Journal of Advanced Zoology
ISSN: 0253-7214
Volume 43 Issue S2 Year 2022 Page 58-62

Anti-Diabetic Activity of Phoenix Dactylifera Seed Extract and Its Mediated Silver Nanoparticles

Ishwarya [1], Suganya Panneer Selvam[2*], Rajesh Kumar Shanmugam[3], Ramya Ramadoss[4], Sandhya Sundar[5], Pratibha Ramani[6]

[1]Undergraduate Student, Department of Oral Biology, Saveetha Dental College And Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, Tamil Nadu, India 600077, 152101057.sdc@saveetha.com
[2]Assistant Professor, Department of Oral Biology, Saveetha Dental College And Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, Tamil Nadu, India 600077, suganyap.sdc@saveetha.com*
[3]Researcher Department of Pharmacology, Saveetha Dental College And Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, Tamil Nadu, India 600077, rajeshkumars.sdc@saveetha.com
[4]Professor & Head, Department of Oral Biology, Saveetha Dental College And Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, Tamil Nadu, India 600077, ramyar.sdc@saveetha.com
[5]Assistant Professor, Department of Oral Biology, Saveetha Dental College And Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, Tamil Nadu, India 600077, sandhyas.sdc@saveetha.com
[6]Professor & Head, Department of Oral Pathology & Microbiology, Saveetha Dental College And Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, Tamil Nadu, India 600077, hod.omfp@saveetha.com

***Corresponding Author;** Suganya Panneer Selvam*
**Assistant Professor, Department of Oral Biology, Saveetha Dental College And Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, Tamil Nadu, India 600077, suganyap.sdc@saveetha.com*

Abstract

Introduction: phoenix dactylifera has been traditionally used for different reasons because of bioactive agents. A single herb has different actions on many diseases but each herba may have one dominating effect and other subsidiary effects. Silver nanoparticles synthesized from plant sources are eco friendly, cost effective and have a wide range of applications. The antibacterial property of silver nanoparticles produced by various herbal sources has been well studied. Date seeds have been used in this study along with silver nanoparticles due to their antioxidant, antimicrobial, anticancer, anti-inflammatory and antimutagenic activities. These characteristics of silver nanoparticles make them suitable for medical application and healthcare products where they may treat infections or prevent them efficiently and effectively.
Aim: To analyze the anti-diabetic activity of phoenix dactylifera seed extract and its mediated silver nano particle.
Materials & Methods: Dates powder has been grinded from dates after that dates seed extract have been collected and aqueous silver nitrate solution has been taken. Finally centrifuging of dates seed extract of (AgNp) These are the materials and methods used for the anti-diabetic activity of phoenix dactylifera

seed extract & its mediated silver nanoparticles. Data was entered in Microsoft excel spreadsheet and analyzed using SPSS software (version 23).
Result: The antidiabetic activity of phoenix dactylifera seed extract and its mediated silver nanoparticles was done and our result concludes that phoenix dactylifera has more percentage of inhibition whereas previous research on and diabetic property of phoenix dactylifera has proven is to be cost effective
Conclusion: Hence by using phoenix dactylifera seed extract and its mediated silver nanoparticles, we can conclude that it has Anti diabetic property which play major role in human health. Silver nanoparticles produced using Phoenix dactylifera seed extract have good antibacterial activity and can be used in the future as anti-bacterial pastes & gels for topical application instead of using conventional agents to minimize their side effects. Thus, a safe, effective, affordable approach is found to control the disease development and progression.

Keywords: Phoenix dactylifera, Anti diabetic, Nano particle, plant extracts

INTRODUCTION

Phoenix dactylifera has been traditionally used for different diseases because of the presence of bioactive agents like anthocyanin, phenols, carotenoids and flavonoids, however its potential as a medicine food is still unclear(Shaw, Sicree and Zimmet, 2010). Phoenix dactylifera has been used as a source of food, building houses and landscaping.(Saryono and Sarmoko, 2021) It is consumed in Arab areas for a long time as a part of an essential diet(Ferreira, Morales and Barros, 2016). Phoenix dactylifera belongs to the family Arecaceae and its leaves, barks, pits and fruits and pollens have anticancer, antioxidant. hepatoprotective are antidiabetic and antiviral potential. coplay ms, Jose, Eduards DR, Horton ML, et al (2001) (Al-Alawi *et al.*, 2017)Detection of palm fruit.

