A REVIEW ARTICLE ON LITERATURE REVIEW OF CHROMATOGRAPHIC, SPECTROPHOTOMETRIC AND OTHER METHODS FOR QUANTITATIVE ESTIMATION OF TERAZOSIN HYDROCHLORIDE AND TOLTERODINE TARTRATE IN PURE AND COMBINATION WITH OTHER DRUGS.

*Pragati J. Vanavi, J. S. Shah1 and D. G. Maheshwari2

1,2Department of Quality Assurance, L. J. Institute of Pharmacy, Ahmedabad-380021, India.

*Corresponding Author: Dr. J. S. Shah
Associate Professor, Department of Quality Assurance, L. J. Institute of Pharmacy, Ahmedabad-380021, India.

INTRODUCTION
Terazosin belongs to selective alpha –antagonist with Mol.mass:459.92g/mol, It is effectively works in treatment of symptoms of benign prostatic hyperplasia. It can be indicated for patient with hypertension and prostate enlargement because it lowers blood pressure. It blocks the action of adrenaline on smooth muscle of the bladder and the blood vessel walls. Alpha 1 Receptors leads contraction and hypertrophic growth of smooth muscle cells. It Works by Alpha1 receptors are coupled with G proteins. Three alpha 1 receptors subtype have been identified: they are alpha 1 A, alpha 1 B, alpha 1 D. Terazosin is first to show selectivity for alpha 1 A receptor. All alpha receptors maintain vascular tone. The α1A-receptor manages basal vascular tone; the α1B-receptor mediates the vasoconstrictory effects of exogenous α1-agonists. Activation of α1-receptors activates Gs proteins, which results in intracellular stimulation of phospholipases C, A2, and D. This results in mobilization of Ca2+ from intracellular stores, activation of mitogen-activated kinase and PI3 kinase pathways and subsequent vasoconstriction. Pharmacological effect of Terazosin is inhibition of α1A receptor activation. Thus it will produce vasculature and prostate muscle relaxation, decreased blood pressure and improved urinary outflow in symptomatic benign prostatic hyperplasia.

LITERATURE REVIEW OF TERAZOSIN HYDROCHLORIDE.

Figure: 1 Chemical Structure of Terazosin Hydrochloride.

1.1 Official methods for estimation of Terazosin Hydrochloride
Terazosin hydrochloride is official in United State pharmacopoeia (USP29 NF24, 2005) and Indian Pharmacopeia-2014.
### TABLE 1.1: OFFICIAL METHODS FOR ESTIMATION OF TERAZOSIN[1-2]

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>DRUG</th>
<th>METHOD</th>
<th>DESCRIPTION</th>
<th>Ref. No.</th>
</tr>
</thead>
</table>
| 1       | Terazosin Hydrochloride (USP29)           | Liquid chromatography          | **Detection Wavelength:** 254nm  
**Mobile Phase:** Citrate Buffer: Acetonitrile (1685:315 v/v)  
**Stationary Phase:** Stainless Steel Column 4.6×25mm  
packed to porous silica  
**Flow Rate:** 1.0 ml/min | [1]      |
| 2       | Terazosin hydrochloride (IP 2014)         | Potentiometric method          | **Titrate:** 0.3 gm of mixture+5ml of 0.01M HCl+50ml methanol  
**Titrate with:** 0.1 M NAOH | [2]      |

