

ASSAY OF CLOPIDOGREL HYDROGEN SULPHATE IN TABLET FORM FROM DIFFERENT MANUFACTURING SOURCES BY USING UV SPECTROSCOPY

Zehra Ashraf^{1*}, Summaiya Khurram¹, Uroosa Maqbool¹, Kiran Raees Khan¹, Uroosa ajaz¹, Syeda Fizza Fatima¹, Sadia Naz¹, Faiza Muneer¹, Ummam Irfan¹ and Maria Ayub¹

Jinnah University for Women Karachi Pakistan.

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***Correspondence for
Author**

Dr. Zehra Ashraf

Jinnah University for
Women Karachi Pakistan.

ABSTRACT

The Study involves quantitative analysis or performance of assay percentage of two different brands (samples) of Clopidogrel hydrogen sulphate tablet (one is of multi industry and other is of local pharmaceuticals) by using Ultra Violet Spectroscopy. Clopidogrel hydrogen sulphate is anti-platelet drug as inhibitor of ADP & its main adverse effect is Haemorrhage. In this experimental study the samples were dissolved in distilled water & their absorbances determined at wavelength of 240nm. The result obtained were compared with that of standard. Percentage content of assay was calculated by using

absorbances of samples, to see the result is in the specified limits by official limits (99%-101.5% according to USP) & thus our Assay is 99% that is within the official limits. This shows the result is correct & thus the label claimed is also right.

KEYWORDS: Clopidogrel hydrogen sulphate, Haemorrhage, absorbances.

INTRODUCTION

Pharmaceutical analysis refers determination of the qualitative and quantitative analysis of medicinal agent and their metabolites.^[1] **Clopidogrel hydrogen sulfate** (CHS) is belong to Class of drug Anti platelet (inhibitor of ADP =mediate platelet aggregation), Chemical Name: Methyl(+)-(S)- α -(2-chlorophenyl)-6,7-dihydrothieno[3,2-c] pyridine-5 (4H) acetate sulfate, its molecular formula $C_{16}H_{18}ClNO_6S_2$.and molecular mass of clopidogrel hydrogen sulfate is 321.82 g/mol 2]. The solubility in methanol, slightly insoluble in water.

Dissociation constant of CHS is pKa is equal to 5.3 (tertiary amine) and its melting point is 176.8 by differential scanning calorimeter. **Clopidogrel hydrogen sulfate** (CHS) White to slightly cream colour powder.^[3]

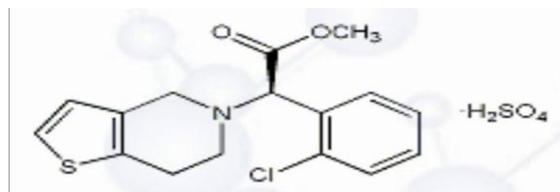


Figure 1 Structure of Clopidogrel Hydrogen Sulphate.

Clopidogrel hydrogen sulphate is rapidly absorbed. A peak plasma level of unchanged CHS is (about 2.2-2.5 ng/mL after a single 75-mg oral dose) occurred approximately 45 minutes after dosing. Absorption is at least 50% it is based on urinary excretion of clopidogrel metabolites. Clopidogrel is widely metabolized by the liver and 46%.^[4] Clopidogrel hydrogen sulphate acts by inhibiting the ADP receptor on platelet cell membranes. It is a pro-drug, which requires CYP2C19 for its activation. Clopidogrel hydrogen sulphate irreversibly inhibits the P2Y12 subtype of ADP receptor, which is involve in activation of platelets and ultimate cross-linking by the protein fibrin hence potentiate Platelet aggregation.^[5] In prevention of atherothrombotic events in platelets suffering from myocardial infarction, ischemic stroke or stabilized peripheral artery disease. It is also used in combination with aspirin in non- ST segment elevation or acute coronary syndrome (unstable angina).The recommended doses for ADULT are 75 mg daily with or without food.^[6] Adverse effects of Clopidogrel hydrogen sulphate is thrombotic thrombocytopenic purpura, hemorrhage, epistaxis (nosebleeds), gastrointestinal haemorrhage, diarrhoea, dyspepsia (heartburn).^[7] Drug-drug interaction of CHS is the CYP3A4 substrate atorvastatin may attenuate the platelet inhibitory effect of clopidogrel.^[8]

The aims of this study were to investigate Clopidogrel from different pharmaceutical companies in Pakistani market to prove that to determination of % Assay the active constituent of different samples using Ultra-violet spectrophotometry.

