IJMPR 2022, 6(6), 92-97

International Journal of Modern Pharmaceutical Research

www.ijmpronline.com

ISSN: 2319-5878
IJMPR
Research Article

SJIF Impact Factor: 5.273

FORMULATION AND EVALUATION OF GLIPIZIDE ORAL ROUTE OF HYDROGEL

Dr. Jyoti Rai*, Pragati Pandey and Dr. J. Narayan Mishra

Kailash Institute of Pharmacy & Management, Gida, Gorakhpur.

Received on: 09/05/2022
Revised on: 29/05/2022
Accepted on: 19/06/2022

***Corresponding Author**
Dr. Jyoti Rai
Kailash Institute of Pharmacy & Management, Gida, Gorakhpur.

ABSTRACT

Guargum- Carbopol Hydrogel could be used to deliver micromolecular medications in a controlled manner, according to the researchers. Because of its oral and mucoadhesive properties, drug release can be targeted to the top region of the small intestine, minimizing uneven absorption of many micromolecules. It was also shown that in acidic environments, the extent of hydrogel swelling was reduced; hence, drugs that would break down in acidic stomach conditions could be protected from the harsh acidic environment.

KEYWORDS: Carbopol, Mucoadhesive, Micromolecules.

1.1INTRODUCTION

Diabetes Mellitus is a chronic biochemical condition characterised by persistently elevated blood sugar levels. In the late 1700s, British physician John Rolle added the word "mellitus," which means "from honey," to distinguish the disorder from diabetes insipidus, that is also linked with excessive urination. It is a rapidly spreading global issue with significant social, medical, & economic implication.

In 2010, it was projected that 285 million people worldwide (about 6.4 percent of the population aged) were affected by this condition. In the pursuit of alternative control or treatment, this figure is expected to rise to 430 million. The increase is due to two factors: an ageing populace & obesity. Furthermore, nearly half of all presumed diabetics really aren't identified for another ten years just after commencement of the disease, implying that the true global diabetes incidence must be enormous.

At same time, Indian doctors diagnosed the condition and labelled it as Madhumeha, or "honey urine," observing that the pee attracted ants. This could be due to the old people's nutrition and culture, or because the common signs were detected at an advanced phase of the disease The ailment was given the name "urinary diarrhoea" by Galen (diarrhea urinosa) Losing weight, polydipsia , polyuria and polyphagia are all typical signs of uncontrolled diabetes (increased hunger). In type 1 diabetes, indications may appear quickly (weeks or months), whereas in type 2 diabetes, sensations normally appear considerably more gradually and may be faint or absent. Environments, the extent of bead swelling was reduced; hence, drugs that would break down in acidic stomach conditions could be protected from the harsh acidic environment.

A variety of many other indications or signs, albeit not specific to diabetic, can suggest the disease's onset. In addition to the reasons described complaints, they comprise blurred vision, headaches, fatigue, back pain, and skin irritation. For long periods of time, hyperglycemia can stimulate glucose intake in the eye lens, resulting in changes in its structure and vision.

Diabetes, ketosis a form of metabolic condition marked by nausea, vomit, and stomach discomfort, the smell or alcohol on the breath, breathing deeply known as Kussmaul breath, or, in extreme cases, a lowered level of awareness, can occur in people (typically with type 1 diabetes). Hypertonic non ketotic condition, which would be more frequent in diabetes mellitus and is mostly caused by exhaustion, is an uncommon but equally dangerous scenario.

1.2 Complications

Hyperglycemia, in any form, raises the chance of lengthy consequences. These usually appear after a number of years (10–20), but they may be the initial symptom among those who have not been diagnosed.

Disruption to blood arteries is one of the most serious long-term effects. Diabetes increases the risk of heart disease, but coronary artery disease is responsible for nearly 75% of diabetic deaths. Stroke and peripheral arterial disease are two more "macrovascular" illnesses.

