SIMPLE UV SPECTROPHOTOMETRIC ASSAY OF NORFLOXACIN FORMULATION AND THEIR COMPARATIVE STUDY

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ABSTRACT
Norfloxacin belongs to fluoroquinolones class of antibiotics. Its structure is related to nalidixic acid. The purpose of following study was to develop an easy, less time consuming and economically affordable UV Spectrophotometric method for assay of Norfloxacin in tablet formulation and comparison of two brands of Norfloxacin tablets. This assay procedure based on the absorbance measurements of 2 brands of Norfloxacin 400mg tablet available in market at wavelength of 294nm. These two brands are taken and their solutions of 100ppm, 50ppm, 25ppm, 12.5 and 6.25ppm is prepared. Results obtained by regression equation and regression line. Percent assay is calculated by taking absorbance of sample and standard solutions of 12.5ppm to predict the availability of drug in both brands i.e. 98.27% and 102.6%. Results indicates that both brands meet USP/BP limit.

Key words: Norfloxacin, UV spectrophotometer, Assay

INTRODUCTION

Norfloxacin (NFX) 1-ethyl-6-fluoro-1,4-di-hydro-4-oxo-7-(1-piperazinyl)-3-quinoline carboxylic acid, is a synthetic antifluoroquinolon (Prapaporn B et al., 2002). It is a synthetic drug was the firstly selected drug for the treatment of diseases caused by Ecoli, Salmonella, Campylobacter, V. cholera, Shigella and V. cholera (Murakawa GJ et al., 2003). The drug is also prescribed for optical infections as well as gonorrhea and infection urinary tract (Van Bambeky et al., 2005).

The dose usually recommended is 400mg two times daily. Half-life of NFX in plasma and serum is measured 3-4 hours and only approx bioavailability of oral dose is 30–40%. Norfloxacin, aflouroquinolone antibacterial agent structurally related nalidixic acid, Merck Index (2001).

Following are few developed methods for assay of Norfloxacin. The UV spectrophotometer was used for
the determination of the Norfloxacin in tablets at wavelength 337nm using 0.05M NaOH as solvent (Stankov, M et al., 1993). A reversed-phase high-performance liquid chromatographic assay for Norfloxacin (NFLX) has been developed. The method gave good linearity (r2≥0.999) in the range 1–20μg/mL using a Lichrosorb-RP-8 column (10μm, 20cm×4.6mm) at wavelength (278nm) at normal temperature. Above method is also useful for the analysis of photo degraded NFLX samples, and was useful to study the photo-stability of NFLX tablets under different conditions i.e., UV light, sunlight light or fluorescent light (Córdoba-Borrego et al., 1999). To measure the quantity or the content of Norfloxacin in its tablet by UV spectrophotometer, the assay was carried out at the wavelength of maximum absorption in hydrochloric acid solution 0.1mol/L (Samanidou, V. F et al., 2003).

A simple titration method is also used for Norfloxacin analysis as weight and crushes tablet equal to 250mg of Norfloxacin. Dissolve in 80mL of anhydrous acetic acid and titrate with 0.1N per chloric acid, crystal violet used as indicator.

MATERIALS AND METHODS

UV visible 1601 Shimadzu double beam spectrophotometer was used to measurement of Spectra. The solvents which were used for the assay was distilled water.

Wavelength Selection
About 100 to 6.25ppm of Norfloxacin was accurately prepared in water. These solutions were scanned in the 200-400nm UV regions. The wavelength kept was 294nm and this wavelength was adopted for absorbance measurement.

Standard Stock solution
Accurately weighed 10mg of Norfloxacin standard was transferred to a volumetric flask and add sufficient methanol to produce 100mL. This was sonicated 5 min to dissolve it. Make up volume up to 100mL with water. Transfer 6.25mL from stock solution to 50mL volumetric flask and make up volume with water.

Sample preparation
Two different brands of Norfloxacin from the marketed sample were weighed and crushed uniformly with the help of a mortar and pestle. By calculating the average weighed sample powder equivalent to 10mg of Norfloxacin was transferred into a volumetric flask containing 10mL water. The solutions were sonicated for about 5 min and then make up volume up to 100mL with water. Now transfer 6.25mL from stock solution into 50mL volumetric flask and make up volume with water (Safila N, 2014).

PROCEDURE
After preparation of standard and tablet solutions, strength of solution 12.5ppm in 50mL Absorbance of the sample preparation and standard preparation in 1cm cell at the wavelength of maximum. Absorbance at about 294nm using a spectrophotometer, using the blank solution, calculate the quantity in mg, of Norfloxacin per tablet.

RESULTS AND DISCUSSIONS
Using spectrophotometer on both brands of Norfloxacin tablets during the study carried out pharmaceutical assay. Table-1.1 shows brand as A and B identification and % assay of both brands i.e. 98.27% and 102.6% respectively. Table 1.2 and 1.3 shows absorbance of brand A and brand B respectively. Graphical representation of linearity of equation and regression value for both brands given in figure 2 and 3. These results indications that Absorbance is directly proportional to concentration thus, it obeys to Beers lambert law. Our research group work on different assay method those were useful for pharmacy professionals (Safila et al., 2014,15).
### TABLE 1.1: SHOWS % ASSAY OF TWO BRANDS

<table>
<thead>
<tr>
<th>Brand ID</th>
<th>ABS at 294nm</th>
<th>% Assay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brand A</td>
<td>0.342</td>
<td>98.27%</td>
</tr>
<tr>
<td>Brand B</td>
<td>0.358</td>
<td>102.6%</td>
</tr>
<tr>
<td>Standard (Norfloxacin)</td>
<td>0.348</td>
<td>--------</td>
</tr>
</tbody>
</table>

### TABLE 1.2: SHOWS ABS OF BRAND A AT DIFFERENT CONC.

<table>
<thead>
<tr>
<th>Conc ppm</th>
<th>Abs</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>2.42</td>
</tr>
<tr>
<td>50</td>
<td>1.25</td>
</tr>
<tr>
<td>25</td>
<td>0.718</td>
</tr>
<tr>
<td>12.5</td>
<td>0.342</td>
</tr>
<tr>
<td>6.25</td>
<td>0.17</td>
</tr>
</tbody>
</table>

### TABLE 1.3: SHOWS ABS OF BRAND B AT DIFFERENT CONC.

<table>
<thead>
<tr>
<th>Conc ppm</th>
<th>Abs</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>2.59</td>
</tr>
<tr>
<td>50</td>
<td>1.28</td>
</tr>
<tr>
<td>25</td>
<td>0.625</td>
</tr>
<tr>
<td>12.5</td>
<td>0.358</td>
</tr>
<tr>
<td>6.25</td>
<td>0.19</td>
</tr>
</tbody>
</table>

### FIGURE 2: LINEARITY OF EQUATION FOR BRAND A

\[
y = 0.0237x + 0.0606 \\
R^2 = 0.9982
\]
CONCLUSION

It is concluded that brand B is more potent than brand A while both brands shows good linearity of equation and regression values. The proposed method for the assay of commercially available Norfloxacin tablet formulation is very simple, accurate, least time consuming and rapid. It can be easily used for routine quality control for monitoring the assay, in process samples and tablet formulation.

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