### TABLE 1.2: REPORTED SPECTROPHOTOMETRIC METHOD[3-12]

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>DRUG</th>
<th>METHOD</th>
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<th>Ref. No.</th>
</tr>
</thead>
</table>
| 1       | Terazosin Hydrochloride in Bulk and  
formulation.                          | Spectrometric Method           | **Wavelength:** 250 nm  
**Solvent:** Methanol  
**Linearity Range:** 2-14 µg/ml  
**Correlation Coefficient (R²):** 1.5971  
**LOD:** 1.11×10⁵-2 µg/ml  
**LOQ:** 1.1×10⁶-5 µg/ml | [3]      |
| 2       | Terazosin Tablet                          | Diazotoazotization with  
1%sodium nitrite and HCL  
followed by coupling with β  
naphthol in 4% NAOH          | **Wavelength:** 560nm  
**Linear Range:** 1-10 µg/ml  
**LOD:** -  
**LOQ:** 1 µg/ml | [4]      |
| 3       | Terazosin Tablet                          | Fluorimetric: Dilution in  
methanicol 0.1N H₂SO₄         | **Wavelength:** 246 and 382 nm  
**Linear Range:** 25-150 ng/ml  
**LOD:** -  
**LOQ:** 25 ng/ml | [5]      |
| 4       | Terazosin in Urine and Plasma             | Fluorimetric: precoancentrating Terazosin  
by microextracion solvent     | **Detection Wavelength:** 376 and 330 nm  
**Linear Range:** 0.1-115 µg/L  
**LOD:** 0.027 µg/ml  
**LOQ:** - | [6]      |
| 5       | Terazosin and Bovine serum albumin  
interactions.                        | Spectrofluorimetric.           | **Wavelength:** 280/413 nm  
**Linear Range:** 0.9×10⁻⁶/mol  
**LOD:** 0.21 mg/l  
**LOQ:** - | [7]      |
| 6       | Terazosin Tablet Terazosin Tablets and  
urine samples.                      | Spectrofluorimetric             | **Wavelength:** ex -332 and em -382 nm  
**Linear Range:** 1×10⁻⁴ to 7 µg/ml  
**LOD:** 3.04×10⁻⁴ µg/ml  
**LOQ:** 1.11×10⁻² µg/ml  
**LOQ:** 3.7×10⁻⁵ µg/ml | [8]      |
| 7       | Terazosin Determination in presence of  
degradation product.                | Spectrofluorimetric             | **Wavelength:** 340 and 345 nm  
**Linear Range:** 4.18 µg/ml  
**b. Wavelength:** 340 nm  
**b. Linearity Range:** 24-45 µg/ml  
**c. Wavelength:** 543 nm  
**c. Linearity Range:** 4.12 µg/ml  
**d. Wavelength:** 412 nm  
**d. Linearity Range:** 4.20 µg/ml  
**e. Wavelength:** λₑ 390/λₑ 382 nm  
**e. Linearity Range:** 0.025-0.1 µg/ml | [9]      |
| 8       | Terazosin pure and tablet.              | Ion pair complex               | **Detection Wavelength:** 419,415,425,428 nm  
**Linear Range:** 2.14, 1.2-1.1, 10.5-130 µg/ml | [10]     |
| 9       | Terazosin hydrochloride in  
drug substance                           | Potentiometric and  
Fluorimetric method           | **Potentiometric method**  
**Electrodes:** 2 Carbon paste ion selective  
**Titration:** Phosphomolybdic acid and | [11]     |
and tablet formulation

Phosphotungestic acid.

Response: In Conc. Range of $1\times10^{-6}$-1\times10^{-2}$ mol L$^{-1}$, 2\times10^{-7}$-1\times10^{-2}$mol L$^{-1}$
Slope: 58.4±0.35(By PMA),57.3±0.23 mV
Decade$^{-1}$(By PTA)

pH Range: 2-6
Low detection limit: $8\times10^{-7}$, $6\times10^{-7}$ mol L$^{-1}$

Fluorimetric method

Method 1
Measurement of native fluorescence
Conc. Range: 10-1000ng mol$^{-1}$
correlation coefficient: $r^2$-0.9982
LOD: 3.87ng/ml
LOQ: 10.5ng/ml

Method 2
By binary complex formation
Conc. Range: 0.5-12ng/ml
correlation coefficient: $r^2$-0.9987
LOD: 0.198ng/ml
LOQ: 0.6ng/ml