Injury to the eye, kidney, & nerve are the most common microvascular consequences of diabetes. Injury to the eye, termed as diabetic neuropathy is produced by injury to the blood vessels in the brain and can lead to loss of vision over time. Diabetic nephropathy, including kidney damage, can cause tissue damage, protein leakage in the urine, and finally kidney disease, needing dialysis or a

kidney transplant. Soreness, tingling, soreness, and altered pain feeling are some of the indications, that can damage the skin damage. Diabetic foot problems (such as diabetic foot ulcers) can emerge and can be hard to cure necessitating amputation in certain cases. Proximal diabetic neuropathy also results in severe muscular atrophy and weakening.

There is a relationship between diabetic and cognitive impairment Those of us with hyperglycemia have a 1.2 to 1.5-fold higher rate of loss in mental ability than those without the condition.

Present research has been carried out to prepare and evaluate tablet by using Glipizide for antidiabetic medication of the sulfonylurea class used to treat type 2 diabetes.

1.3 MATERIALS AND METHODS

Glipizide are obtained by a gift sample from Aerocamp industry in Maharashtra, Carbopol 934, Guargum these chemicals are provided by college.

1.4 Methods

- These all polymers carbopol and guargum are mixed with different concentratuions and kept at 24 hours
- After that carbopol and guargum are kept for magnetic stirrer at 2 hours.
- At between the 2 hours 5mg drug incorporated into the three formulations and 10mg drug incorporated into the three formulations.
- And the all ingredient are weighed accurately a mention in table. The above mentioned content are passed by a 20 mesh sieve and the properly mixed and then the blends are mixed with 5 minute, after the addition of magnesium stearate and talc and the blends were compressed by using the tablet punch machine.

1.5 Tablet Blend Evaluation

In this the tablet blend evaluation before compression check the rheological properties such that
(Tapped Density),
(Bulk Density)
(Angle of Repose)
(Carr's index), (Hausner ratio)

2 Preparation of formulation

Ingredients(mg)	F_1	F_2	F_3	F_4	F_5	F_6
Drug	5	5	5	10	10	10
Carbopol	1.3	1.1	1.7	1.5	1.7	1.5
Guargum	1.1	1.3	1.5	1.7	1.9	1.9
Sodium alginate	20	30	20	-	-	-
Magnesium stearate	5	5	5	5	5	5
Lactose	6.5	5.5	8.5	7.5	8.5	7.5
Talc	3	3	3	3	3	3

2.1Evaluation of Hydrogel Tablet

In this the hydrogel tablet are evaluated for weight variation, friability, hardness, disintegration test, Drug content uniformity are checked by using the (UV Spectrophotometer) Shimazdu UV-1800 wavelength 235nm and check the percent of drug content.

2.2 Weight Variation Test

Weight loss has been done by selecting 20 tablets. taken from each formulation by using Wensar Electronic balance in this the results are calculated and also reported a mean average.

2.3 Friability Test

In this the preweighted tablets 20 taken from each formulation and the selected a transferred into the Roche Friabilator plastic chamber. and the tablets are dropping at a distance of 6 inches in each revolution. and it was operated for 4 minutes. and also determine this test in the effect of shock and abrasion plastic chamber with revolution. It was calculated by formula.

%Weight loss = $W_1 – W_2 / W_1$ multiply by 100

2.4 Hardness Test

In this the 6 tablet are taken from each formulation, selected the tablet and recorded the breaking force by Monsanto hardness tester.

2.5 Disintegration Test

In this the 6 tablets are taken from each formulation and this tablet drops into the DT apparatus a start the DT apparatus will see how any times tablets are mixing in.

