Available online at http://s-epub.in/ojs/index.php/TPHRES/

THE PHARMA RESEARCH

An International Journal of Pharmacy Research

Published on: 15-03-2014 **ISSN: 0975-8216**

DEVELOPMENT & VALIDATION OF RP-HPLC METHOD FOR THE SIMULTANEOUS ESTIMATION OF OMEPRAZOLE AND DOMPERIDONE FROM DIFFERENT CAPSULES

Bhuvnesh Kumar Singh*, Anuj Agarwal, Neelanchal Trivedi, Anuj Mittal, Sachin Singhal, K.K.Jha

Affiliation:

Teerthanker Mahaveer College of Pharmacy, Teerthanker Mahaveer University, Moradabad, Uttar Pradesh, India

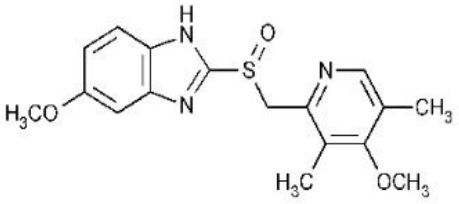
ABSTRACT

HPLC is a simple, fast and precise reverse phase high performance liquid chromatographic method developed for the simultaneous determination of Omeprazole and domperidone in diffrent capsules. The determination was carried out a Kromasil, ODS, C18 (150 x 4.6 mm, 5 micron) column using a mobile phase of Acetonitrile: 0.1M Ammonium Acetate (pH-4) buffer in the ratio of 60 : 40 % v/v. The flow rate and run time were 1ml/min and 10 min, respectively. Linearity for omeprazole and domperidone were 10 µg/ml to 60 µg/ml and 5 µg/ml to 30 µg /ml respectively. The correlation coefficient (r2) was found to be greater than (0.999). Amount of omeprazole and domperidone present in each capsule were found to be 19.98 mg/cap and 10.03mg/cap respectively. The % RSD values were less than 2% for method precession. The LOD for omeprazole and domperidone were 2.1 and 1.9µg/mL respectively. The LOQ of omeprazole and domperidone is found to be 6.8 and 4.3 µg/ml respectively. Results were found to be satisfactory and the results found for omeprazole in the range from 99.9% to 100.6%, for domperidone in the range from 99.6%-101.9%. The Proposed method is accurate, precise, selective and rapid for the simultaneous estimation of omeprazole and domperidone in capsule granules.

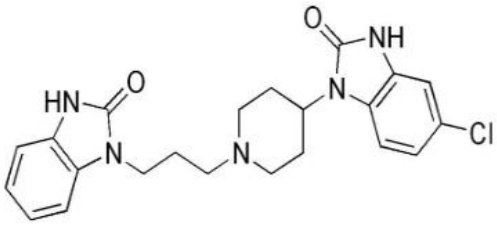
Keywords: HPLC, Validation, Omeprazole, Domperidone

INTRODUCTION

Omeprazole is chemically (RS)-5-methoxy-2-[[(4-methoxy-3, 5-dimethylpyridin-2yl) methyl] sulphinyl] - 1H-benzimidazole. In pharmaceutical preparations, the compound is used as a proton pump inhibitor in the treatment of peptic ulcer. It has a fallowing structural formula:



Domperidone is chemically 5-chloro-1-[1-[3-2,3-dihydro-2-oxo-1Hbenzimidazol- 1-yl)propyl]-piperidin-4-yl]-2,3-dihydro-1H-imidazol-2-one, is used as an antiemetic. It has the fallowing structural formula:



There have been numerous publications describing various methods for the quantification of these compounds individually or in combination with other drugs. Recently omeprazole has been successfully quantified in formulation by high performance liquid chromatography with photon diode array detector. The present paper describes the development of RP-HPLC method using isocratic mobile phase that offers certain advantages in its simplicity and time saving.

MATERIALS AND METHOD

Standard samples of omeprazole and domperidone, which were prepared from reference standard procured from a pharmaceutical company (Akums Drugs Laboratories Pvt. Ltd, Haridwar). HPLC grade methanol manufactured by E. Merck was procured from commercial sources. Double distilled water was procured from in the laboratory. Capsules formulations, Ocid-D, (Cadila Healthcare), Okacid-D (Cipla Healthcare) and Omidom (Mankind pharma Ltd,) containing both omeprazole and domperidone were obtained from local retail market.