1.3 Summary of chromatographic method

Table 1.3 SUMMARY OF CHROMATOGRAPHIC METHOD $^{[4,13-17]}$

<table>
<thead>
<tr>
<th>Sr No.</th>
<th>Drug</th>
<th>Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Terazosin Tablet</td>
<td>Stability indicating HPTLC</td>
<td>Stationary Phase: Silica gel precoated aluminum plate</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mobile Phase: Chloroform:Toluene:Methanol(9:1:6)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Detection: 254nm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Linear Range: 50-2500µg/ml</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>LOD: 18.06µg/ml</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>LOQ: 54.72µg/ml</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HPTLC</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Simultaneous determination with Prazosin, Alfuzosin and Doxazosin</td>
<td>HPTLC</td>
<td>Stationary Phase: Silica Gel Precoated Aluminum Plate.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mobile Phase: Chloroform:Methanol(9.5:0.5)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Detection: 254nm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Linearity Range: 0.8-1.2mg/ml</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>LOD: 0.013mg/ml</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>LOQ: 0.041mg/ml</td>
</tr>
<tr>
<td>3</td>
<td>Pharmacokinetic study</td>
<td>HPLC with fluorescence</td>
<td>Stationary Phase: Column packed with Spherical Silica gel particles Chemically bonded with Octadeacyl group</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mobile Phase: 0.01M disodium hydrogen phosphate:acetonitrile: tetrahydrofuran(76:22:2 v/v)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Fluorescence Detection: $\lambda_{ex}$ 250nm $\lambda_{em}$ 370nm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Linearity Range: 0.25-100mg/ml</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>LOQ: 0.25mg/ml</td>
</tr>
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<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Enantioselective Determination</td>
<td>HPLC with fluorescence</td>
<td>Stationary Phase: Chiral stationary phase chiralpak AD 100</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mobile Phase: Hexane+2-Propranol(0.05%):Diethyl Amine 0.9% (65:35)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Detection : $\lambda_{ex}$ 238nm $\lambda_{em}$ 370nm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Linearity Range: -</td>
</tr>
<tr>
<td>5</td>
<td>Terazosin Tablet</td>
<td>HPLC with fluorescence</td>
<td>Stationary Phase: Shimpack column VP-ODS</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mobile Phase: disodium hydrogen phosphate:acetonitrile: tetrahydrofuran(76:22:2 v/v)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Detection: $\lambda_{ex}$ 250nm $\lambda_{em}$ 370nm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Linearity Range: 20,180,320 ng/ml</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>LOD : 0.1308ng/ml</td>
</tr>
</tbody>
</table>
Pharmacokinetic studies of Terazosin

Stationary Phase: RP C18 column
Mobile Phase: Acetonitrile: THF: potassium dihydrogen phosphate(15:5:80)
Detection: 254nm
Linearity Range: 10-400ng/ml
LOQ: 10ng/ml

1.4 Reported literature of Terazosin in combination with other drugs

Table 1.4 REPORTED LITERATURE OF TERAZOSIN IN COMBINATION WITH OTHER DRUGS.[18-20]

<table>
<thead>
<tr>
<th>Sr No</th>
<th>Drug Description</th>
<th>Method</th>
<th>Description</th>
<th>Ref no</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Terazosin+ Prazosin+ Doxazosin in Formulation</td>
<td>HPLC-UV</td>
<td>Stationary Phase: Kromacil c18 Column Mobile Phase: ACN diethylamine: Methanol: Ammonium acetate(60:20:20:0) Linearity Range: 2-500µg/ml LOD: 0.065 µg/ml LOQ: 0.197 µg/ml</td>
<td>[18]</td>
</tr>
<tr>
<td>2</td>
<td>Terazosin+ Alfuzosin +Prazosin+ Doxazosin+ Tamsulosin Formulation</td>
<td>HPLC-UV</td>
<td>Stationary Phase: c18 column Mobile Phase: ACN diethylamine: Methanol: ammonium acetate: water A: 230nm Linearity Range: 4-16 µg/ml LOD: 0.08 µg/ml LOQ: 0.264 µg/ml</td>
<td>[19]</td>
</tr>
<tr>
<td>3</td>
<td>Terazosin+ Prazosin in Formulation</td>
<td>HPLC-UV</td>
<td>Stationary Phase: Kromacil C18 Column Mobile Phase: Methanol Flow Rate: 1.1 ml/min Linearity Range: 10-60 µg/ml LOD: 0.514 µg/ml LOQ: 1.557 µg/ml</td>
<td>[20]</td>
</tr>
</tbody>
</table>

2. REVIEW LITERATURE OF TOLTERODINE TARTRATE.

Fig 2.1: Chemical structure of Tolterodine tartrate.