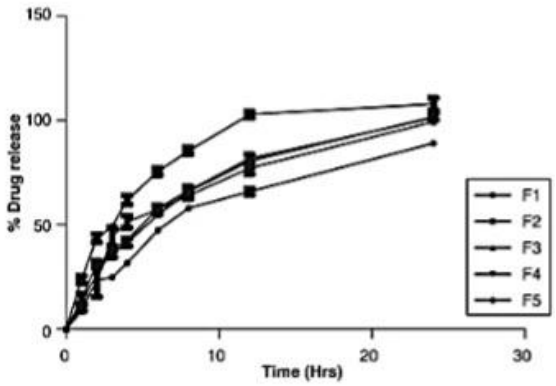
2.6 Drug content uniformity

Weigh the hydrogel 100mg taken into the beaker and add the 20 ml of Phosphate buffer P^H 7.4 Will mix this solution well and filter this solution by Whatsman Filter paper a using this filter the solution 1.0ml and taken into the 10ml volumetric flask and make up the volume 10 ml volumetric flask with Phosphate buffer this solution analyzed by using UV spectrophotometer at the wavelength 235nm.

Drug content uniformity	Percentage
F_1	0.14%
F_2	0.07%
F_3	0.16%
F_4	0.05%
F_5	0.01%
F_6	0.13%

In vitro drug release

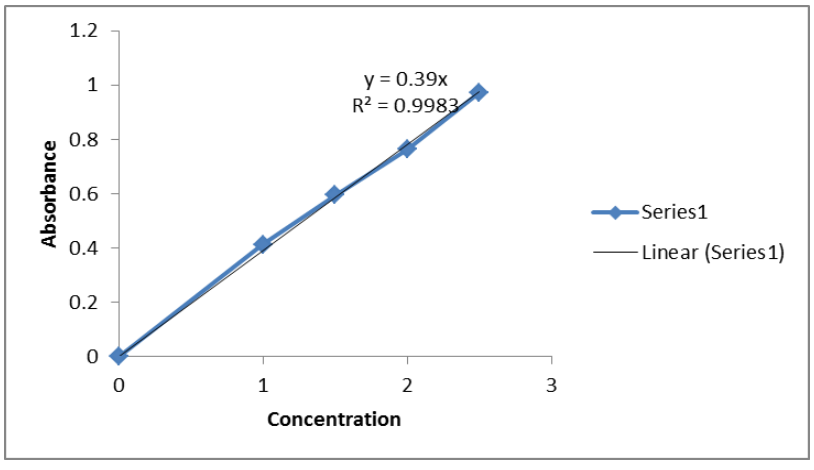
The disintegration test equipment baskets method was used to conduct drug release investigations in phosphate buffer 7.4 (900 ml). The mixing speed was kept constant at 50 rpm. Degradation fluid samples were removed at various time periods, processed using a 0.45 m syringe filter, and then analyzed for drug concentration at 235 nm the double spectrometer after appropriate dilutions.



3.1 Preparation of Calibrtion Curve

To the prepare for 100ml P^H 7.4 then add the Nacl 0.8g add 0.2 g Kcl add $Na_2HPo_4$1.44g add KH_2PO_4 0245g. In the prepared by dissolving 50 mg Glipizide Acetonitrate 35ml, and the phosphate buffer 15 ml mixed in the 50ml of volumetric flask and fill with the solvent (Phosphate Buffer) for prepare the stock solution of Phosphate Buffer 12.5 ml mixed with the 250 ml of volumetric flask and then make up with the solvent Phosphate Buffer. For the stock solution was taken (1ml) into the 10 ml of volumetric flask then dilute it and this pipette out 1, 1.5, 2, 2.5, 3ml into the series of 10 ml volumetric flak, make up of the volume is done up to the 10 ml Phosphate Buffer and check the absorbance of Glipizide this wavelength 235nm.

S.NO.	CONCENTRATION	ABSORBANCE
1	1ml	0.413
2	1.5ml	0.596
3	2ml	0.763
4	2.5ml	0.973
5	3ml	1.123



RESULT AND DISCUSSION

3.2 Pre compression of tablet blend.

S. No.	Bulk density	Tapped density	Carr's index	Hausner ratio	Angle of repose
F_1	0.51	0.22	0.33	1.12	44^0
F_2	0.54	0.26	0.38	1.04	34^0
F_3	0.52	0.34	0.24	1.10	32^0
F_4	0.42	0.12	0.30	1.14	31^0
F_5	0.44	1.14	0.35	1.08	44^0
F_6	0.56	1.08	0.44	1.07	32^0

