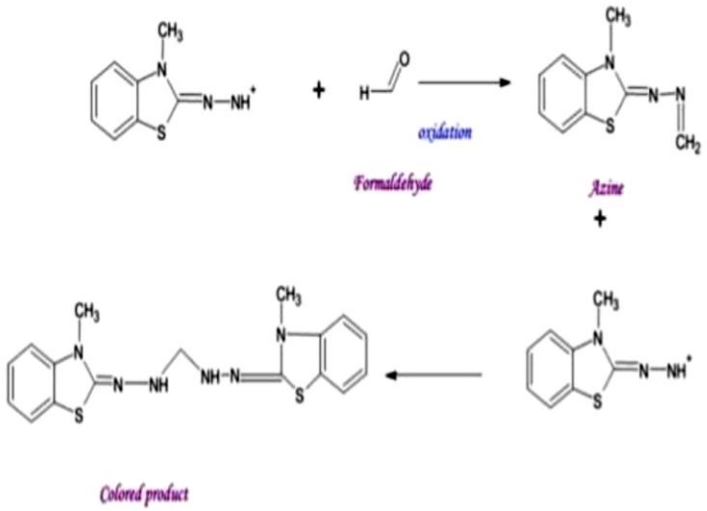
PDAB REACTION



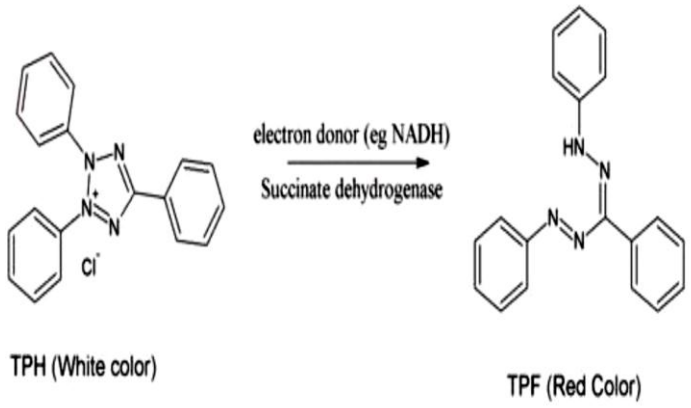
Folin reaction



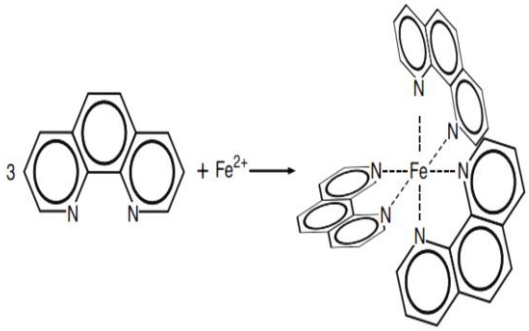
Mbth reaction



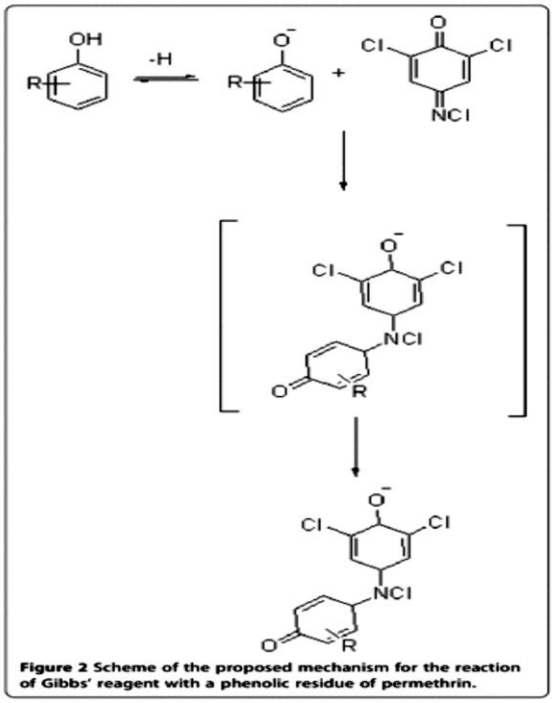
2,3,5-TRIPHENYL TETRAZOLIUM REACTION



1,10-PHENANTHROLINE REACTION



2,6-DICHLOROQUINONE REACTION



S. No	REAGENTS	DRUGS	METHOD
1.	MBTH	Acelophenac, Sulphacetamide,Dasatinib, Acyclovir, Cefadroxil, Nicorandil, Methyldopa, Ceftazidine, Ezitimibe, Lamuvidine	UV Visible spectroscopy, Colorimetry
2.	PDAB	Mesalamine,pregabalin, Chloramphenicol, Ranitidine, Metronidazole, Sulphamethoxazole	Mass spectroscopyand High performance liquid chromatography(HPLC), Colorimetry
3.	2,3,5-triphenyl tetrazolium	Cefepime hydrochloride, Cefuroxime sodium, Isoniazid, Rifampin,	Spectrophotometry, Colorimetry
4.	1,10-phenanthroline	Guiaphenesil, Esomerprazole, Meloxicam, Captopril, Deferasirox, Deferiprone, labetolol, Risperdone, Amantidine HCL	UV Visible spectroscopy, Colorimetry
5.	Folin ciocalteu	Secnidazole,Ganciclovir, Aspirin, Piroxicam, Acetazolamide, Sparfloxacin, Pyridoxine HCl, Zolmitriptan	UV Visible spectroscopy, Mass spectroscopy
6.	2,6-dichloro quinone	Captropril, Methyldopa, Dopamine hydrochloride,Tranexamic acid, Famciclovir and Racecodotril	Spectrophotometry, Colorimetry

CONCLUSION

In physical and analytical chemistry, colorimetry or colourimetry is a technique "used to determine the concentration of colored compounds in solution. Colorimetric assays use reagents that undergo a measurable colour change in the presence of the analyte. They are widely used in biochemistry to test for the presence of enzymes, specific compounds, antibodies, hormones and many more analytes. By knowing reagent structure, principles' and their uses, the drug content from Pharmaceutical dosage forms can be estimated by using spectro photometrical methods. Further investigations on analytical reagents are still going on to find more and more reagents to determine different drug molecules using colorimetry. An additional advantage of the spectro photometric methods is that the absorbance is measured at longer wavelengths where the interference from excipients is less and there is no risk of standardisation. From the economical point of view, all the analytical reagents are inexpensive, have excellent shelf life and are available in any analytical laboratory.

Therefore this method can be recommended for the routine analysis of these drugs in quality control laboratories. Hereby it can be concluded that when reagents are used in optimized volume and optimized 7 concentrations they may be successfully used for the estimation of drug in pharmaceutical preparations both quantitatively and qualitatively.

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