For a long time, silver has been regarded as a valuable metal with numerous commercial and pharmacological benefits, including antidiabetic and anti-bacterial properties [4, 5]. Chemical and physical properties of plant-mediated silver nanoparticles have raised a worry that nanoparticles orchestrated from herbs may interface in new obscure routes with the biological framework. In recent years, plant-mediated silver nanoparticles (PMSNPs) may increase uncommon consideration from researchers in the region of nanotechnology and pharmacology because of their unique characters and biological applications('*Standards of Medical Care in Diabetes—2016*: Summary of Revisions', 2016).

Besides these dates also increased levels of Oestrogen, RBG , PCV, reticulocytes and platelet counts. Diabetes mellitus is an important human disease affecting many from various walks of life in different countries(Institute of Medicine, Board on Health Care Services and Committee on Identifying and Preventing Medication Errors, 2007). Even though modern medicines contribute to a variety of effective treatment options, they can have several unfavorable effects. The intention of this study review is to create awareness and discuss various studies(Watson, 2015)

MATERIALS AND METHODS

Dates powder has been grinded from dates after that seed aqueous extract have been collected and aqueous silver nitrate solution has been taken. Finally centrifuging of Dates seed extract of AgNP these are the materials

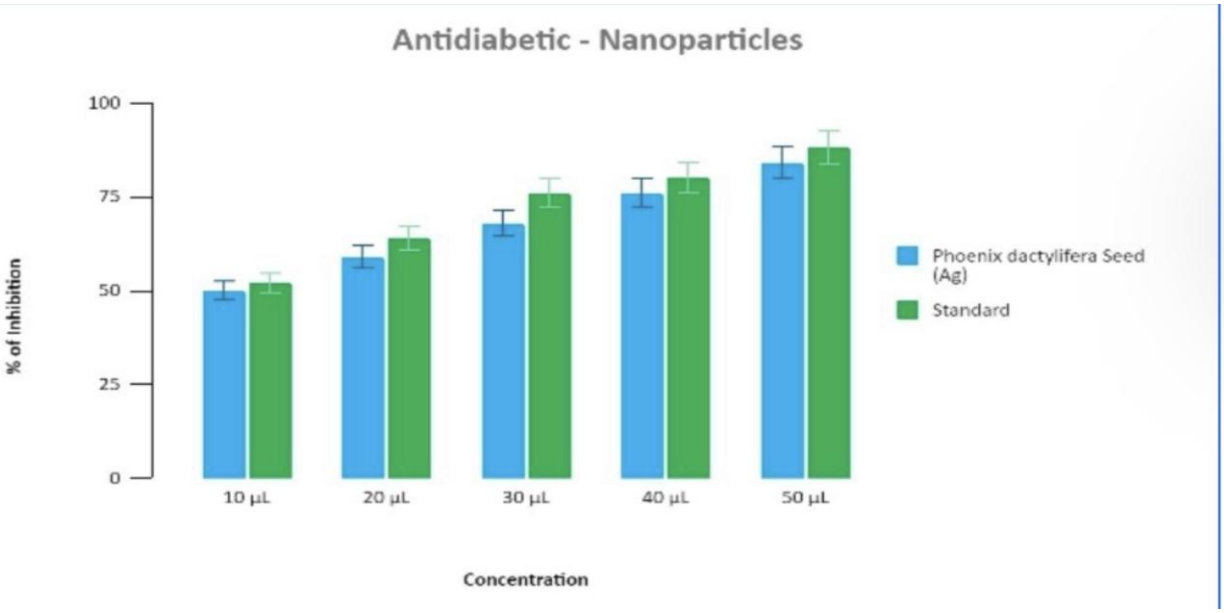
and methods used for the Anti diabetic activity of phoenixducer seed extract and its mediated silver nanoparticle Green synthesis of silver nanoparticles is considered a non-dangerous, ecological neighborly technique analogized to synthetic strategy [6]. PMSNPs have been widely used in various bio- applications, such as the antidiabetic movement [7, 8], the anti-cancer movement [9], and pharmaceutical businesses. Nanotechnology and its based procedures hold significant potential for upgrading the consistency of patients with diabetes [10]. Thus, plant-mediated nanoparticles encircling antidiabetic potential may serve as a relevant and intact alternative candidate in the treatment of diabetes.

