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Assay for Quantitative Analysis of Losartan Potassium by using UV Spectroscopy

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Abstract- Drug is a substance that brings about a change in the biological functions through its chemical actions. Drug losartan are the first marketed beta blockers of the angiotensin II-type (AT1) receptor. It is the prototypic ARB. Their pharmacologic effect are very similar to the ACE inhibitors, because they also produce the arteriolar and venous dilation and block aldosteron secretion, thus lowers the blood pressure, decreases the salt and water retention. Its chemical name is losartan potassium. It is indicated in mild to severe hypertension and contraindicated in pregnancy because it increases teratogenic risk and may leads to mal formation or death of fetus. It is light yellow solid and stable under recommended storage conditions, freely soluble in water and soluble in alcohol. Losartan inhibit the binding of angiotensin II to type 1 in tissue (kidney and adrenal gland) losartan and its active metabolite is more potent then losartan inhabitation causes vasodilation and decreases sodium and water retention. The aim of study is to determine the %age assay of losartan potassium of different brands.

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I. Introduction

Drug is a substance that brings about a change in the biological functions through its chemical actions. Losartan are the first marketed blockers of the angiotensin II-type receptor (non peptide, orally active, and competitive antagonist of AT1 receptor) [1]. Its wavelength is 234nm which lies in the UV range i.e. 200-380nm. It is the prototypic ARB. Their pharmacologic effects are very similar to the ACE inhibitors, because they also produce the arteriolar and venous dilation and block aldosteron secretion, thus lower the blood pressure, decreases the salt and water retention. They have no effect on bradykinin levels and metabolism [2]. They decrease the nephrotoxicity of diabetes and making attractive therapy in hypertensive diabetics. They also provide benefit in patient with heart failure and chronic kidney disease. The adverse effects are also similar to ACE's inhibitors, but the risk of cough and angioedema is decreased because it has no effect on bradykinin levels ARB's are fetotoxic and should not be used by women who are pregnant, it is contraindicated during pregnancy [3].

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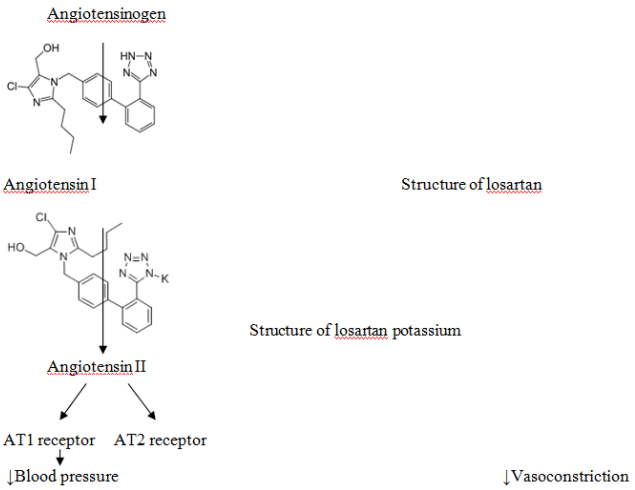
Losartan belong to antihypertensive therapeutic class. It blocks the receptor also called angiotensin II receptor blocker (ARBs). Losartan is specific or selective type I angiotensin II receptor (AT1) antagonist. They block receptor as a result decrease in blood pressure (rennin-angiotensin-aldosteron system) RAAS [4].

Losartan inhibit the binding of angiotensin II to type I in tissue (kidney and adrenal glands). Losartan and its active metabolitesE-3174 is more potent then losartan inhibition (angiotensin II to type I) cause vasodilation (normally AT1→vasoconstriction + aldosteron) decrease sodium and water retention and increases excretion [5].



The formula of losartan is $C_{22}H_{23}ClKN_{6O}$.Losartan is given orally and it is well absorbed but undergo first pass metabolism. Systemic bioavailability is 33 after metabolism it is highly protein bound and while taking the food with medicine decreases its absorption. In healthy individual it distributes about 34l and its metabolite about 12l. It is metabolized in liver by an enzyme CYP450, 2C9 and 3A4 and converts into an active metabolite 5 carboxylic acid derivatives (E-3174). It is administered orally so 35% excreted in urine and about 60% excretion in feces. When administer by IV route then 45% of drug is excreted in urine and 50% drug in feces [6]. Protein binding of losartan is 99.7% (primarily albumin) and bioavailability is 25-35%. [7].

