ISSN 0973-3450 (Print)
JUC Vol. 15(3), 39-42 (2019). Periodicity 2-Monthly
ISSN 2319-8036 (Online)

JOURNAL OF ULTRA CHEMISTRY
An International Open Free Access Peer Reviewed Research Journal of Chemical Sciences and Chemical Engineering
website:- www.journalofchemistry.org
Estd. 2005

Comparative study of Hypoglycemic activity of gliclazide to its silver complex

[1]RASHIDA QURESHI and [2]MANISH SINGH

Department of Chemistry, Saifia College of Science & Education Bhopal (India)
Corresponding Author E. Mail : saadrehman439@gmail.com, snghmanish1982@gmail.com
http://dx.doi.org/10.22147/juc/150303

Acceptance Date 26th May, 2019, Online Publication Date 28th May, 2019

Abstract

Gliclazide, N-(4-Methyl Benzene Sulphonyl)-N-(3-azo bicycle (3,3,0-Oct-3-yl) urea trade name Diamicron, an oral hypoglycemic agent was used to synthesize its complex with Ag(I). The hypoglycemic activity of gliclazide was observed on experimental animals (dogs) and then compared with Ag Complex, using Folin-Wu method. Results reveals that the gliclazide Ag-Complex is more effective than that of parent drug.This blood sugar lowering effect of sulfonylureas seems to be related to the stimulation of insulin secretion. On the other hand many studies have strongly indicated the presence of long term or extra pancreatic action of sulfonylureas. The interesting observation on metal complex of oral sulfonylurea used as anti-diabetic agent for lowering blood sugar concentration may likely substantiates the use of these complex after extensive clinical studies.

Key words : Silver complex,Hypoglycemic Activity,Diabetes Melitus, Antidiabetics, Insulin.

Introduction

A large number of metals are used as Chemotherapeutic agents in Unani & Ayurveda system of medicine. Iron (Kushta-e-faulad) used in sprue and anaemia.

Nobel metal silver has a powerful ablugoclynamic action,due to which silver vessels are used for various purposes. It is used in the treatment of epilepsy.

Diabetes is a deceptive disease and if not detected at an early stage may cause even death. Diabetes mellitus is characterised by an excess sugar in blood and its excretion in urine also. To avoid daily prick of insulin injection the use of oral anti-diabetics has become more common in recent years.

Looking to the useful effect of silver and its metal complex[1-5]. An attempt is made to synthesized a gliclazide-Ag complex and to compare its hypoglycemic activity, which is presented in this paper.

Experimental Section

Materials

All the reagents and chemicals employed for the preparation of the ligands and their Ag(I) complexes were of the best grade available (Merck) and used without further purification.

Methods

Four dogs of appropriate body weight 4.00 kg were kept in laboratory condition on experimental diet (milk and bread) for four days and their fasting sugar was estimated for five days (Folin and Wu method[6] (table-1) colorimetrically as well as by glucometer to maintain an average blood sugar level. On sixth day animals (dog) were given a dose of gliclazide according to body weight and fall in blood sugar level was noted with increasing duration of time. The maximum decrease in blood sugar was upto 42.35 mg/100ml of blood (an average of four animals). Now the animals (dogs) were again kept on same experimental diet for three days so as to further maintain the normal blood sugar. On Eighth day animals (dogs) are given orally the gliclazide-Ag complex and fasting blood sugar was noted again, on the day of administration of drug and complex, the diet was given to the animals (dogs) after final observations *i.e*. at 2:00 pm. Result are recorded. Table -2.

Results & Discussion

The hypoglycemic effect of gliclazide, an oral anti-diabetic drug was investigated on the blood sugar level of normal non-diabetic male dogs. Analysis of data reveals the drug caused a marked decrease in blood sugar level to the extent of 42.35% while its Ag-complex reduced sugar level to 49.49%.

These results clearly indicates a better hypoglycemic activity of Ag-gliclazide complex over its parent drug which is in agreement with the earlier finding of Iqbal et al[7]. This increased hypoglycemic activity of parent drug may also be due to smaller particle size of Ag-gliclazide complex than gliclazide, as on complexation size is reduced, which may inhance the rate of absorption of complex in gastro-intestinal tract.