Antibacterial activity of respective nanoparticles against the strain Staphylococcus aureus, pseudomonas, and E.coli. Mueller Hinton Agar was utilized for this activity to determine the zone of inhibition. Mueller hinton agar was prepared and sterilized for 15 minutes at 1210C. Media poured into the sterilized plates and let it stable for solidification. The wells were cut using a 9mm sterile polystyrene tip and the test organisms were swabbed. The nanoparticles with different concentrations (25µL, 50 µL,100 µL, antibiotics)were loaded and in the fourth well standard antibiotic amoxyrite was loaded. The plates were incubated for 24 hours at 37 °C. After the incubation time the zones of inhibition were measured.

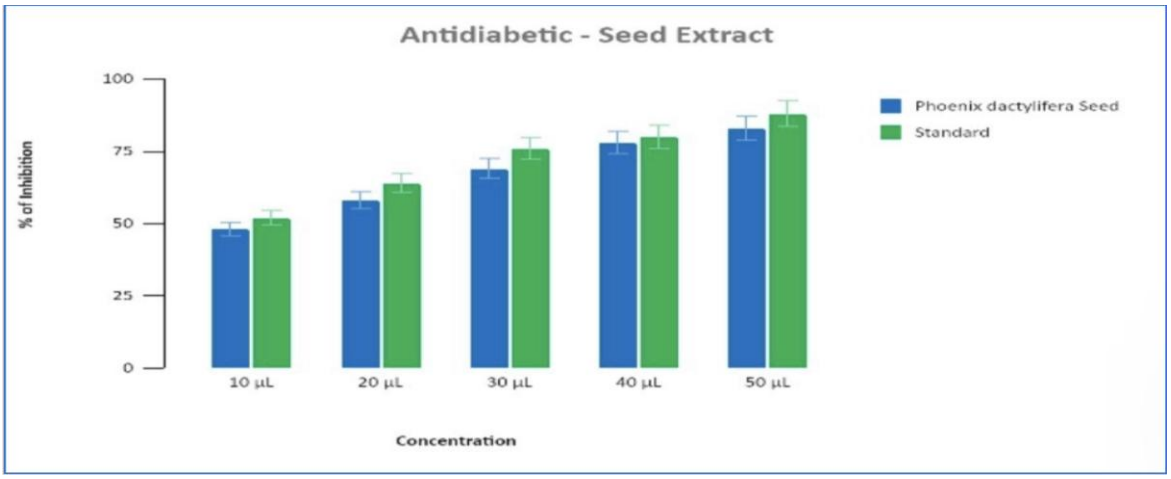
The graph was plotted for the percentage of inhibition and concentration for the Anti diabetic nano particles which conclude that phoenix dactylifera has more advantage of inhibition.

The dates seed extract was stored in refrigerator for this research for the study as it contains bioactive agents like anthocyanin,phenols, sterols however its potential as medical food is still unclear Thus finally the preparation of phoenix dactylifera seed extract was made to compare their Anti diabetic properties.

RESULTS



The graph was plotted for the percentage of inhibition and concentration for the Anti diabetic nano particles which conclude that phoenix dactylifera has more advantage of inhibition.



The Anti diabetic activity of phoenix dactylifera seed extract and its mediated silver nanoparticles was done and our result concludes that phoenix dactylifera has more percentage of inhibition .