A gradient high-pressure liquid chromatograph (Shimadzu HPLC) with two LC-20AD (Prominence) pumps, with variable wavelength programmable Photon Diode array Detector SPD-M20A, CBM-20A system controller (Shimadzu) and operating software LC solution software was used for the analysis.

The method was carried out on a Kromasil C18 (250 mm×4.6 mm i.d., 5µ) column as a stationary phase. The mobile phase consisted of Acetonitrile: Ammonium Acetate (0.1M) buffer in the ratio of 60: 40 % v/v. The mobile phase was filtered through a 0.45 µ membrane filter and degassed before analysis. Detection was done at 280 nm and separation was carried out at room temperature of about 25°C.

Buffer preparation:

7.70 gm (0.1M) of ammonium acetate dissolved in HPLC water and volume made up to 1000 ml by HPLC water. From this solution, 50ml diluted to 1000 ml with 0.05M Acetic Acid pH adjusted to 4 with the Triethylamine, filtered through 0.45-µm nylon membrane filter and sonicate to degass.

Preparation of Solution:

Standard preparation:

Omeprazole and domperidone (50 mg each) were weighed accurately in two 100 ml volumetric flask separately and both standards were dissolved in about 40 ml of solvent solution (60 volumes of water and 40 volumes of methanol). The volume was made up to 100 ml with solvent solution (stock solution). In case of omeprazole varying amounts (1, 2, 3, 4, 5 and 6 ml) of the above solution (500 µg/ml) was taken in six different 50 ml volumetric flasks and the volume was made up to the mark with the solvent solution. An aliquot of 20 µl of the solution from each flask was injected two times. In case of domperidone 10 ml was taken from stock solution (500 µg/ml) and diluted to 100 ml with the solvent solution (50 µg/ ml). Varying amounts (1, 2, 3, 4, 5 and 6 ml) of the above solution (50 µg/ml) was taken in six different 10 ml volumetric flasks and the volume was made upto the mark with the solvent solution. An aliquot of 20µl of the solution from each flask was injected two times. Calibration curves were constructed by plotting mean peak areas against the corresponding drug concentrations. The detector response was found to be linear in the concentration range of 10-60 µg/ml for omeprazole and 5-30 µg/ml for domperidone.

Sample preparation:

Ten capsules granule of each brand were taken, powdered (a quantity of powder equivalent to 40 mg of Omeprazole and 20 mg of Domperidone) and transferred into 100 ml volumetric flask. Flask was shaken for 15 min and to this added 100 ml methanol and filtered through Whatsman No. 1 filter paper and further dilution (10 times) were made to get a concentration of 40 µg/ml omeprazole and 20 µg/ml domperidone. Results of the triplicate analysis are given in Table 1.

Mobile phase:

Acetonitrile: Ammonium Acetate (0.1M) buffer in the ratio of 60: 40 % v/v.

RESULTS AND DISCUSSION

This method was validated for statistical parameters i.e. precision, accuracy, specificity, linearity and range, stability of analytical solutions and ruggedness criteria. Results of the method validation experiments are given in Table 2. The precision of the method was determined by knowing percentage RSD of means of three replicate solutions of all the three independent samples. The retention time of omeprazole and domperidone was found to be 6.25 & 8.45 minutes, respectively. (shown in Fig:1)

TABLE -1 Analysis of capsules of Omeprazole & Domperidone

Formulation	Label content (mg/capsule)	Mean amount found	% Mean drug (mg/capsule)	Standard deviation
		Omeprazole		
Ocid-D	20	20.12	100.6	0.57
Okacid-D	20	20.04	100.2	0.58
Omidom	20	19.98	99.9	0.58
		Domperidone		
Ocid-D	10	10.13	101.13	0.62
Okacid-D	10	10.19	101.9	0.62
Omidom	10	9.96	99.6	0.63