3.3 Post compression of Tablet Blend.

S. No.	Weight variation	Hardness	Friability	Disintegration
F_1	490%	2 kg	0.15%	10min
F_2	500%	3 kg	0.12%	15min
F_3	495%	1 kg	0.19%	5min
F_4	502%	4 kg	0.20%	20min
F_5	501%	1.5 kg	0.18%	12min
F_6	500%	2 kg	0.11%	10min

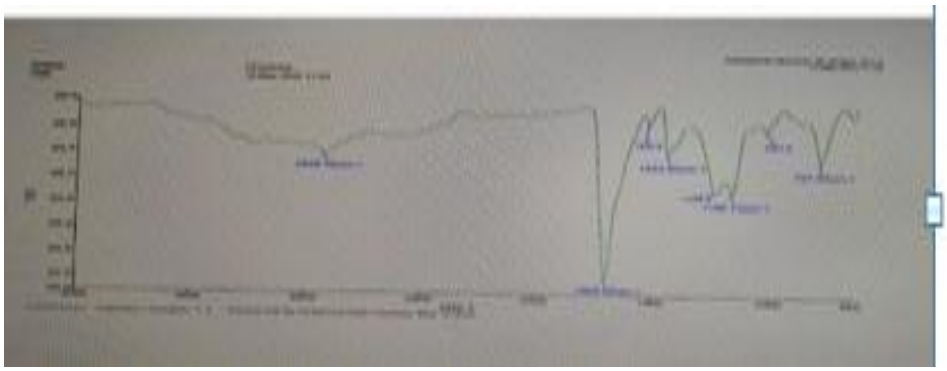


Fig- 3.4 Glipizide

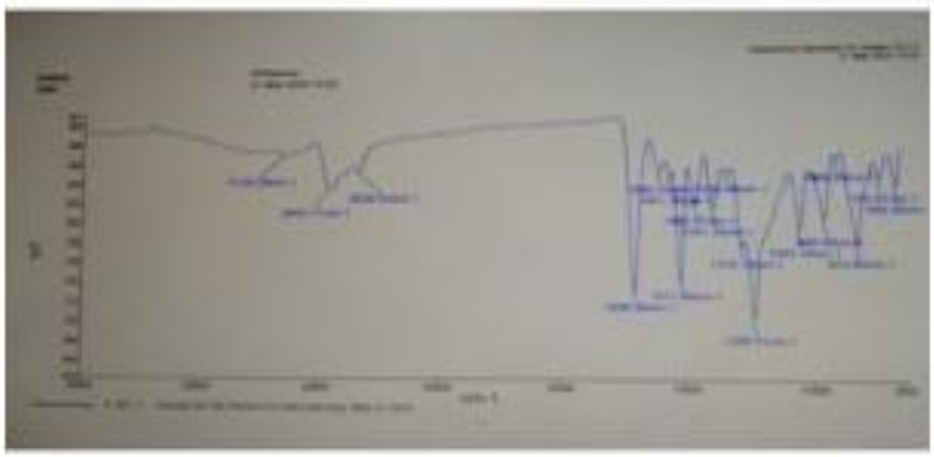


Fig 3.5 Excipients

Preparation of stock solution

Firstly prepared the phosphate buffer p^H7.4 for 100ml add the Nacl(0.8g), Kcl(0.2g), Na_2HPO_4(1.44g), KH_2PO_4(0.245g).

Take the Glipizide drug 50mg,Acetonitrate 35ml, phosphate buffer 15ml and these are all Mixed in to the 50ml volumetric flask then fill with the solvent (Phosphate Buffer).

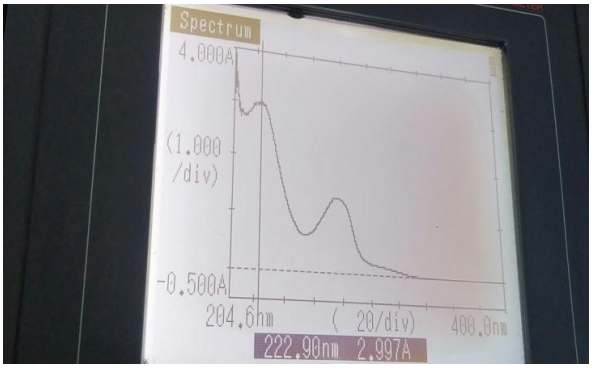


Fig. 3.6: Stock solution of Glipizide.