DISCUSSION

The Anti diabetic activity of phoenix dactylifera seed extract and its mediated silver nanoparticles was done and our result concludes that phoenix dactylifera has more percentage of inhibition whereas previous research on Anti diabetic property of phoenix dactylifera has proven to be cost effective(Akash, Navneet and Bhandari, 2020)(Bhaskaracharya, Bhaskaracharya and Stathopoulos, 2022) Apart from the regulation of carbohydrate metabolism insulin also plays an important role in metabolism of lipids(National Center for Health Statistics and Center For Disease Control And Preventio, 2017)Insulin is a potent inhibitor of lipolysis because it inhibits the activity of hormone sensitive lipase in adipose tissue and suppresses the release of fatty acid(Watson and Preedy, 2012). In diabetes , enhanced activity of this enzyme increases lipolysis and releases more free fatty acid into circulation. Increased fatty acid concentration also increases the oxidation of fatty acid producing more acetyl coA and cholesterol in diabetes('*Standards of Medical Care in Diabetes—2016*: Summary of Revisions', 2016). The hypocholesterolemic activity of PDE and its fraction after sub chronic administration may be due to number of mechanism(Navanietha Krishnaraj and Sani, 2021) (Al Mutairi *et al.*, 2022)

There is a continuous rise in the rate of medicine consumption because of the development of drug resistance by microbial pathogens(Watson, 2015).(Shaw, Sicree and Zimmet, 2010) In the last one decade, silver nanoparticles (AgNPs) have become a remarkable choice for the development of new drugs due to their excellent broad-spectrum antimicrobial activity(Bantle and Slama, 2006). In the current piece of work, we have synthesized AgNPs from the root extract of Phoenix dactylifera to test their antimicrobial and anti-cancer potential(Balick, Elisabetsky and Laird, 1996)(Abdeen *et al.*, 2021)

The broad applications of AgNPs have been explored, such as catalysis, dye reduction, antimicrobial, anticancer, and household goods(Watson, 2015). As a result, it piques the interest of researchers to investigate more and more applications for synthesizing AgNPs(de J. Sosa *et al.*, 2009)

There are various methods for the synthesis of AgNPs, such as physical, chemical, and biological methods(Lokhande and Pathak, 2018) Both physical and chemical methods have been found to be extremely time-consuming, expensive, and poten. tially harmful to the environment and human health(OECD, 2022)(Watson, 2015)

The biological method, which employs fungi, bacteria, plants, and algae as nanofactories, has been shown to be nontoxic, environmentally friendly, and cost-effective, and it has a wide range of applications in biomedical, industrial, and pharmaceutical settings(Marvin Davis, 2006)(Alade and Irobi, 1993)(Al-Dayan, 2021)

Decreased fasting blood sugar improves body weight in aloks and induced diabetic rest this helps in traditional use of phoenix dataly for leaves in Southwest Iran for the treatment of diabetes(Watson, 2015). The date palm tree is grown extensively in arid and semi arid regions of the world it is highly popular worldwide(Quattrocchi, 2016)(de J. Sosa *et al.*, 2009)

Actually the date sheets have high nutrients, high energy value as well as good fatty acids which are beneficial to human beings(Chongtham and Bisht, 2020).

Date seed oil has been reported to have unique fatty acid

CONCLUSION

Hence by using phoenix that relifera seed extract and its mediators silver nanoparticle we can conclude that it has Anti diabetic property which play a major role in human health does from this research we cure most of the diabetic patients suffering from diabetes mellitus these or several ways to add dates in our diet one popular way used to eat them as a great snacks(Banerjee, 2012)

Silver nanoparticles produced using Phoenix dactylifera seed extract have good antibacterial activity and can be used in the future as anti-bacterial pastes & gels for topical application instead of using conventional agents to minimize their side effects. Thus, a safe, effective, affordable approach is found to control the disease development and progression.

REFERENCE

1. Abdeen, A. *et al.* (2021) 'The potential antioxidant bioactivity of date palm fruit against gentamicin-mediated hepato-renal injury in male albino rats', *Biomedicine & pharmacotherapy = Biomedecine & pharmacotherapie*, 143, p. 112154.

