rebioin journal
OF BIOSCIENCES

Analysis
of UTI infection in Diabetic Patients: Antimicrobial Therapy by Beta Vulgaris and Momordica Charantia

admin@reboin.com

www.rebioin.com

Analysis of UTI infection in Diabetic Patients: Antimicrobial Therapy by Beta Vulgaris and Momordica Charantia

Nishu Pal [1*] Virender Virk [1]

[1]Department of Botany and Microbiology,Gurukul Kangri Deemed University,Haridwar

*Corresponding author's Email : paln75730@gmail.com

ABSTRACT

Diabetes is a chronic condition where the body becomes resistant to insulin .Diabetic Patient also shows illness of the urinary tract which includes the kidney ,bladder and urethra is known as a urinary tract infection (UTI). The infiltrate of urinary tract grow and can cause UTIs by inflaming and irritating the affected areas and grow pathogenic bacteria . Aim for this research to describe the Urinary Tract Infection in diabetic patient , isolation of pathogenic bacteria *Enterococcus, Klebsiella* and *E.coli* and its Antimicrobial therapy by *Beta Vulgaris* and *Momordica Charantia.*

Keywords: Urinary tract infection, Antimicrobial , Pathogenic , Diabetes .

1. INTRODUCTION

Diabetes is a chronic metabolic disorder characterized by high blood sugar level (hyperglycemia) due to inadequate insulin, resistance or both [1] .Insulin is a hormone produced by the pancreas that regulates blood sugar levels.[2] When the produce or use insulin effectively it lead to diabetes which require lifelong management.

Diabetic patients also known as individuals living with diabetes need to carefully monitor their diet physical activity and medication to maintain optimal blood glucose level[3]. Without proper management diabetes can lead to severe complication affecting various organ including the heart, kidneys. nerve and eyes.

2. URINARY TRACT INFECTION

An illness of the urinary system which includes the kidney ,bladder and urethra is known as a urinary tract infection (UTI).[4] Bacteria that infiltrate the urinary tract and grow there cause UTIs by inflaming and irritating the affected areas. [5] Strong constant urges to pee pain or discomfort are all typical signs of a UTI.

Women are more likely than men to develop UTIs and risk factor for this condition include sexual activity ,pregnancy ,menopause ,abnormalities of the urinary system and the use of specific forms of birth control[6].

Escherichia coli (E.coli) and other bacteria that typically reside in the intestine and rectum are the most common causes of UTIs[7].

Common symptom of a UTI include a strong , persistent urge to urinate, a burning sensation during urination, passing small amounts of the urine frequently, cloudy or strong – smelling urine , and pelvic pain or discomfort[8].

3. CORRELATION BETWEEN UTI AND DIABETES

There is a correlation between UTIs and diabetes particularly in people with uncontrolled or poorly managed diabetes [9].High blood sugar levels can create a favorable environment for bacteria to grow in the urinary tract which can increase the risk of UTIs. [10]Additionally diabetes can damage the nerves that control the bladder making it more difficult to fully empty the bladder and increasing the risk of UTIs.

4. MATERIALS AND METHOD

4.1 Sample collection

All patient who fulfill the inclusion standard have been protected in the observe group all through the look at length .Knowledgeable consent was acquired from every affected person.[11]The pattern collection procedure and implication of look at turned into explained to the patient before hand . History related the study become received in term of name ,age, sex, length of hospitalization ,date of catheterization proceeding administration of antibiotic and the presence of any threst factors like diabetes mellitus ,weight problem and immune suppression[12].

4.2 Collection of urine sample

Collecting a urine sample can be various reason such as medical test or drug screening[13] .Sun diagonistic center, Doon hospital,Tata 1 mg lab.

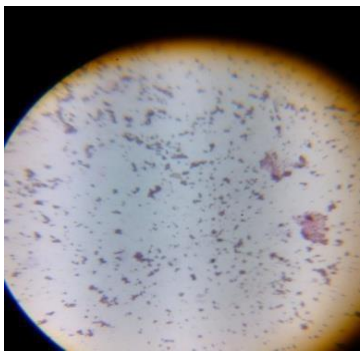
5. BIOCHEMICAL TESTING: Standard biochemical test were performed on the isolated bacteria to identify their metabolic and enzymatic properties[14].

Table 1 : Biochemical test describe the characterization isolated bacteria.