Tolterodine is an antimuscarinic which is used to treat overactive bladder and to relieve urinary difficulties like frequent urination and inability to control urination. The chemical name of Tolterodine tartrate is (+)-(R)-2-[[2[(Diisopropylamino) ethyl] benzyl]-p-cresol L-tartrate (1:1) salt. It Works by at postganglionic muscarinic receptor, Tolterodine tartrate produce competitive antagonist effect for acetylcholine. Cholinergic muscarinic receptors are responsible for Urinary bladder contraction and salivation.

2.1 Official Method

TABLE 2.1: OFFICIAL METHODS OF TOLTERODINE TARTRATE[2]

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Drug</th>
<th>Method</th>
<th>Description</th>
<th>Ref. No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tolterodine Tartrate</td>
<td>Liquid Chromatography</td>
<td>Stationary Phase: Stainless still 25×4.6mm packed with octadeclsilane bonded with porous silica 5µm Mobile Phase: A.0.05M Potassium Dihydrogen orthophosphate pH 3.5 with Ortho phosphoric acid B. Acetonitrile Initial (65:35) Method: Gradient Detection: 215nm</td>
<td>[2]</td>
</tr>
</tbody>
</table>
### 2.2 Reported Chromatographic methods

<table>
<thead>
<tr>
<th>Sr No</th>
<th>Drug</th>
<th>Method</th>
<th>Description</th>
<th>Ref No</th>
</tr>
</thead>
</table>
| 1     | Tolterodine in bulk drug and Pharmaceutical dosage form | RP-HPLC | **Stationary Phase:** Hypersil c18 column  
**Mobile Phase:** Acetonitrile:10mM Ammonium acetate (80:20 v/v)  
**Detection:** 283 nm  
**Linearity Range:** 20-100 µg/ml  
**Mean Recovery:** 99.39% | [21]  |
| 2     | Tolterodine in Pharmaceutical dosage form | RP-HPLC | **Stationary Phase:** Hypersil BDS C18 Column.  
**Mobile Phase:** Potassium Phosphate pH 4.5:Acetonitrile (Mixed by low pressure gradient program)  
**Detection:** 205 nm  
**Linearity Range:** 10-60 µg/ml  
**LOD:** 0.6 µg/ml  
**LOQ:** 10 µg/ml  
**Tailing Factor:** 1.00 | [22]  |
| 3     | Tolterodine Stability indicating Determination in Pharmaceutical dosage form | RP-HPLC | **Stationary Phase:** Reversed Phase C18 column.  
**Mobile Phase:** Buffer solution of ammonium dihydrogen phosphate: methanol (40:60)  
**Detection:** 220 nm  
**Flow rate:** 1.5 mL/min.  
**Linearity Range:** 200.60-601.80 µg/ml  
**Retention time:** 6.49 min. | [23]  |
| 4     | Tolterodine Tartrate in bulk and in Pharmaceutical dosage formulation | RP-HPLC | **Stationary Phase:** Kromacil Symmetry C18 column.  
**Mobile Phase:** Phosphate buffer pH 3.0: Acetonitrile.  
**Detection:** 282 nm  
**Flow Rate:** 0.8 ml/min  
**Linearity Range:** 20-100 µg/ml  
**% Recovery:** 98.1%-100.2%  
**LOD:** 0.108 µg/ml  
**LOQ:** 0.36 µg/ml | [24]  |
| 5     | Tolterodine Tartrate in Capsule formation | RP-HPLC | **Stationary Phase:** Reversed Phase C18 column.  
**Mobile Phase:** Methanol: phosphate buffer (40:60) v/v  
**Detection:** 220 nm  
**Retention time:** 10 min | [25]  |
| 6     | Tolterodine tartrate in Tablet formulation | HPLC    | **Stationary Phase:** Kromacil C18 column.  
**Mobile Phase:** Acetonitrile:Methanol:Ammoniumacetatre pH 3 (30:30:40)  
**Detection:** 281 nm  
**Retention time:** 4.99 min.  
**Mean % Recovery:** 102.65%  
**Linearity Range:** 10-30 µg/ml | [26]  |
| 7     | Tolterodine Tartrate stability indicating assay and impurities profiling | RP-HPLC | **Stationary Phase:** C18 column  
**Mobile Phase:** Water: Acetonitrile  
**Detection:** 285 nm  
**Retention time:** 4.7 min | [27]  |
| 8     | Tolterodine Tartrate HPTLC  | HPTLC   | **Stationary Phase:** Aluminum plate precoated with silica gel G 60  
**Mobile Phase:** Acetonitrile:Water:Formic acid (50:50:3)  
**Detection:** Densitometric absorbance mode at 281nm  
**Drug Found:** 99.1%  
**Linearity Range:** 10-30 µg/ml  
**LOD:** 21 ng  
**LOQ:** 53 ng | [28]  |
| 9     | Tolterodine Tartrate in tablet | HPLC    | **Stationary Phase:** Phosphate acetate 0.1 M pH 2.5:acetonitrile: (50:50 v/v) | [29]  |