2. Akash, Navneet and Bhandari, B.S. (2020) *Ethnomedicinal Plant Use and Practice in Traditional Medicine*. IGI Global.
3. Alade, P.I. and Irobi, O.N. (1993) 'Antimicrobial activities of crude leaf extracts of Acalypha wilkesiana', *Journal of ethnopharmacology*, 39(3), pp. 171–174.
4. Al-Alawi, R.A. *et al.* (2017) 'Date Palm Tree (L.): Natural Products and Therapeutic Options', *Frontiers in plant science*, 8, p. 845.
5. Al-Dayan, N. (2021) 'Biosynthesis of Copper Oxide Nanomaterials Using the Seeds of Date Fruits (L.) and Antibacterial Activity Evaluation', *Pakistan journal of biological sciences: PJBS*, 24(10), pp. 1034–1039.
6. Al Mutairi, J.F. *et al.* (2022) 'Antimicrobial Activity of Green Silver Nanoparticles Synthesized by Different Extracts from the Leaves of Saudi Palm Tree (L.)', *Molecules* , 27(10). Available at: https://doi.org/10.3390/molecules27103113.
7. Balick, M.J., Elisabetsky, E. and Laird, S.A. (1996) *Medicinal Resources of the Tropical Forest: Biodiversity and Its Importance to Human Health*. Columbia University Press.
8. Banerjee, S. (2012) *Infections in Diabetes - ECAB*. Elsevier Health Sciences.
9. Bantle, J.P. and Slama, G. (2006) *Nutritional Management of Diabetes Mellitus and Dysmetabolic Syndrome*. Karger Medical and Scientific Publishers.
10. Bhaskaracharya, R.K., Bhaskaracharya, A. and Stathopoulos, C. (2022) 'A systematic review of antibacterial activity of polyphenolic extract from date palm (L.) kernel', *Frontiers in pharmacology*, 13, p. 1043548.
11. Chongtham, N. and Bisht, M.S. (2020) *Bamboo Shoot: Superfood for Nutrition, Health and Medicine*. CRC Press.
12. Ferreira, I.C.F., Morales, P. and Barros, L. (2016) *Wild Plants, Mushrooms and Nuts: Functional Food Properties and Applications*. John Wiley & Sons.
13. Institute of Medicine, Board on Health Care Services and Committee on Identifying and Preventing Medication Errors (2007) *Preventing Medication Errors*. National Academies Press.
14. de J. Sosa, A. *et al.* (2009) *Antimicrobial Resistance in Developing Countries*. Springer Science & Business Media.
15. Lokhande, J.N. and Pathak, Y.V. (2018) *Botanical Drug Products: Recent Developments and Market Trends*. CRC Press.
16. Marvin Davis, W. (2006) *Consumer's Guide to Dietary Supplements and Alternative Medicines: Servings of Hope*. CRC Press.
17. National Center for Health Statistics and Center For Disease Control And Preventio (2017) *Health, United States, 2016, with Chartbook on Long-Term Trends in Health*. Government Printing Office.
18. Navanietha Krishnaraj, R. and Sani, R.K. (2021) *Microbial Interactions at Nanobiotechnology Interfaces: Molecular Mechanisms and Applications*. John Wiley & Sons.
19. OECD (2022) *OECD Guidelines for the Testing of Chemicals, Section 4 Test No. 425: Acute Oral Toxicity: Up-and-Down Procedure*. OECD Publishing.
20. Quattrocchi, U. (2016) *CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology (5 Volume Set)*. CRC Press.
21. Saryono and Sarmoko (2021) *Aktivitas Biji Kurma Sebagai Antiinflamasi*. Unsoed Press.
22. Shaw, J.E., Sicree, R.A. and Zimmet, P.Z. (2010) 'Global estimates of the prevalence of diabetes for 2010 and 2030', *Diabetes Research and Clinical Practice*, pp. 4–14. Available at: https://doi.org/10.1016/j.diabres.2009.10.007.
23. '*Standards of Medical Care in Diabetes—2016*: Summary of Revisions' (2016) *Diabetes Care*, pp. S4–S5. Available at: https://doi.org/10.2337/dc16-s003.
24. Watson, R.R. (2015) *Health of HIV Infected People: Food, Nutrition and Lifestyle with Antiretroviral Drugs*. Academic Press.
25. Watson, R.R. and Preedy, V.R. (2012) *Bioactive Food as Dietary Interventions for Diabetes: Bioactive Foods in Chronic Disease States*. Academic Press.