A NOVEL SPECTROPHOTOMETRIC METHOD FOR THE DETERMINATION OF TAXIM-AZ AND MOLYBDENUM(VI)

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ABSTRACT
A simple and sensitive method was developed for analytical determination of Taxim-AZ and Molybdenum(VI) in pharmaceutical formulation is carried out based on a colour reaction between the two. Molybdenum(VI) forms yellow coloured complex with Taxim-AZ in a buffer of pH-6. This method can be conveniently used for the determination of Molybdenum(VI) and Taxim-AZ, in the ranges of Mo(VI) 1.20 to 8.4 μg/ml and Taxim-AZ in the range of 0.5 to 2.5 mg/ml. The method is successfully applied for the determination of Taxim-AZ and Molybdenum(VI) in pharmaceutical formulation.

KEYWORDS: Spectrophotometric method, Taxim-AZ and Molybdenum(VI) system.

1. INTRODUCTION
Molybdenum is available in appreciable amounts in the earth’s crust. Molybdate ion forms extensive series of iso and hetero polyacids. Molybdenum is important in the fixation of dinitrogen. Pure Molybdenum is obtained by dissolving MoO3 in dilute NH4OH and precipitating ammonium molybdate as di-molybdate (or) para-molybdate. This is reduced with hydrogen to give the metal. Molybdenum metal is used as a catalyst in the petrochemical industry. It has high melting point. So melting to give molten metal would be expensive. Taxim-AZ is a combination of cefixime and Azithromycin. Cefixime is a cephalosporin antibiotic and it is used to treat and cure bacterial infections. It is often used to treat Sinusitis, Tonsillitis, Bronchitis, Pneumonia, Cystitis, Kidney infections and Gonorhoea.
Azithromycin prevents bacteria from producing the proteins that are required to help them reproduce. It is a fast acting antibiotic which is used to treat a wide number of bacterial infections.

2. REAGENT AND EQUIPMENT
All the chemicals used were of analytical reagent grade and the solvents were of spectroscopic grade. Analytical balance, ELICO digital pH meter, UV-visible recording spectrophotometer.

3. EXPERIMENT
One ml of ammonium molybdate and 1ml of Taxim-AZ are taken in a 10ml standard flask and it is made up to the mark with a buffer solution of pH-6. A blank solution is prepared on similar way containing the drug. The spectrum is recorded in the wave length region of 400-750nm.

1. RESULT AND DISCUSSION
1.1 EFFECT OF pH
Absorption spectral characteristics were studied in the pH range 1 to 8 and the absorption spectrum of the complex recorded in the range 350 to 700 nm. The Taxim-AZ and Molybdenum(VI) complex exhibits maximum absorbance at pH-6, 550nm (Fig-1).

Figure -1: pH=2 [Mo(VI)] = 1 x 10^{-4} M [Taxim-AZ] = 0.1 mg/ml, A = Molybdenum + buffer, B = Taxim-AZ + buffer, C = [MO(VI)] + Taxim-AZ + buffer
1.2 EFFECT OF TIME
The absorbance values of the complex solution are recorded over a period of one hour at regular intervals of time. The absorbance values are found to be approximately constant indicating that the complex formed is quiet stable over a period of one hour. The data is presented in Table-1.

Table-1: Effect of time on absorbance

<table>
<thead>
<tr>
<th>S.No</th>
<th>Time in minutes</th>
<th>Absorbance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10</td>
<td>0.35</td>
</tr>
<tr>
<td>2</td>
<td>20</td>
<td>0.34</td>
</tr>
<tr>
<td>3</td>
<td>30</td>
<td>0.36</td>
</tr>
<tr>
<td>4</td>
<td>40</td>
<td>0.37</td>
</tr>
<tr>
<td>5</td>
<td>50</td>
<td>0.33</td>
</tr>
<tr>
<td>6</td>
<td>60</td>
<td>0.35</td>
</tr>
<tr>
<td>7</td>
<td>70</td>
<td>0.34</td>
</tr>
</tbody>
</table>

pH=6; \([\text{Mo (VI)}] = 1 \times 10^{-4}\text{ M}\) \([\text{Taxim-AZ}]= 0.1\text{ mg/ml}\) \(\lambda_{\text{max}} = 550\text{ nm}\)

1.3 EFFECT OF MO(VI) CONCENTRATION
The concentration of the drug was maintained constant, studies relating to the effect of metal ion concentration were carried out by varying the Mo(VI) concentration. The linear calibration plots are shown in Fig-2. The corresponding Beer’s Law range are 1.20 to 8.4 \(\mu\text{g/25ml}\).
1.4 EFFECT OF DRUG CONCENTRATION
The effect of Taxim-AZ is studied in the range 0.5 to 2.5 mg/ml. The absorbance values are measured at 550nm. The concentration of Molybdenum(VI) constant. It is shown in Fig-3.

![Graph showing effect of drug concentration](image)

1.5 EFFECT OF ORGANIC SOLVENTS
Usually the presence of an organic solvent effects a complexation reaction. Therefore effect of methanol, acetone, acetonitrile, propanol on the colour reaction keeping them at 50% by volume. An analysis of data reveals that except acetone the other solvents do not show much influence on absorbance. The data is presented in Table-2.

**Table: 2: Effect of organic solvents on absorbance**

<table>
<thead>
<tr>
<th>S.No</th>
<th>Organic solvent 50% (v/v)</th>
<th>Absorbance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No solvent</td>
<td>0.38</td>
</tr>
<tr>
<td>2</td>
<td>Methanol</td>
<td>0.37</td>
</tr>
<tr>
<td>3</td>
<td>Acetone</td>
<td>0.20</td>
</tr>
<tr>
<td>4</td>
<td>Acetonitrile</td>
<td>0.40</td>
</tr>
<tr>
<td>5</td>
<td>Propanol</td>
<td>0.30</td>
</tr>
</tbody>
</table>

pH=6; \([\text{Mo (VI)}] = 1 \times 10^{-3} \text{ M} \quad [\text{Taxim-AZ}]= 1 \text{ mg/ml} \quad \lambda_{\text{max}} = 550 \text{ nm}\)
1.6 COMPOSITION AND STABILITY CONSTANTS OF THE COMPLEX
The yellow colour formed when Mo(VI) is treated with Taxim-AZ is attributed to a complex between the two. The composition and stability constant of the complex are obtained by Job’s Continuous Variation Method and Mole Ratio method.

1.7 JOB’S CONTINUOUS VARIATION METHOD
In this method a series of solutions containing varying volumes metal ion and Taxim-AZ solution at required concentration were taken in 10ml volumetric flask. The absorbance values are measured in each case at 550nm. It is clear from the Fig-4 that Molybdenum forms 1:1 complex with the reagent.

![Jobs Method](image)

1.8 MOLE RATIO METHOD
In this method the metal ion concentration is maintained constant and drug concentration is varied and the absorbance values are measured at 550nm. From the Fig-5 it is clear that Mo(VI) forms a 1:1 complex with the drug Taxim-AZ.
1.9 EFFECT OF DIVERSE IONS
The effect of foreign ions on the determination of Mo(VI) is studied by adding known concentration of various cations and anions. The data is presented in Table-3.

2. CONCLUSION
The proposed procedure require no costly equipment (or) chemicals. Thus the method is simple and rapid for the determination of metal ion and Taxim-AZ in the range of 1.20 to 8.4 μg/25ml and 0.5 to 2.5mg/ml respectively.

3. REFERENCES