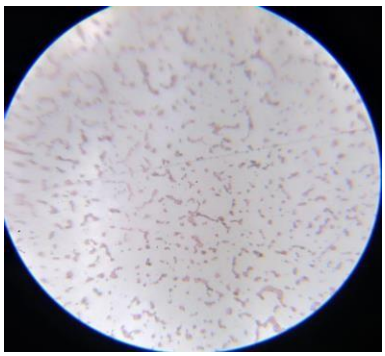
S.No	Biochemical test	Enterococcus	Klebsiella	E.coli
1	Sugar • Dextrose • Sucrose • Maltose • D-mannitol	 + + + +	 + + - +	 + + + +
2	Indole	+	+	+
3	Nitrate	+	+	+
4	Citrate	-	-	+
5	Urease	+	-	+
6	H2S	-	+	+
7	MR	+	+	+
8	MR-VP	+	+	+
9	Catalase	+	+	+

10	Motality	-	-	+

6. STAINING



Escherichia coli



Klebsiella

Enterococcus

7. COLLECTION OF PLANT

Fig 1: ***Momordica charantia***

Fig 2: ***Beta Vulgaris***

Fig 3: **Extract of *Beta Vulgaris* and *Momordica charantia***

7. PHYTOCHEMICAL TESTING – Standard phytochemical tests were performed on the isolated bacteria to identify their metabolic and enzyme properties[16].

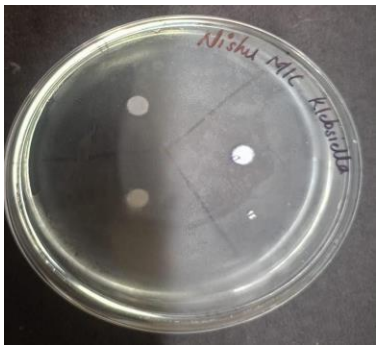
Table 2 : Phytochemical test describe the characterization of Plant Sample.

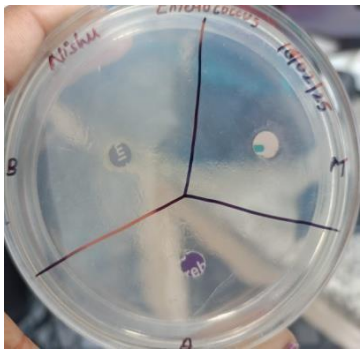
S.No	Phytochemical test	Momordica charantia	Beta Vulgaris
1	Saponin	-	-
2	Tanin	+	-
3	Flavonoids	+	+
4	Alkaloid or wagner	+	+
5	Terpenoid	+	+
6	Phenolic	+	+
7	Alkaloid test (Mayer's reagent)	+	+
8	Dragendroffs	-	+
9	Ammonia test	+	+
10	Carbohydrate	+	+

8. **ANTIMICROBIAL SUSCEPTIBILITY TESTING**

Testing for antibiotic susceptibility .When one or more antimicrobial medication prevent microbes like bacteria and fungi from growing the word "susceptibility" is employed.[17] After the bacteria or fungi that are infecting the person are recovered in a culture of the sample susceptibility testing is done on them. Testing is done to see if certain antibiotic might work against the germs or to see if the bacteria have become resistant to a particular antibiotics.[18] The outcomes of this test can be used to aid in choosing the drug or drugs that are most likely to successful treat an infection.

Antibiotic and antifungal medication resistance in bacteria and fungi could happen at any time .Consequently antibiotic were originally employed to kill.





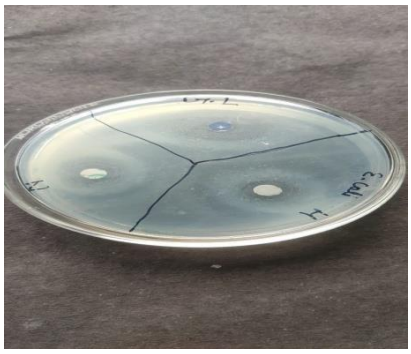


Fig 4 : Showing zone of Klebsiella **Fig 5**: Showing zone of Enterococcus **Fig 6**: Showing zone of E.coli

Table 3 MIC Result

Strain	Zone of Inhibition Beta Vulgaris	Zone of Inhibition Momordica charantia
Klebsiella	1 ± mm	0.2 ± mm
Enterococcus	1.0 ± mm	1.5 ± mm
E.coli	1.5 ± mm	1.0 ± mm

9. MEASUREMENT OF ZONE OF INHIBITION

After incubation of the plate for 24 hours, the antibacterial spectrum of the extract was determined in the terms of zone of inhibition around the well. The diameter of zone of inhibition produce by the plant extract were compared with those produces by antibiotic or positive control.[19]The experiment were performed and average zone diameter was recorded.