METHODOLOGY

Many methods are available in literature for the assay of drug (clopidogrel) tablets. But we have chosen UV spectroscopy method.^[9]

Spectroscopic method is the branch of science dealing with the study of interaction between Electromagnetic radiation and matter.^[12] UV-Visible spectrophotometer is one of the most frequently employed technique in pharmaceutical analysis. It involves measuring the amount of ultraviolet or visible radiation absorbed by a substance in solution. Clopidogrel hydrogen sulfate wavelength for operating in spectrophotometer is **240nm**.^[10]

MATERIAL

mortar & pestle, clopidogrel H.sulphate(local & multi), conical flask, measuring cylinder, weighing balance of sample, Distilled water, spectrophotometer.

METHOD

Take clopidogrel H-sulphate tablet (75 mg) & weight it on weighing balance. Calculate for 0.05 mg & crush the tablet. Then take according to obtained weight. Transfer this powdered tablet into 50 ml of fresh distilled water & make dilutions. Check its absorbance using spectrophotometer. Repeat the same procedure for standard & checked its absorbance. Calculate its % assay by applying the formula. Plot the graph to compare sample with standard.^[11]

CALCULATIONS

Clopidogrel Hydrogen Sulphate Tablets

Table 1: Absorbance of clopidogrel Hydrogen Sulphate.

TYPE	BRAND NAME	COMPANY	ACTIVE	AVG. WT.	ACTIVE WT. (THAT WE REQ.)	WEIGHT COMES	HENCE DILUTION IS:
Multi	Plavix	Sanofi	75mg or 0.075g ⇒	0.253g	0.05g ⇒	$0.253/0.075 = 3.373 * 0.05$ ⇒ 0.168g	0.168g/50ml
Local	Plafix	Hansel pharmaceu-cals	75mg or 0.075g ⇒	0.185g	0.05g ⇒	$0.185/0.075 = 2.466 * 0.05$ ⇒ 0.123g	0.123g/50ml

Table 2: Absorbance of Clopidogrel Hydrogen Sulphate.

MULTI	LOCAL
Absorbance = 3.40	Absorbance = 3.37

Assay % = Local abs./standard abs.

⇒ 3.37/3.40

% ASSAY= 99%.

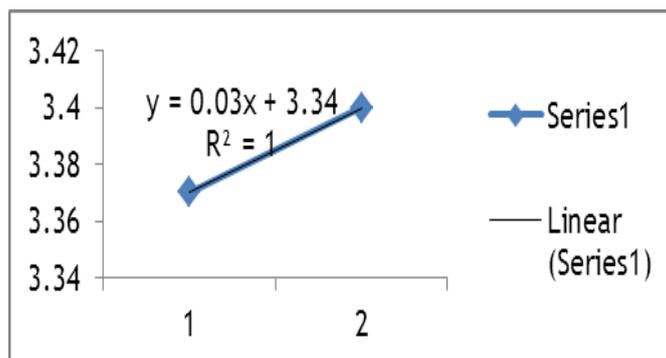


Figure 2: Linearity of Clopidrogel Hydrogen Sulphate.

RESULT

After performing experiment and observe the absorbances of each sample and then calculate its assay % with the help of formula that is come out 99%.

DISCUSSION

As the official limits according to United States Pharmacopoeia(U.S.P) for clopidogrel tablet (containing clopidogrel hydrogen) sulphate should not contain less than 97.0 percent & not more than 101.5 percent of $C_{16}H_{18}ClNO_6S_2$ and our calculated result is not less than or more than the official limits. The percentage content (assay) of samples obtained using UV spectroscopy is 99%. As by observing we can evaluate that our result is within specified limits as laid down by U.S.P hence the label claimed is approved to be correct with very less or no handling error.^[12]

CONCLUSION

Clopidogrel hydrogen sulfate is Anti platelet (inhibitor of ADP = mediate platelet aggregation) its recommended dose is oral doses of 75 mg per day, clopidogrel is rapidly absorbed. Used in prevention of atherothrombotic events in platelets suffering from myocardial infarction. Clopidogrel bisulfate wavelength for operating in spectrophotometer is 240nm.It can thus be concluded that the samples from different brands are the brands which are in specified limits by U.S.P. Also concluded that the spectroscopic method for performing assay percentage is quite effective as it is cheap and easy method and yet drawn accurate result.

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