**TABLE 2.2 REPORTED CHROMATOGRAPHIC METHODS**[^21-33]
Flow rate: 1.2 ml/min
Detection: 285 nm
LOD: 5 µg/ml
LOQ: 10 µg/ml
Linearity Range: 10-100 µg/ml

Stationary Phase: Water X-Teraa MS C18 column.
Mobile Phase: 0.05% TFA+ water: 0.05%+
Acetonitrile(Binary Gradient mode)
Detection: 220 nm
LOD: 66 ng/ml
LOQ: 200 ng/ml

Stationary Phase: Hypersil BDS
Mobile Phase: Phosphate Buffer: Acetonitrile (65:35v/v)
Flow rate: 1 ml/min
Detection: 220 nm
Retention time: Tamsulosin: 2.285 min
Tolterodine: 4.334 min
Linearity range: Tamsulosin: 1-6 µg/ml
Tolterodine: 10-60 µg/ml

Mobile Phase: Acclaim Trinity P1
Solvent: 5% 0.2 M NH4OAc, pH 4/ 52% water/ 43% CH3CN
B: 80% 0.2 M NH4OAc, pH 4/ 20% CH3CN
Flow rate: 0.8 mL/min
Detection: Corona ultra Charged Aerosol Detector

<table>
<thead>
<tr>
<th>Sr No</th>
<th>Drug Description</th>
<th>Method Type</th>
<th>Description</th>
<th>Ref No</th>
</tr>
</thead>
</table>
| 1     | Tolterodine Tartrate in bulk and pharmaceutical formulation. | UV | Solvent: Water
Detection: Zero order : 281.5 nm
First order: 274 nm
AUC: 276-286 nm
Linearity Range: 30-180 µg/ml | [37] |
| 2     | Tolterodine in bulk drug and formulation | Visible spectrophotometric | Complex: Charge Transfer colored complex of Tolterodine tartrate with N-Bromo succinimide, complexes with chloramines –T and Phosphomolybdic acid.
Detection: 520nm, 540nm, 840nm
Linearity range: 5-35 ppm, 2-14 ppm, 10-60 ppm
LOD: 0.03 µg/ml
LOQ: 0.6 µg/ml | [38] |
| 3     | Tolterodine Tartrate in bulk and pharmaceutical dosage form. | UV spectrophotometric. | Solvent: 0.1N NaOH
Linearity Range: 10-80 µg/ml
Detection: 280 nm
LOD: 0.715 µg/ml
LOQ: 2.167 µg/ml | [39] |
<p>| 4     | Tolterodine Tartrate in bulk in pharmaceutical | Extractive colorimetric method using tropaeolin ooo- | Solvent and Complex: A Chloroform extractable orange red complex formed between the acid dye, tropaeolin OOO-1 and Tolterodine in acid media. | [40] |</p>
<table>
<thead>
<tr>
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<th>Drug</th>
<th>Method</th>
<th>Description</th>
<th>Ref No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tolterodine and its metabolite in rat plasma and pharmacokinetic study.</td>
<td>LC-MS/MS method.</td>
<td>Stationary Phase: Ascentis Express RP amide column</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mobile phase: 10mM ammonium acetate: Acetonitrile(20:80 v/v)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Flow rate: 0.5mL/min</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Linearity Range: 20-5000pg/mL</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tolterodine Tartrate in bulk and tablet dosage form.</td>
<td>UPLC Assay method.</td>
<td>Detection: 220nm</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Stationary Phase: BEH C18 Sub-2-µm</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mobile Phase: Trifluoroacetic acid: Acetonitrile</td>
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<td></td>
<td></td>
<td></td>
<td>LOD: 0.05 µg/ml</td>
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<td></td>
<td></td>
<td></td>
<td>LOQ: 0.15 µg/ml</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Retention time: 2.4min</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Tolterodine Tartrate and its metabolite in human plasma and pharmacokinetic study.</td>
