Abstract

The project was undertaken with an aim to develop analytical methods of selected antiulcer and anti-emetic drugs both individually and in combinations. Simple, economic and yet sensitive methods employing commonly available instruments were developed. The study employed spectrophotometric, HPTLC and HPLC techniques for the development of analytical methods of certain molecules. Proper statistical tools like ANOVA were used to compare the results obtained in these different methods. UV spectrophotometric technique was used to analyze Esomeprazole (ESO) and Domperidone (DOMPE) combination by Q absorption ratio method. This method exhibited clear advantage over the reported spectrophotometric methods as the molar absorption point is same at 301 nm, at this wavelength both drugs could be quantified. This method is comparatively superior to the one reported by simultaneous equation method. ESO and DOMPE were also analyzed by simple, precise and sensitive HPLC method using C18 column and buffer (Ammonium acetate pH 3.4): acetonitrile: methanol (55:35:10) as mobile phase. The methods were validated as per ICH guidelines. Good resolution of both the compounds for bulk drug and combination could be achieved at 4.42 min and 6.76 min for DOMPE and ESO respectively. Linearity range was found to be 4-19 µg/mL, LOD 0.3 µg/mL and 0.4 µg/mL for both drugs respectively. LOQ was found to be 1.5 µg/mL and 2.5 µg/mL respectively. Percent recovery obtained was 99.81 % and 100.42 % for ESO and DOMPE respectively. Excipients in the market formulation did not interfere with analysis nor did they influence the results. HPTLC method was also developed for quantification of ESO and DOMPE. The analysis was undertaken as HPTLC is less time consuming, cost effective and large number of samples can be analyzed in one run. After trial and error experiments the mobile phase ethyl acetate: benzene: methanol (5: 4: 1) was proved to be ideal for resolution of these two compounds. Visualization of spots was done at 290 nm. Linearity was found between 200-400 ng/band and 500-1000 ng/band, LOD 1.75 and 2.94 ng/band, LOQ 4.29 and 2.94 ng/band and recovery 100.45% and 100.34% for ESO and DOMPE respectively. It has been observed that by and large the analytical results obtained by three techniques remain more or less within the acceptable limits. Hence, from the results we would like to conclude that UV spectrophotometry, HPLC and HPTLC methods can conveniently be employed for routine analysis of both ESO and DOMPE.
Granisetron is a 5-HT₃ antagonist for which an attempt was made to develop simple UV, HPLC and HPTLC methods. UV method was developed using zero order and first derivative spectroscopic methods. Linearity was observed between 3-11 µg/mL, LOD 0.16 and 0.18 µg/mL, LOQ 1.91 and 1.78 µg/mL and % recovery 99.93% and 100.12% for zero order (method-1) and derivative (method-2) respectively. From the results it seems method-2 is preferred to method-1. The HPLC method of Granisetron involves simple isocratic method, wherein C18 column was used and mobile phase consisted of acetonitrile: water with 0.5% acetic acid (60: 40) with detection wave length at 302 nm. Linearity was observed between 2-10 µg/mL, LOD 0.6 µg/mL and LOQ 2.03 µg/mL and %recovery was obtained 100.47 % for Granisetron. The method was by and large different from the number of reported methods which have concentrated mainly on quantification of Granisetron from plasma. In such cases hyphenated techniques like LC-MS/MS were proved to be more suitable. Whereas such methods utilized acetonitrile and water along with ammonium acetate and acetic acid, our mobile phase did not contain ammonium acetate. Yet good resolution of peak could be achieved. In HPTLC method for analysis of Granisetron, n-butanol: acetic acid: ammonia (5: 4: 1) was used as developing solvent. Beer’s law was obeyed between 50-30 ng/band. LOD was found to be 0.22 ng/band and LOQ 0.68 ng/band. Good recoveries could be achieved in this method. The peak purities were found to be more than 99 %. All the three methods used for quantification of Granisetron in bulk and in formulations gave almost similar results there by suggesting that any one method can be conveniently used in routine analysis of Granisetron.

Analysis of Rabeprazole and Levosulpiride was carried by using Q absorption, HPLC and HPTLC methods. Q absorption point was obtained at 258 nm. Linearity range was found in the range of 4-16 µg/mL for RABE and 15-35 µg/mL for LEVOS, LOD and LOQ were found to be 0.18, 0.72 µg/mL and 0.55, 2.22 µg/mL for RABE and LEVOS respectively. Good recoveries could be obtained for both compounds. HPLC analysis for simultaneous quantification of RABE and LEVOS was done on a C18 RP-column and using mobile phase buffer (Phosphate pH 4): acetonitrile: methanol (30:35:35). Linearity was obtained between 4-10 µg/mL for RABE and 5-25 µg/mL for LEVOS. Percentage recoveries for both compounds were found to be more than 99 %. HPTLC analysis was also carried out for simultaneous determination of RABE and LEVOS. No HPTLC method is available in literature. These two compounds could be successfully resolved and simultaneously quantified by using a mobile phase of n-propanol: methyl ethyl ketone: ammonia (5: 4: 1). Linearity was achieved between 50-300 ng/band and 250-750 ng/band for RABE and LEVOS respectively. There was nearly 100 % recovery found for both of the compounds. Peak purities were more than 99 %. Thus it was noted that all three techniques could be conveniently used for quantification of RABE and LEVOS both individually and simultaneously. The results obtained by all
the developed methods have been statistically compared by Tukey’s multiple comparison test of one way ANOVA.

**Keywords:** Simultaneous determination; Q Absorption, HPLC, HPTLC, Esomeprazole, Domperidone, Rabeprazole, Levosulpiride, and Granisetron.