



## NOTE

### Study of Effect of Acidic and Basic Medium on Hydroxyzine by UV Spectroscopy

SAFILA NAVEED<sup>1,\*</sup>, FATIMA QAMAR<sup>1,\*</sup>, S. SARAH ABBAS<sup>1,2</sup>, NIMRA WAHEED<sup>1</sup>,  
ZEHRA ASHRAF<sup>1</sup>, MAHEEN NAFEEES<sup>1</sup>, HAMEEZ JAWED<sup>1,2</sup> and SYEDA ZAINAB<sup>2</sup>

<sup>1</sup>Faculty of Pharmacy, Jinnah University for Women, Karachi, Pakistan

<sup>2</sup>Faculty of Pharmacy, University of Karachi, Karachi, Pakistan

\*Corresponding authors: E-mail: safila117@yahoo.com; fatimamudassar2009@hotmail.com

Received: 5 May 2015;

Accepted: 28 November 2015;

Published online: 30 December 2015;

AJC-17719

In this work, the effect of different environmental conditions by subjecting the pharmaceutical formulation *i.e.*, hydroxyzine under acidic and basic conditions are studied by using spectrophotometer. When hydroxyzine subjected to 0.1 N HCl and 0.1 N NaOH, hydroxyzine showed increased availability in acidic medium and decreased availability in alkaline medium.

**Keywords:** Hydroxyzine, Acidic medium, Basic medium, Degradation, UV spectrophotometer.

Hydroxyzine is a first-generation antihistamine belongs to diphenylmethane and piperazine class of drug [1] (Fig. 1). It shows its antagonistic effects on several receptor systems in the brain, it has a strong anxiolytic and mild antiobsessive as well as antipsychotic properties [2]. It is used for the symptomatic relief of tension and anxiety associated with psychoneurosis and in organic disease states in which anxiety is manifested used as an adjunct. Because of its antihistamine effects it can also be used for the treatment of severe cases of hyperalgesia, itching and nausea due to motion sickness. This drug has also been used in some cases to relieve the effects of opioid withdrawal [3]. It is also an effective sedative, anxiolytic and hypnotic, it allegedly shares virtually none of the abuse, addiction, dependence and toxicity potential of other drugs used for the same reason therapeutically. Hydroxyzine has also been used to potentiate the analgesia of opioids and to alleviate some of their side effects, such as itching, nausea and vomiting [4]. Cetirizine the second-generation antihistamine is in fact one of the metabolites of hydroxyzine produced in the human body. Unlike hydroxyzine, cetirizine is not reported to cross the blood-brain barrier. However it has been reported to be associated with dystonic reactions as well as sedation [5]. In this study the drug substance is exposed to acid and base stress testing for the evaluation of degradation of a drug substance. The drug is exposed to basic or acidic medium over a period of time to obtain its primary degradation products. Carbonyl functional groups which are imines, amides, aryl amines, imides, esters, carbamates and alcohols are more prone to acid/base hydrolysis.

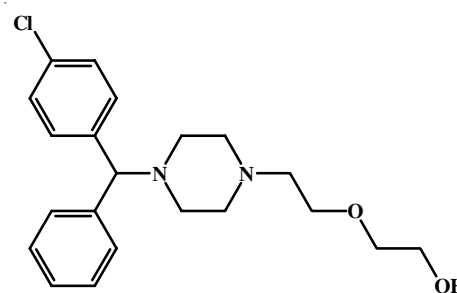


Fig. 1. Absorbance of hydroxyzine

The aim of the study is to evaluate the effect of different environmental conditions by subjecting the pharmaceutical formulation *i.e.* hydroxyzine under acidic and basic conditions by using spectrophotometer. It is usually preferred over other methods because of less equipment cost and economical maintenance advantage.

All glasswares were washed with chromic acid then with water and finally rinsed with freshly prepared double distilled water. Reagents were of analytical grade reagents. Ultraviolet Lamp Power of 8N, Serial No. N 045571, LF-204.LS '4W-254 and 365 nm', spectrophotometer with a quartz cuvette T80 UV-VI spectrometer 'PG Instrument', Weighing Balance Item PA214C: 'Pioneer OHAIUS' and Water Bath 'HH-4' having digital and constant temperature tank.

**Preparation of 0.1 N HCl and 0.1 NaOH:** 4 g of NaOH is transferred in 100 mL volumetric flask and dissolved in small quantity of water and finally volume was made up to

mark of the flask with de-ionized water. 8.3 mL analytical grade HCl having 37 % purity and 12 N normality was taken in a volumetric flask and the volume was made up to mark flask with deionized water.

**Preparation of hydroxyzine solution:** About 20 tablets of hydroxyzine were weighed and crushed. Average weight was determined 200 ppm of the solution was prepared by weighing the required amount of the powder to obtain 0.020 g active hydroxyzine then dissolved in small quantity of water. The solution was then transferred in to a 100 mL volumetric flask finally volume was made up to mark of the flask with de-ionized water. Absorbance was determined at wavelength  $\lambda_{\max}$  299 nm.

**Acid and base:** To determine the effect of acid and base on hydroxyzine, 5 mL of 200 ppm solution of hydroxyzine was transferred in to two separate test tubes then 5 mL of 0.1 N hydrochloric acid was added in one test tube and 5 mL of 0.1 N sodium hydroxide was added in another test tube respectively. Then the tubes were left for 0.5 h. The absorbance of the solution was determined using spectrophotometer at wavelength  $\lambda_{\max}$  299 nm.

The main objective of this study is to determine the effect of acidic and basic medium on the drug hydroxyzine. For this reason we prepared a 200 ppm solution of hydroxyzine. To determine the effect of acid and base on hydroxyzine the 200 ppm solution of hydroxyzine was transferred in to two separate test tubes that contain 5 mL of acid HCl and base NaOH separately. Then the tubes were left for 0.5 h. The absorbance of the solution was determined using spectrophotometer at wavelength  $\lambda_{\max}$  299 nm. The result reveals that the drug is

degraded more in acidic medium (0.1 N HCl) as compared to alkaline medium (0.1 N NaOH). In presence of acid the drug is converted to such products that shows absorbance at 299 nm. The absorbance of solution was increased to many folds as compared to hydroxyzine solution in basic medium, the absorbance of hydroxyzine solution was found to be 0.453. When the solution was subjected to alkaline medium the absorbance decreases as compared to acidic medium. In alkaline medium the absorbance was found to be 0.201. In acidic medium the percent availability of the drug was 213.67 % and in alkaline medium the percent availability was 94.81 % Table-1.

TABLE-1  
ABSORBANCE OF HYDROXYZINE

Medium	Absorbance	Availability (%)
Standard	0.212	100.00
Acid	0.453	213.67
Base	0.201	94.81

## REFERENCES

1. F.E. Simons, K.J. Simons and E.M. Frith, *J. Allergy Clin. Immunol.*, **73**, 69 (1984).
2. W.S. Schram, *Dis. Nerv. Syst.*, **20**, 126 (2006).
3. FDA DrugInfo, <http://dailymed.nlm.nih.gov/dailymed/archives/fdaDrugInfo.cfm?archiveid=51459>.
4. P.M. Llorca, C. Spadone, O. Sol, A. Danniau, T. Bougerol, E. Corruble, M. Faruch, J.-P. Macher, E. Sermet and D. Servant, *J. Clin. Psychiatry*, **63**, 1020 (2002).
5. M. Boone, L. Lespagnard, N. Renard, M. Song and J.P. Rihoux, *J. Eur. Acad. Dermatol. Venereol.*, **14**, 263 (2000).