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Research Article

Novel spectrophotometric estimation of Gliclazide by using mixed hydrotropic solubilization phenomenon.

Jesika Rane*, Dr. Vinod Thakre , Dr. R.L.Bakal, Suraj Patil

Department of Quality Assurance.

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ABSTRACT

To increase the solubility of Gliclazide which is sparingly soluble in water by using hydrotropic agent i.e. urea, sodium acetate and their combinations. Hydrotropic means to increase in solubility of solute by the addition of high concentrations of alkali metal salts of various organic acids. In hydrotropic solubilization phenomenon, addition of large amount of second solute results in an increase in solubility of another solute. Mixed hydrotropy has been explored in the recent times in order to decrease the amount of hydrotropic agents used for solubility enhancement. Is used in mixed combination, when the ratio of Gliclazide (GZ): Urea (U) 6M: Sodium acetate (SA) 2M then it show about eight times enhancement of solubility. Urea, sodium acetate do not interfere above 225 nm and this mixed hydrotropic method can avoid the toxic and costlier effect caused by the organic solvent It is thus concluded that the proposed methods is new simple, cost-effective, safe, accurate, precise and environmentally friendly.

KEY WORDS:-Gliclazide, solubilization phenomenon

INTRODUCTION

HydrotropicSolubilization phenomenon:-

Hydrotropic means to increase in solubility of solute by the addition of high concentrations of alkali metal salts of various organic acids. In hydrotropic solubilization phenomenon, addition of large amount of second solute results in an increase in solubility of another solute. Mixed hydrotropy has been explored in the recent times in order to decrease the amount of hydrotropic agents used for solubility enhancement. Is used in mixed combination .This mixed hydrotropic method can avoid the toxic and costlier effect caused by the organic solvent. It is thus concluded that the proposed methods is new simple, cost-effective, safe, accurate, precise.

DRUG PROFILE:-

Gliclazide is oral Hypoglycemic (Anti diabetic) drug and is classified as sulphonyl urea . Gliclazide is prodrug of reasarch done by sevier a French pharmaceutical compony.

Structure:-

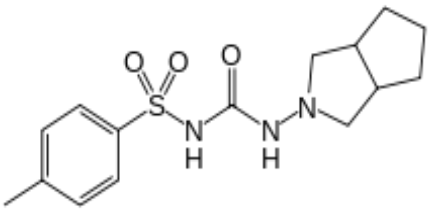


Fig:-1-Gliclazide:

IUPAC NAME:-

N-[hexahyrocyclopenta]pyrrol-2(1-H)ylcarbomoyl methyl benzene sulphonamide.

Experimental Method:-

Step 1:-

1.10mg gliclazide was accurately weight and transfer to 10ml volumetric flask.

2.To this add 10ml distilled water and shaken to solubilize the drug.

3. This stock solution 1000mcg/ml was further diluted with distilled water to obtain various

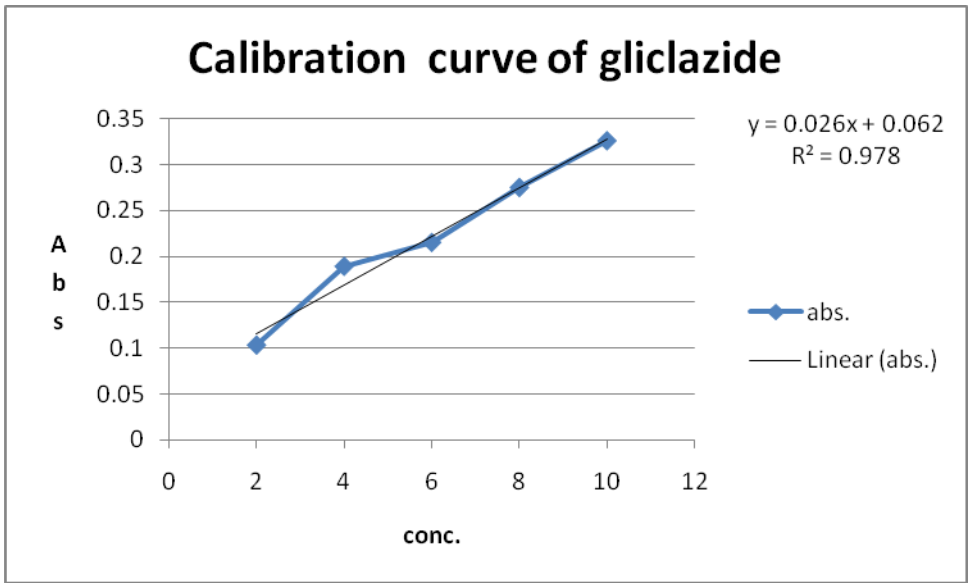
dilution containing 2,4,6,8 and 10mcg/ml of drug.

4.Absorbances were noted at 225nm against reagent blanks to get calibration curve.

Step 2:-

1.Accurately weight 10mg of gliclazide was solubilized 8ml of mixed hydrotropic solution of urea 6 M: ;sodium acetate 2M in 10ml volumetric flask and distilled water was added to make up the volume.2. This stock solution was further diluted with distilled water to get various dilutions containing 2,4,6,8 and 10 mcg/ml of drug.3.Absorbances were noted at 225nm against corresponding reagent blanks.

*Corresponding author: Jesika Rane ||



SOLUBLITY STUDY OF GLICLAZIDE:-

1.Determination of solubility of drug carried out plain distilled water and two hydrotropic agent viz. urea and sodium acetate.

2.Sufficient excess amount of drug was added to screw capped 30ml glass vials containing various hydrotropic solution and distilled water separately.

3. The solutions wereallowed to equilibrate for next 24 hours and solution was filtered through whatman filter paper.

4. Filtrates were diluted with distilled water suitably and absorbance of solution was noted against respective reagent blanks to determine the solubility.

RESULT AND DISCUSSION:-

The solubility of Gliclazide markedly increased about 6 time using urea follow by sodium acetate (about 2 times) with ratio 1:10

Gliclazide:Urea:-

SR.NO.	DRUG:UREA	SOLUBILITY(mg/ml)
1	1:0	12
2	1:1	24
3	1:3	36
4	1:5	48
5	1:7	60
6	1:10	72

Gliclazide : sodium acetate:-

SR.NO.	DRUG:SODIUM ACETATE	SOLUBILITY(mg/ml)
1	1:0	15
2	1:1	26
3	1:3	37
4	1:5	39
5	1:7	43
6	1:10	46

Gliclazide:Urea:Sodium acetate(Mixed hydrotropy):-

SR.NO.	DRUG:HYDROTROPIC AGENT	SOLUBILITY(mg/ml)
1.	1:0	14
2.	Gliclazide:Urea+sodium acetate	104

Conclusion:-

Most of the organic solvents are toxic costly like methanol, ethanol, toluene, chloroform, diethyl ether which are used for hydrotropy.Inaccuracy due to their volatility in spectrophotometric estimation.Urea,Sodium acetate are used to enhance aqueous solubility which is not interfere above 225 nm.The above study shows that there was marked solubility enhancement of about eight times when the hydrotropic agents were used in combinations at low concentration.

FUTURE PROSPECTUS:-

Mixed hydrotropy may find wide use in development of aqueous formulation of poorly water soluble drugs in future.

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