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RP-HPLC Method for Simultaneous Estimation of Domperidone in Combination with Esomeprazole Magnesium in Solid Dosage Form

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The present work describes a reverse phase high performance liquid chromatographic method for simultaneous estimation of domperidone in combination with esomeprazole magnesium in capsule formulation. Chromatography was performed on a Inertsil C_{18} (250 mm × 4.6 mm i.d. particle size 5 µm) column in isocratic mode with mobile phase containing 0.05 M potassium dihydrogen phosphate:acetonitrile:methanol in the ratio 40:30:30 % (v/v/v) and pH of the final mobile phase was adjusted to 7.44 ± 0.03 with 5 M KOH. The flow rate was 1.0 mL/min and the eluent was monitored at 284 nm. The selected chromatographic conditions were found to effectively separate domperidone (run time 9.74 ± 0.33 min) and esomeprazole magnesium (run time 7.16 ± 0.44 min). Linearity for domperidone and esomeprazole magnesium found in the range of 3-300 and 4-400 µg/mL, respectively. The proposed method was validated by different parameters and was found to be accurate, precise, reproducible and specific and can be used for simultaneous analysis of these drugs in capsule formulation.

Key Words: Domperidone, Esomeprazole Magnesium, RP-HPLC.

INTRODUCTION

Domperidone (Dom) is 5-chloro-1-[1-{3-(2-oxo-2,3-dihydro-1*H*-benzimidazol-1-yl)propyl}-piperidin-4-yl]-1,3-dihydro-2*H*-benzimidazole-2-one and esomeprazole magnesium (ESO) is 5-methoxy 2-{(s)-[(4-methoxy-3,5-dimethyl-2-pyridyl)methyl]sulfinyl}benzimidazole magnesium (2:1) trihydrate[1], respectively. Domperidone is an antiemetic drug usually given in combination with either rabeprazole or esomeprazole, respectively. The combination is useful in treatment of gastro esophageal reflux disease (GERD). The marketed capsule formulations contain domperidone and esomeprazole magnesium in the ratio 3:4 (sompraz D 40, domperidone 30mg and esomeprazole Mg 40 mg, manufactured by Sun Pharmaceuticals industry).

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Literature survey revealed spectrophotometric[2] and RP-HPLC[3-7] method for estimation of domperidone alone and in combination with other drugs in pharmaceutical preparation. Esomeprazole magnesium alone and in combination is reported to be estimated by RP-HPLC[8], LC-MS[9] methods.

So far no analytical method is reported for simultaneous determination of domperidone with esomeprazole magnesium in pharmaceutical formulation. The present work describes validated reverse phase HPLC method for simultaneous determination of these drugs in capsule formulation.

EXPERIMENTAL

An isocratic HPLC system (Jasco) consisting of Jasco PU 1580 intelligent HPLC pump, rheodyne injector (20 µL) loop, Jasco UV-1575 intelligent UV/Vis detector, an Inertsil C_8 column (250 mm × 4.6 mm ID), 25 µL Hamilton injecting syringe and window based single channel Borwin software 1.21.60 used. Pure drug samples of domperidone and esomeprazole magnesium were procured from Abbott pharma, Mumbai and Blue cross labs, Nasik, respectively.

The capsule formulations sompraz D 40, (manufactured by Sun Pharmaceutical industry,) with a labeled claim of 30 mg domperidone and 40 mg esomeprazole magnesium, respectively, were obtained from local drug stores. The solvents acetonitrile, methanol and water used in the investigation were of HPLC grade (LOBA chemicals, Mumbai).

Chromatographic conditions: The column temperature was kept ambient temperature. The flow rate of mobile phase was maintained 1.0 mL/min. The detection was carried out at 284 nm. Injection volume was taken 20 µL and run time was kept 20 min.

Preparation of mobile phase: Potassium dihydrogen phosphate (0.05 M) was prepared by dissolving 6.8045 g in 1000 mL of HPLC grade water; 0.05 M KH_2PO_4 (400 mL), methanol (300 mL) and acetonitrile (300 mL) were mixed and pH of final mobile phase was adjusted to 7.44 ± 0.03 with 5 M KOH and filtered through 0.45 µm membrane filter and sonicated.

Preparation of stock solution of domperidone and esomeprazole magnesium: Accurately weighed quantity of domperidone (30 mg) and esomeprazole magnesium (40 mg) was weighed and transferred to standard 100 mL volumetric flasks separately, dissolved and diluted to the mark with methanol. The stock solutions were further diluted with mobile phase to get concentration range of 3-300 µg/mL of domperidone and 4-400 µg/mL of esomeprazole magnesium. Plotting a graph of peak area *vs.* concentration allowed the checking of linearity of detector response.