The result of each plate was observed and recorded after 24-26 hours of incubation at 37°C by measuring zone diameter (mm), caused by plant extract different solvents.

10. DISCUSSION

In the context of managing urinary tract infection in diabetic patients traditional Indian medicines. Diabetic patients are highly susceptible to urinary tract infection due to hyperglycemia induced immunosuppression glycosuria mediated bacterial growth and impaired bladder function. Traditional Indian medicinal plant such as Momordica charantia (Bitter gourd) and Beta vulgaris (Beetroot) possess bioactive phytochemicals with antidiabtic,antimicrobial, and anti inflammatory properties that may help mitigate UTI risk and progression.

11. CONCLUSION

A urinary tract infection (UTI) is caused by bacteria that get inside your urinary tract. Most bacteria that enter your urinary tract are expelled when you urinate.[20] If the bacteria stay in your urinary tract, you may get an infection. Your urinary tract includes your kidneys, ureters, bladder, and urethra. Urine is made in your kidneys, and it flows from the ureters to the bladder. Urine leaves the bladder through the urethra. A UTI is more common in your lower urinary tract, which includes your bladder and urethra.

In diabetics who had signs of a urinary tract infection 23% of the patients had bacteriuria which was a sign of diabetes .[21] Neuropathy patients had higher chances of developing bacteriuria . The age of the patients and urinary tract infection are no longer correlated. Urinary tract infection has an increased prevalence among female patients. Patients with diabetes for longer than 7 years had a higher risk of developing urinary tract infection.

The current study is equivocal on the likelihood of having a urinary tract infection based on the types of diabetes .Patients receiving a combination of oral hypoglycemic medication and insulin had significantly lower rates of bacteriuria. [22] The prevalence of asymptomatics bacteriuria in the female population has not changed. Leucocytosis was widely identified in the bacteria institute . It was show that gyrated hemoglobin levels were high in diabetes patients with urinary tract infection.

ACKNOWLEDEMENT

I would like to express my sincere gratitude to Manjit Kaur for their invaluable guidance encouragement and support throughout this research . Their insightful feedback and expertise have greatly contributed to the success of this work.

REFERENCES

1. Campbell P, Torrens C, Pollock A, and Maxwell M, A Scoping Review of Evidence Relating to Communication Failures That Lead to Patient Harm. Glasglow Caledonia University Glassglow 2018;23(4):1223-1226.

2. Connolly A, and Thorp Jr JM , Urinary tract infection in pregnancy.Urologic Clinics of North America 1999;26(4) :779- 787.

3. Morris AD, Boyle DIR, MacAlpine R, Emslie-Smith J, Jung RT, Newton RW, MacDonald TM, DARTS/MEMO Collaboration. The diabetes audit and research in Tayside Scotland (DARTS) study: electronic linkage to create a diabetes register. BMJ 1997;315:524–528.

4. Gatling W, Budd S, Walters D, Mullee MA, Goddard JR, Hill RD. Evidence of an increasing prevalence of diagnosed diabetes mellitus in the Poole area from 1983 to 1996. Diabet Med 1998;15:1015–1021.

5. Gardner MJ, Altman DG. Statistics with Confidence—Confidence Intervals and Statistical Guidelines. London: BMJ Books, 1989.

6. Larsson J, Apelqvist J, Agardh CD, Stenstrom A. Decreasing incidence of major amputation in diabetic patients: a consequence of a multidisciplinary foot care team approach. Diabet Med 1995;12:770–776.

7. Emiru T, Beyene G, Tsegaye W, et al. Associated risk factors of urinary tract infection among pregnant women at Felege Hiwot Referral Hospital, Bahir Dar, North West Ethiopia. BMC Res Notes 2013;6:292.

8. Kshef N, Djavid GE, Shahbazi S. Antimicrobial susceptibility patterns of community-acquired uropathogens in Tehran, Iran. J Infect Dev Ctries 2010;4(4):202–206.

9. Chakupurakal R, Ahmed M, Sobithadevi DN, et al. Urinary tract pathogens and resistance pattern. J Clin Pathol 2010;63(7):652–654.

10. Feitosa DC, da Silva MG, de Lima Parada CM. Accuracy of simple urine tests for diagnosis of urinary tract infections in low-risk pregnant women. Rev Lat Am Enfermagem 2009;17(4):507–513.