TABLE-2 Result of method validation

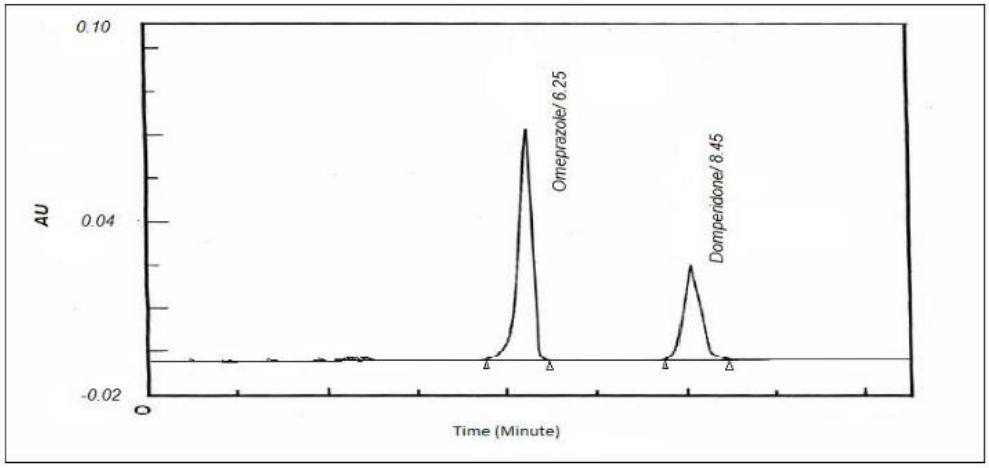
Parameters	Omeprazole	Domperidone	Limit
Precision	1.35%	1.45%	NMT 2.0% RSD
Accuracy	3.05%	1.98%	% Bias NMT 5%
Linearity (Regression Coefficient-r)	0.996	0.998	Linear NLT 0.995%
Ruggedness	0.67%	0.76%	NMT 2.0% RSD

RSD- Relative Standard Deviation; NMT- Not More Than; NLT- Not Less Than

Assay: 20 µl standard solution sample solution (n=3) were injected in to an injector of liquid chromatography. From the peak area of omeprazole and domperidone, the amount of drugs in sample (n=3) were observed. In replicate analysis n=3 of the drug by the proposed method the active content of omeprazole and domperidone in the drug were 20.12 mg/cap to 19.98 mg/cap and 10.19 mg/cap to 9.96 mg/cap respectively. The results obtained by the proposed method were close to the label claim of the drug indicating that the method is precise and accurate.

FIGURE -1

Chromatogram of omeprazole & domperidone (by Shimadzu prominence LC-20AD, Detector SPD-M20A



Linearity study:

The linearity of analytical method was studied by analyzing response of standard with predetermined concentration range, linearity curve was plotted for response areas against the concentration of the solution. Regression coefficient was calculated using above plot. For omeprazole, prepared solutions were within concentration range of 10 to 50 µg/ml at 5 constant consecutive concentration levels i.e. 10, 20, 30, 40 and 50µg/ml. For domperidone, prepared solutions were within concentration range of 5 to 30 µg/ml at constant consecutive concentration levels i.e. 5, 10, 15, 20, 25 and 30 µg/ml. The regression coefficient of area of above consecutive concentrations was calculated.

Accuracy:

The accuracy of method is determined by adding known amount of standard to that of sample (above and below the normal level) at 3 different levels to cover both above and below (75 to 125%) the normal levels expected in the sample. The normal expected level for the assay of omeprazole and domperidone is about 20 µg/ml. So the study range was 15, 20 and 25 µg/ml for both.

Robustness:

Robustness of the method was evaluated by deliberately altering the method condition from the original method parameters and verifying compliance of the system suitability requirement. Differences in peak areas and less variability in retention time (Rt) were observed and results (system suitability results, assay values) were found to be satisfactory.

System suitability:

This test were carried out on freshly prepared standard solution of omeprazole and domperidone and all system sutabilty parameters (retention time, tailing factor, theoretical plate, peak area, relative standard deviation of peak area) were found to be satisfactory

CONCLUSION

The proposed statistical parameters in method validation studies is simple, precise and accurate for the simultaneous determination of Omeprazole and Domperidone in capsule dosage. The proposed method can be used in routine quality control of combined dosage form containing omeprazole and domperidome.

REFERENCES

1. Indian Pharmacopoeia, Vol. 1, The Controller of Publications, Delhi, 1996, 532.
2. British Pharmacopoeia, Vol.1, The British Pharmacopoeia Commission, London, 2001.
3. United States of Pharmacopoeia 23 and NF18, US Pharmacopoeial Convention, Rockville. MD, 2003,16.
4. Argekar, A.P and Shah, S.J., J. Pharm. Biomed. Anal., 1999,19, 813.

5. International Conference on Harmonization, Guidance for Industry In; Q2B Validation of analytical procedures, 1996, 2.

6. Mashru, R.C. and Banerjee, S.K., Eastern Pharmacist, 1998, 41, 141.