Spectrophotometric Method for Ondansetron Hydrochloride

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Patra, et al.: Spectrophotometric Method for Ondansetron

A new simple, sensitive spectrophotometric method in UV region has been developed for the estimation of ondansetron in bulk and solid dosage forms. It shows maximum absorbance at 310 nm with water. Beer’s law obeys in the concentration range of 5-15 µg/ml. Results of the analysis were validated statistically and by recovery studies.

Key words: Spectrophotometric method, ondansetron HCl, optical characteristics, recovery study

Ondansetron, which is a specific antiemetic drug, is used in cancer chemotherapy and induced nausea and vomiting1. Chemically, it is (±) 1,2,3,9-tetrahydro-9-methyl-3-[2-methyl-1H-imidazol-1-yl)methyl]-4H-carbazol-4-one, monohydrochloride dihydrate2 is a selective 5HT3 antagonist. It acts both, peripherally on vagal nerve terminals and centrally in the chemoreceptor trigger zone of the area postrema3. The drug is white to off white crystalline powder, odourless, soluble in water, methanol and normal saline3. Literature survey revealed very few analytical methods which include only HPLC method for the estimation of ondansetron2. The authors have developed a simple sensitive and reproducible UV spectrophotometric method for the determination of ondansetron in pure form as well as in dosage forms, which are described in present communication.

All chemicals used were of analytical grade. The commercially available tablets were procured from local market. Spectral and absorbance measurements were made on Shimadzu double beam UV/Vis spectrometer UV 2101.

About 10 mg of pure ondansetron was accurately weighed and dissolved in 10 ml of water. The above stock solution was further diluted with the same to get a working standard solution of 5 to 15 µg/ml. Aliquots of test solution of ondansetron were transferred into a series of 10 ml volumetric flask and the final volume was brought to 10 ml with water. The absorbance was measured at 310 nm against water and the amount of ondansetron present in the sample solution was computed from calibration curve.

The optical characteristics such as Beer’s law limits, Sandell’s sensitivity, Molar extinction coefficient were given in Table 1.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beer’s law limit (µg/ml)</td>
<td>5-15</td>
</tr>
<tr>
<td>Molar extinction coefficient (mol⁻¹ cm⁻¹)</td>
<td>15.29×1000</td>
</tr>
<tr>
<td>Sandell’s sensitivity (µg/cm²/0.001 absorbance unit)</td>
<td>0.002386</td>
</tr>
<tr>
<td>Correlation coefficient (r)¹</td>
<td>1.00</td>
</tr>
<tr>
<td>Regression²</td>
<td></td>
</tr>
<tr>
<td>Slope (a)</td>
<td>0.042</td>
</tr>
<tr>
<td>Intercept (b)</td>
<td>-0.006</td>
</tr>
</tbody>
</table>

¹Y = a + bC, where C is concentration of analyte (mg/ml) and Y is absorbance unit. ²Calculated from three determinations

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References

(calculated from the eight measurements containing 3/4th of the amount of upper Beer’s law limits of ondansetron) and correlation were calculated for the methods and the results are summarized in Table 1.

The methods were applied for the analysis of the drugs in the tablet formulation. To evaluate the validity and reproducibility of the methods, known amount of pure drug was added to the previously analysed by proposed methods and mean percent recovery was found to be 99.14 respectively. Interference studies revealed that the common excipients and other additives usually present in the dosage form did not interfere in the proposed methods. In conclusion, the proposed methods appear to be economical, simple, sensitive, reproducible and accurate enough for the routine determination of ondansetron in bulk as well as in tablet.

<table>
<thead>
<tr>
<th>Labelled amount (mg)</th>
<th>Amount of drug added (mg)</th>
<th>Amount of drug obtained¹ (mg)</th>
<th>Percentage recovery² (Proposed method)</th>
<th>Standard deviation</th>
<th>% Coefficient of variation</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>10</td>
<td>7.8</td>
<td>98.71</td>
<td>0.7390</td>
<td>0.7454</td>
</tr>
<tr>
<td>8</td>
<td>20</td>
<td>7.8</td>
<td>100.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>30</td>
<td>7.9</td>
<td>98.73</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

¹Average of three determinations. ²Recovery of amount added to the pharmaceutical formulation (average of three determinations)

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REFERENCES


HPTLC Determination of Artesunate as Bulk Drug and in Pharmaceutical Formulations

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Agarwal, et al.: HPTLC Analysis of Artesunate

A new, simple, rapid, accurate and precise HPTLC method has been developed for the estimation of artesunate in bulk and pharmaceutical formulations. The study employs silica gel F₂₅₄ as stationary phase on aluminium foil and mobile phase comprising toluene: ethyl acetate: acetic acid (2:8:0.2). Vanillin (1%) in sulphuric acid (5%) in ethanolic solution gave prominent well-resolved pink colour spot for artesunate, which was stable for more than a day. The densitometric analysis was carried out in the absorbance mode at 520 nm and symmetrical, well-resolved, well-defined peaks were obtained. The Rf value for artesunate was found to be 0.44. The linear detector response for artesunate was observed between 100-600 ng per spot and the calibration plots showed good linear relationship with coefficient of regression, r = 0.9989 with respect to peak area. The method was validated for precision, recovery and robustness. The limits of detection and quantitation were 30 ng/spot and 90 ng/spot, respectively. The recovery study was carried out by standard addition method and the recovery was found to be 99.89±1.006. Recovery from tablets was 98.88 (±0.55) and from injection, it was 98.83 (±0.60) of the labeled amount.

Key words: Artesunate, HPTLC analysis, Dihydroartemisinin hemi succinate, dosage form analysis

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