The appearance of losartan potassium is white to off white crystalline powder its melting point is

between 263-265C and it is freely soluble in water. Molecular mass of losartan potassium is 462.01 [8].

Its indications are: mild to severe hypertension, diabeticnephropathy reducing risk of stroke in people with heart disease [9]. Its adverse effect include: losartan worsens the condition the patients who had a history of PD, in the form of several falls and episodes of freezing and severe bradykinesia. So, its combination with levodopa or carbidopa should be avoided [10]. Hypergranulosis and hyperkeratosis be developed during its treatment with losartan for arterial hypertension. Long term of losartan potassium develops angioedema. It triggers psoriasis and generalized bullous lesions and patients can develop Steven-Johnson syndrome and renal impairment during the treatment of hypertension with losartan [11].

Losartan potassium is contraindicated in pregnancy because it is fetotoxic and cancause mal formation of the fetus and even leads to death and it is also contraindicated for renal impaired function and bilateral renal artery stenosis[12].

Drug-Drug interactions of losartan potassium with fluconazol rises the plasma level of losartan, indomethacin blunt its antihypertensive effect, concomitant use of potassium supplement may lead to increase in serum potassium, rifamycin may reduce the antihypertensive effect, and increase in lithium may increase its adverse effects [13]. Drug food interactions of losartan potassium with grapefruit which decreases its active metabolites so reducing the efficacy, drinking alcohol can further lower B.P and may increase certain side effects [14]

II. Methodology

a) Material

Distilled water, losartan potassium tablets standard and sample, glass rod, mortar and pestle, measuring cylinder, tissue paper, weigh balance and UV visible spectrophotometer.

b) Method

- Wash the apparatus (beakers, glass rod, conical flask, mortar and pestle, measuring cylinder) and rinsed with freshly prepared distilled water.Dry all the apparatus.Now weight the tablets accurately.Crush the tablets in mortar and pestle.Transfer the 0.2mg of calculated amount of drug into 100ml of beaker andmake up the volume with freshly prepare distilled water.Note down the absorbance of standard solution and sample solution separately at 234nm wavelength by using UV visible spectrophotometer.
- Calculate the % assay with the help of formula [15].

III. Observations and Calculations

Standard

Weight of tablet 1=0.158gm
Weight of tablet 2=0.156gm

Average: 0.158+0.156/2=0.157
Each tablet of 100mg or 0.1gm

0.1gm ---------- 0.175gm
0.2gm ---------- 0157×0.1/2=0.314gm

Sample

Weight of tablet 1=0.248gm
Weight of tablet 2=0.247gm

Average: 0.248+0.247/2=0.2475gm
Each tablet of 100mg or 0.1gm

0.1gm ---------- 0.2475gm
0.2gm ---------- 0.2475×0.2/0.1=0.495gm

Losartan Potassium

Absorbance of Standard	Absorbance of Sample
2.864	2.796

% ASSAY:

% assay = absorbance of sample/absorbance of standard×100
% assay = 2.796/2.864×100

% assay = 97.62 or 98%

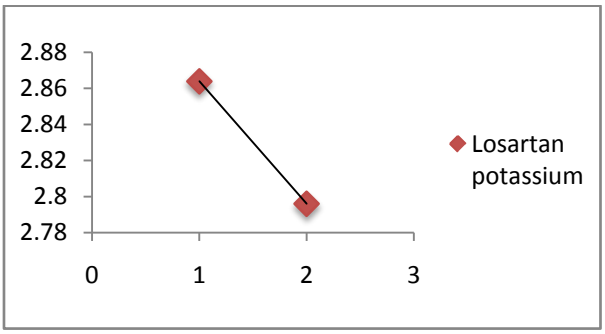


Figure 1: Linearity of Losartan potassium

IV. Result

We have performed the assay of losartan potassium by using UVvisible spectrophotometer, and the calculated % assay of losartan potassium is 98% [16].

V. Discussion

The aim of the study was to carry out the pharmaceutical assay on different brands of losartan potassium by using spectrophotometer. This results shows that absorbance is directly proportionto concentration so, it is obeys to Beers lambert law and assay of all brands are within range of USP and British pharmacopeia linearity given in figure1.We have done these types ofassay for different brand which helpful for selecting drugs[17].

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