Procedure for assay: Assay was performed on marketed formulations containing domperidone and esomeprazole magnesium, respectively.

Marketed capsules (20), of SOMPRAZ D 40 (esomeprazole magnesium and domperidone, manufactured by Sun pharmaceutical industry) were taken and weighed properly.

Average weight of capsule was determined. The pellets from each capsule were crushed properly. A powder equivalent to 40 mg esomeprazole magnesium [= 30 mg domperidone] was weighed out in 100 mL volumetric flask containing 40 mL methanol and shaken properly. The content in volumetric flask was sonicated properly and volume was made up to mark with methanol and filtered with 0.45 µm membrane filter. Further dilutions were made with mobile phase to get 40 µg/mL of esomeprazole magnesium with 30 µg/mL of domperidone. 20 µL of sample preparation was injected into injector of liquid chromatographic system. Chromatogram was recorded and the results of analysis of capsule formulation are shown in Table-1.

TABLE-1
RESULTS OF ANALYSIS OF CAPSULE FORMULATION

Capsule formulation	Label claim (mg/capsule)		Amount of drug estimated (mg)		% of label claim* ± SD	
	DOM	ESO	DOM	ESO	DOM	ESO
Sompraz D 40	30	40	29.82	38.95	99.41 ± 0.14	97.38 ± 0.27

*Mean of six determinations

Recovery studies: To study the accuracy, precision of proposed method recovery experiments were carried out. To an accurately weighed quantity of capsule powder, standard domperidone and esomeprazole magnesium were added at three different levels (about 80, 100 and 120 % of labeled claim). The amount of drug recovered by proposed method was found out. The results of recovery studies are shown in Table-2.

TABLE-2
RESULTS OF RECOVERY STUDIES

Amount of drug added (mg)		Amount of drug recovered (mg)		% Recovery*	
Domperidone	Esomeprazole	Domperidone	Esomeprazole	Domperidone	Esomeprazole
24	32	23.09	31.96	96.19	99.87
30	40	29.22	40.20	97.40	100.51
36	48	35.25	48.16	97.93	100.33

*Mean of three determinations.

RESULTS AND DISCUSSION

The values of per cent recovery and low values of standard deviation indicate the accuracy, precision and reproducibility of the proposed method. Ruggedness was carried out using different analysts, intraday and interday studies in which three samples were prepared and analyzed by three different analysts, on same day with 2 h interval and on three different days (Tables 3 and 4).

TABLE-3
SYSTEM SUITABILITY PARAMETERS

Parameter	Domperidone	Esomeprazole
Resolution	9.94	9.94
Capacity factor	3.16	2.084
No. of theoretical plates	18754	16806
Tailing factor	0.8	0.9

TABLE-4
VALIDATION PARAMETERS

Parameter	Domperidone	Esomeprazole
Accuracy: Recovery studies	97.18 % ± 0.89	100.23 ± 0.33
Precision (RSD, n = 6)	0.0014	0.0028
Linearity and range (µg/mL)	3-300	4-400
Regression equation	Y= 33094x + 92715	Y=24344x + 103300
Slope (m)	33094	24344
Intercept (c)	92715	103300
Correlation coefficient (r^2)	0.9999	0.998
Limit of detection (ng/mL)	30	40
Limit of quantitation (ng/mL)	90	120
Intra-day precision (RSD, n = 3)	0.0032	0.0065
Inter-day precision (RSD, n = 3)	0.0017	0.0037
Different analysts (RSD, n = 3)	0.0047	0.0020

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REFERENCES

1. British Pharmacopoeia, Her Majesty's Stationary Office London, Vol. 2, pp. 1146-1147 (2003).
2. A.B Avadhanulu and Y. Ramamohan, *Indian Drugs*, **35**, 754 (1998).
3. C. Trivedi, K. Soni, I.J. Khan and P. Loya, *Indian Drugs*, **42**, 461 (2005).
4. D.R. Mehta, S.S. Zarapkar and N.S. Kanyawar, *Indian Drugs*, **39**, 217 (2002).
5. G.V. Kanumula and B. Raman, *Indian Drugs*, **37**, 375 (2000).
6. R.A. Singh, S. Arora, R. Kumar, D. Kumar and A.K. Agarwal, *The Pharma Rev.*, 126 (2005).
7. B.H. Patel, M.M. Patel and J.R. Patel, *J. Liq. Chromatogr. Rel. Technol.*, **30**, 439 (2007).
8. N. Udupa, R. Shetty, G. Subramanian and S. Pandey, *Indian Drugs*, **42**, 158 (2005).
9. L. Hultman, H. Stenhoff and M. Liljeblad, *J. Chromatogr. B*, **848**, 317 (2007).

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