<td>UHPLC-ESI-MS/MS</td>
<td>Mobile Phase: Ethyl acetate: n-hexane(70:30v/v)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Stationary Phase: Agilent Zorbax XDB-phenyl column</td>
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<td></td>
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<td>Detection: Electro spray ionization</td>
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<td></td>
<td></td>
<td>LOQ: 5.0pg/ml</td>
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</tbody>
</table>

**2.4 Summaries of other methods**

| TABLE 2.4 SUMMARIES OF OTHER METHODS | [34-37] |

<table>
<thead>
<tr>
<th>Sr No</th>
<th>Drug</th>
<th>Method</th>
<th>Description</th>
<th>Ref No</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Tolterodine and its metabolite in rat plasma and pharmacokinetic study.</td>
<td>LC-MS/MS method.</td>
<td>Stationary Phase: Ascentis Express RP amide column</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mobile phase: 10mM ammonium acetate: Acetonitrile(20:80 v/v)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Flow rate: 0.5mL/min</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Linearity Range: 20-5000pg/mL</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Tolterodine Tartrate in human plasma and urine samples.</td>
<td>UPLC Assay method.</td>
<td>Detection: 220nm</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Stationary Phase: BEH C18 Sub-2-µm</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mobile Phase: Trifluoroacetic acid: Acetonitrile</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>LOD: 0.05 µg/ml</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>LOQ: 0.15 µg/ml</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Retention time: 2.4min</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Tolterodine Tartrate and its metabolite in human plasma and pharmacokinetic study.</td>
<td>UHPLC-ESI-MS/MS</td>
<td>Mobile Phase: Ethyl acetate: n-hexane(70:30v/v)</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Stationary Phase: Agilent Zorbax XDB-phenyl column</td>
<td></td>
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<tr>
<td></td>
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<td>Detection: Electro spray ionization</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>LOQ: 5.0pg/ml</td>
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</tbody>
</table>

**CONCLUSION**

This review depicts the reported Spectrophotometric and Chromatographic methods; developed and validated for estimation of Terazosin Hydrochloride and Tolterodine tartrate. According to this review it was concluded that for Terazosin Hydrochloride and Tolterodine Tartrate different Spectroscopic & Chromatographic methods are available for Single component as well as for combination and also it was found that the Mobile phase containing Phosphate buffer, Methanol and Acetonitrile were common for most of the chromatographic method to provide more resolution. For Chromatographic method flow rate was observed in the range of 0.8-1.5 ml/min to get good retention time. For most of the Spectroscopic methods common solvent was Methanol. This all methods were found to be simple, accurate, economic, precise and reproducible in nature.

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