11. Henderson E, Paudel S, John P. Examining bacterial urinary tract infection in diabetes. Journal of Diabetes Research 2022;52(2):352-360.

12. Bachoon DS, Wendy A, Dustman. Microbiology Laboratory Manual. Ed. Michael Stranz. Mason, OH: Cengage Learning, 2008; Exercise 15, Normal Flora of the Intestinal Tract.

13. Bakare RI, Magbagbeola OA, Akinwande AI, Okunowo OW. Nutritional and chemical evaluation of Momordica Charantia. Journal of Medicinal Plants Research 2010;4:2189–2193.

14. Mills CE, Khatri J, Maskell P, Odongerel C, Webb AJ. It is rocket science—why dietary nitrate is hard to 'beet'! Part II: further mechanisms and therapeutic potential of the nitrate-nitrite-NO pathway. Br J Clin Pharmacol 2017;83(1):140-15.

15. Geerling SE. Urinary tract infections in patients with diabetes mellitus. International Journal of Antimicrobial Agents 2017;54-57.

16. Klonoff DC. Continuous glucose monitoring: roadmap for 21st-century diabetes therapy. Diabetes Care 2005;28:1231–1239.

17. Garg S, Zisser H, Schwartz S, Bailey T, Kaplan R, Ellis S, Jovanovic L. Improvement in glycemic excursions with a transcutaneous, real-time continuous glucose sensor: a randomized controlled trial. Diabetes Care 2006;29:44–50.

18. Rodbard D. Interpretation of continuous glucose monitoring data: glycemic variability and quality of glycemic control. Diabetes Technol Ther 2009;11(Suppl1):S55–S67.

19. Lumley JL, Terray EA. Kinematics of turbulence convected by a random wave field. J Phys Oceanogr 1983;13:2000–2007.

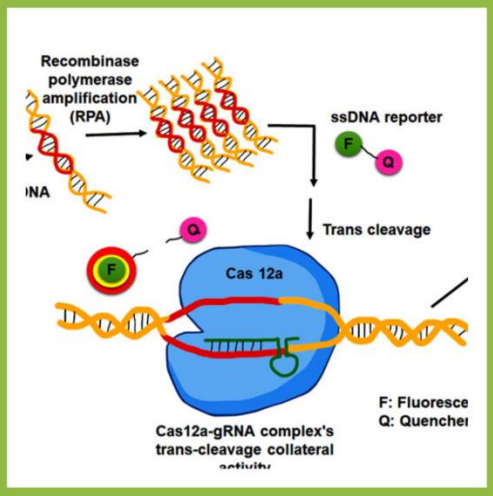
20. ChanM, Reducing cost-related medication nonadherence in patients with diabetes. Drug Benefit Trends 2010; 22(2): 67-71.

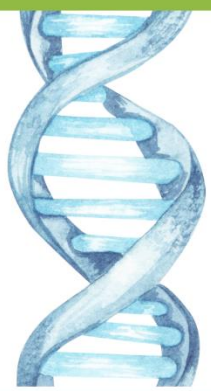
21. Saxena S, MitchellP, & Rochtchina E, Five-year incidence of cataract in older persons with diabetes and pre-diabetes. Ophthalmic Epidemiology2004; 11(4): 271-277. https://doi.org/10.1080/09286580490510733

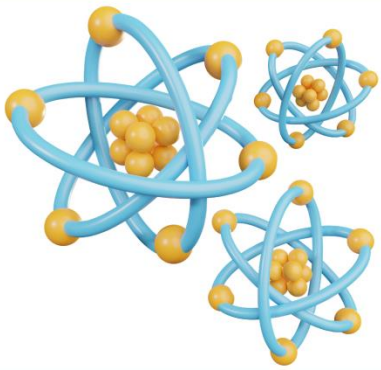
22. Gordon M. O, Beiser J, Brandt J. D, Heuer D. K, Higginbotham E. J, Johnson C. A, The Ocular Hypertension Treatment Study: Baseline factors that predict the onset of primary open-angle glaucoma. Archives of Ophthalmology2007; 120(6): 714-720.

rebioin journal
OF BIOSCIENCES

Beta Vulgaris & Momordica Charantia — A Natural Answer to UTI in Diabetics







Plot no 977, GMS Road, near Balliwala Flyover, opposite Cubic Plaza, Dehradun, Uttarakhand 248001

admin@reboin.com

www.rebioin.com