CONCLUSION

In this research work has been done with the purpose of Glipizide (Antidiabetic drug)used for treat the high blood pressure level cause by type2 diabetes with the aim of oral route Glipizide with cabopol, guargum polymers are used with different concentrations and kept for 24 hrs after mixing the gel in the magnetic stirrer ,sodium carbonate, talc, lactose all the above ingredients mixed and the tablets were formulated by direct compression. After that check the tablets have evaluation parameter like that hardness, weight variation ,disintegration, friability.

REFRENCES

1. Shankar, R., Tiwari, V., Mishra, C., Singh, C., Sharma, D., & Jaiwal, S. Formulationandevaluationof ketoconazolenanoemulsiongelfortopicaldelivery. American Journal of Pharmtech Research, 2015; 5(5)" 446-462.
2. Patel, H. C., Parmar, G., Seth, A.K., Patel, J. D., & Patel, S. R. Formulation and evaluation of o/w nanoemulsion of ketoconazole. International Journal of pharmaceutical sciences, 2013; 4(4): 338-351.
3. Khattab, A., & Ismail, S. Formulation and evaluation of oxiconazolemucoadhe sivenanoe mulsionbasedgel fortreatment offungalva ginalinfection. Int Journal of Pharmacy and PharmSci, 2016; 8: 33-40.
4. Chellapa,P.,Mohamed,A.T.,Keleb,E.I.,Elmahgoubi, A.,Eid, A.M., Issa,Y.S., & Elmarzugi,N.A. Nanoemulsion and hydrogel as a topical formulation. IOSR JPharm, 2015; 5(10): 43-47.
5. Giongo, J. L., Vaucher, R. D., Ourique, A. F., Steffler, M. C., Frizzo, C. P., Hennemman, B.R.U.N.O. &Raffin, R.P. Development of nanoemulsion containing Pelargonium graveolensoil: Characterization and stability study .Int. J Pharm Pharm Sci, 2016; 8: 271-6.
6. Lee, K.W., bin Omar, D., btAbdan,Khalina, & Wong, M.Y. Physiochemical Characterization of Nanoemulsion Formulation of Phenazine andtheir Antifungal Efficacy against Ganoderma Boninense PER71 invitro. Research Journal Of Pharmaceutical Biological And Chemical Sciences, 2016; 7(6): 3056-3066.
7. Chime, S. A., Kenechukwu, F. C., & Attama, A. A. Nanoemulsions—advances in formulation, characterization and applications in drug delivery (Vol.3).chapter. Mishra,R.K.,Soni,G.C.,&Mishra, R.P. Areviewarticle: onnanoemulsionWorld journal of pharmacy and pharmaceutical sciences, 2014; 3(9): 258-274.
8. DaCosta,S.,Basri,M.,Shamsudin,N.,&Basri,H.Stabili tyofpositivelychargednanoemulsionformulationconta iningsteroidaldrugforeffectivetransdermalapplication .Journal of Chemistry, 2014.
9. Makhmalzadeh, B. S., Torabi, S., & Azarpanah, A. Optimization ofibuprofendeliverythroughrat skinfrom traditionalan dnovelnanoe mulsion formulations.Iranian journalof pharmaceutical research: IJPR, 2012; 11(1): 47.
10. Sabale, V., & Vora, S. Formulation and evaluation of microemulsion-based hydrogel for topical delivery. International journal of pharmaceutical investigation, 2012; 2(3): 140.
11. Derle,D.V.,Burade,K.B.,Kotwal,R.S.,&Gaikwad,V. B. Formulatin and evaluation of microemulsion based gel for topical delivery of Ketoconazole. INDIAN DRUGS-BOMBAY-, 2008; 45(2): 138.
12. Jufri, M., & Natalia, M. Physical stability and antibacterial activity of black cumin oil (Nigella sativa L.) nanoemulsion gel. Int J Pharm Tech Res, 2014; 1(6): 47.
13. Patil,M.P.,Shinde,G.P.,Kshirsagar,S.J.,&Parakh,D.R . Development and characterization of ketoconazole loaded organogel for topical drug delivery. Inventi, 2015; J,3: 1-10.
14. Fletcher,J.,&Hill,A. Making the connection-particle size, size distribution and rheology. Chemie. DE Information Service Retrived 11 october/ Saberi,A.H.,Fang,Y.,&McClements,D.J.(2013).Fabr ication of vitamin E-enriched nanoemulsions: factors affecting particle size using spontaneous emulsification. Journal of colloid and interface science, 2007; 391: 95-102.
15. Kishore, R. S., Kiese, S., Fischer, S., Pappenberger, A., Grauschopf, U., &Mahler, H. C. The degradation of polysorbates 20 and 80 and its potential impact on the stability of biotherapeutics. Pharmaceutical research, 2011; 28(5): 1194-1210.
16. Kadian,R.E.N.U. Nanoparticles:a promising drug delivery approach. Asian J. Pharm Clin Res, 2018; 11(1): 30-35.
17. Lee,K.W.,binOmar,D.,btAbdan,Khalina,&Wong,M. Y. Physiochemical Characterization of Nanoemulsion Formulation of Phenazine and their Antifungal Efficacy against Ganoderma Boninense PER71 invitro Research Journal Of Pharmaceutical Biological And Chemical Sciences, 2016; 7(6): 3056-3066.
18. Kishore, R. S., Kiese, S., Fischer, S., Pappenberger, A., Grauschopf, U., &Mahler, H. C. The degradation of polysorbates 20 and 80 and its potential impact on the stability of biotherapeutics. Pharmaceutical