Result of the present work are also in conformity with hypoglycemic effect of Fe-tolazamide

Table-1
COLORIMETRIC ESTIMATION OF BLOOD GLUCOSE OF MALE DOGS (Folin-Wu method)

Test sample	Glucose Standard 1	Glucose Standard 2	Blank (without sugar)
0.05 ml blood + 3.9ml copper reagent + 0.05 ml sodium tungstate (to coagulate protein) and centrifuge the solution.	0.01% Standard Glucose solution (1)	0.0025% Standard Glucose solution (2)	
2.0 ml supernatant liquid of the sample + 2 ml Harding's B- solution ($NaHCO_3$ + potassium oxalate + sodium tartrate).	2ml glucose solution + 2 ml Hardings B-solution	2 ml glucose + 2 ml Harding's B-solution	2 ml Cu reagents + 2 ml Harding's B- solution
Sample (a)	Sample (b)	Sample (c)	Sample (d)

1. $\frac{\text{Test reaing X 80}}{\text{Standard (1) reading}} =$ Glucose /100 ml of blood in mg

2. $\frac{\text{Test reading x 200}}{\text{Standard (2) reading}} =$ Glucose/100 ml blood in mg

Table -2

COMPARATIVE HYPOGLYCEMIC EFFECT OF GLICLAZIDE & ITS SILVER COMPLEX

	FASTINGS BLOOD SUGAR LEVEL IN mg/100 ml OF MALE DOGS													
Average Group of in animals sugar	1 Day	2 Day	3 Day	4* Day	Average value	Oral Administration of Drug 8am	10am	12 noon	2 pm	4 pm	Least blood sugar values	Fall in blood sugar	% Fall in blood sugar	% Fall blood
A	98	97	97	98	97.5	83	65	62	69	80	62	35.5	36.41	
B	94	92	94	92	94	77	62	54	67	85	54	40	42.55	42.35
C	99	97	98	99	98.25	79	64	51	69	86	51	47.25	48.09	
Average Group of inanimals blood sugar	5 Day	6 Day	7 Day	8* Day	Average value	After Oral Administration of Gliclazide Ag-complex 8am	10 am	12 noon	2pm	4 pm	Least blood sugar values	Fall in blood sugar	% Fall in blood sugar	% Fall
A	99	99	100	99	99	72	62	58	50	74	50	49	49.49	
B	101	102	105	104	103	69	60	59	57	77	57	46	44.46	49.49
C	100	99	100	103	100.5	79	64	57	52	72	52	48.5	48.25	

*Values without drug or complex diet was given at 6:10 am.

* Values after administration of drug/complex diet was given at 4 : 00 pm.

complex than tolazamide drug as mentioned by Qureshi *et al*.[8]

Conclusion

In conclusion, the present study revealed the oral administration of Ag-complex marked blood glucose lowering effect on experimental animals (dogs) which is in agreement of previous work[9-19].

Further study is recommended to investigate the hypoglycemic activity of Ag- gliclazide complex on induced diabetes on experimental animals.

Acknowledgement

The authors are thankful to principal Saifia College and to the secretary, Saifia Education Society for providing necessary facilities. First author R.Q. is indebted to Mrs. M.A. Khan, Pathologist at Kamla Nehru Hospital for her sincere co-operation throughout the course of these studies.

References

1. Iqbal, S.A., Kaushal, R and Khan, L.H. Jour. Scie Res. *3(3),* 175 (1981).
2. Qureshi, R. Ph.D. Thesis, Bhopal Univ. Bhopal (1989).
3. Qureshi R. Iqbal, S. A. Biome : *1(2),* 112-114 (1986).
4. Qureshi R. Iqbal, S.A., Siddiqui, M.U., Jour Sci, Res. Vol 8 No. 2
5. Qureshi R. Iqbal, S.A., Oriental J. Chem. Vol *3* No. 1 PP 6-98 (1987).
6. Folin, O. and H. Wu, J Biol., Chem., 41: 367 (1920).
7. Iqbal, S.A., Siddiqui S., Qureshi, R. and Desnavi, A. Oriental J. Chem. *1,* 32-34 (1985).
8. Qureshi, R. Siddiqui, A., Iqbal, S.A., Oriental J. Chem. *20(2),* 417-418 (2004).
9. M. Tawkir *et al.*, Assian J. of Pharmaceutical and clinical research, vol. *15,* Suppi. 4 (2012).
10. Bal Krishan *et al.*, International J. of Theoretical & Applied Science *5(1),*138-144 (2013).
11. Om Prakash *et al.*, Oriental J. of Chem., vol. *29,* No.(2) 823-828 (2013).
12. Sabi Jose *et al.*, Assian J. of Pharmaceutical Education and research Vol. *2,* Issue-1 (2013).
13. George Jacob *et al.*, Oriental J. of Chem., vol. *29,* No. (4) 1351-1358 (2013).
14. Shruti S. Sarwade et al., J. of Chemical Biological and Physical Science vol. *4,* No.2; 976-982 (2014).
15. El-Megharbel, J. Microb Biochem. Technol., vol. *7 (2),* 065-075 (2015)
16. Fathy A. El-Saied *et al*., J. of Pharmaceutical and clinical research, vol. *8(8),* 171-181 (2016).
17. C. Jaig Nesh *et al*., International J. of Pharma and Bio Science vol. *8(3),* 1-15 (2017).
18. Muruganantham Koothappan *et al*., Assian J. of Pharmaceutical and clinical research, vol. *11 (5),* 429 (2018).
19. Muruganantham Koothappan *et al*., Diabetes Metab J. vol. *42(3),* 244-248 (2018).