research, 2011; 28(5): 1194-1210.
19. Kadian,R.E.N.U. Nanoparticles:a promising drug delivery approach. Asian J. Pharm Clin Res, 2018; 11(1): 30-35.
20. Kishore, R. S., Kiese, S., Fischer, S., Pappenberger, A., Grauschopf, U., &Mahler, H. C. The degradation of polysorbates 20 and 80 and its potential impact on the stability of biotherapeutics. Pharmaceutical research, 2011; 28(5): 1194-1210.
21. Kadian,R.E.N.U. Nanoparticles:a promising drug delivery approach. Asian J. Pharm Clin Res, 2018; 11(1): 30-35.
22. Lee,K.W.,binOmar,D.,btAbdan,Khalina,&Wong,M. Y. Physiochemical Characterization of Nanoemulsion Formulation of Phenazine and their Antifungal Efficacy against Ganoderma Boninense PER71 invitro Research Journal Of Pharmaceutical Biological And Chemical Sciences, 2016; 7(6): 3056-3066.
23. Mhaske, R. A., & Sahasrabudhe, S. Identification of major degradation products of ketoconazole. Scientia pharmaceutica, 2011; 79(4): 817-836.
24. Saberi,A.H.,Fang,Y.,&McClements,D.J. Fabrication of vitaminE-enriched nanoemulsions: factors affecting particle size using spontaneous emulsification. Journal of colloid and interface science, 2013; 391: 95-102.
25. N.A. Peppas, Hydrogels in Medicine and Pharmacy, vol. 1, CRC Press, Hydrogels in bioapplications, in: R.M. Ottenbrite, S.J. Huang, K. Park (Eds.), Hydrogels and Biodegradable Polymers for Bioapplications, American Chemical Society, Washington, DC, 1986; 1996: 210.
26. V. Kudela, Encyclopedia of Polymer Science and Engineering, Wiley, New York, 198 T.R. Hoare , D.S. Kohane, Hydrogels in drug delivery: progress and challenges, Polymer, 2008; 49(8): 1993–2007.