

# Antidiabetic activity of Kabasura Kudineer Chooranam

P. Harini,  
Vishnu Priya Veeraraghavan,  
J. Selvaraj, R. Gayathri, S. Kavitha

Department of Biochemistry, Saveetha  
Dental College and Hospitals, Saveetha  
Institute of Medical and Technical  
Sciences, Saveetha University, Chennai,  
Tamil Nadu, India

*J. Adv. Pharm. Technol. Res.*

## ABSTRACT

One of the traditional plants used in Siddha medicine is Kabasura Kudineer Chooranam. It is said to possess antiaging, life-strengthening, and disease-preventing activities that have an enormous influence on health care. It has significant therapeutic potential and ethnobotanical significance. The aim of this study is to investigate the antidiabetic activity of Kabasura Kudineer Chooranam. The antidiabetic potential of Kabasura Kudineer Chooranam was determined *in vitro* using established methods such as alpha-amylase and alpha-glucosidase activity. We used one-way ANOVA to see the statistical difference among the groups. The significance thresholds were considered at the  $P < 0.05$  level. In comparison with the healthy group, the extract showed a significant antidiabetic effect. The proportion of inhibition increased as the concentrations increased. Previous studies established the antiviral, anti-inflammatory, analgesic, antifungal, antioxidant, antibacterial, hepatoprotective, antiasthmatic, immunomodulatory, and antipyretic effects of Kabasura Kudineer or Chooranam. The current findings demonstrated that the Chooranam has good antidiabetic action at a significant concentration. Plant-based products have recently proven to be effective and economical antidiabetic items.

**Key words:** Antidiabetic, green synthesis, innovative technology, Kabasura Kudineer Chooranam, methanolic extract, novel method

## INTRODUCTION

Vedic medicine is one of the world's oldest medicinal systems. This method is widely used in India, especially in the Southern states. As a result of several outbreaks of infectious and highly contagious diseases such as chikungunya, dengue fever, and swine flu, Siddha medications are becoming increasingly popular.<sup>[1]</sup> Many viral infections are a major problem in today's globe due to a lack of effective vaccines. The enormous rise in the rate of disease and the world

population is due to pollution, unsustainable lifestyles, and chemical pollutants produced by people.<sup>[2]</sup> Researchers in the fields of medicine and health care are primarily concerned with tackling the negative consequences of drug misuse, which has prompted assurance of the treatment's safety, potency, and quality. Immunization is one of the most efficient ways to block and eliminate infectious diseases, which kill over 5 million people each year. Immunity boosting is a popular approach for gaining immunity due to its limited understanding and vulnerability in the field of medicine and health care. Kabasura Kudineer is one of the ancient and most traditional systems of medicine. Siddha developed in Tamil Nadu, India's southernmost state. Internal and external medicines in Siddha form are divided into 32 categories based on their application, durability, and form.<sup>[3]</sup>

Among the 32 central medicines, the most effective medicine recommended to treat infections is Kabasura Kudineer

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

**For reprints contact:** WKHLRPMedknow\_reprints@wolterskluwer.com

**How to cite this article:** Harini P, Veeraraghavan VP, Selvaraj J, Gayathri R, Kavitha S. Antidiabetic activity of Kabasura Kudineer Chooranam. *J Adv Pharm Technol Res* 2022;13:S383-6.

### Address for correspondence:

Dr. Vishnu Priya Veeraraghavan,  
Department of Biochemistry, Saveetha Dental College and  
Hospitals, Saveetha Institute, Medical and Technical Sciences,  
Saveetha University, Chennai - 600 077, Tamil Nadu, India.  
E-mail: drvishnupriyav@gmail.com

Submitted: 31-May-2022

Revised: 28-Sep-2022

Accepted: 30-Sep-2022

Published: 30-Dec-2022

### Access this article online

Quick Response Code:



Website:

www.japtr.org

DOI:

10.4103/japtr.japtr\_423\_22

Chooranam. It is used in Siddha medicine to treat fever and related symptoms, as stated in the “Citta Vaittiyattirattu,” a Siddha manuscript. This Siddha preparation is also useful for treating common respiratory diseases like the flu and cold. Siddha practitioners testify by this herbal preparation for relief of respiratory symptoms such as severe phlegm, dry and wet cough, and fever.

The predominant mode of management of diabetes is artificial hypoglycemic drugs and insulin substitute therapy. However, it has numerous unwanted consequences. For that reason, management of diabetes complications with minimal impact on clinical exercise is still the main undertaking. Medicinal vegetation preserves a notable remedy for diabetes.<sup>[4-6]</sup> Flavonoids and phenolic contents of these plants have strong antioxidant and free-radical scavenging activities. It is effective in the treatment of a number of ailments, including diabetes. Our knowledge and research have resulted in the production of high-quality publications from our team.<sup>[7-20]</sup>

## MATERIALS AND METHODS

### Inhibition of alpha-amylase by plant extract

The usual method for determining inhibition of alpha-amylase with our drug, we used with minimal modifications (Ademiluyi and Oboh, 2013). In a 96-well plate, a reaction mixture containing 50  $\mu$ L of phosphate buffer was preincubated at 37°C for 20 min. After that, 20  $\mu$ L of 1% soluble starch was added as a substrate and incubated for another 30 min at 37°C; 100  $\mu$ L of DNS color reagent was added and boiled for 10 min. The absorbance was measured at 540 nm using a microwell plate Reader (Robonik). In this study, we used acarbose as a standard, and the percentage of inhibition was calculated as inhibitory activity (%) =  $(1 - As/Ac) \times 100$ .

### Inhibition of alpha-glucosidase

The alpha glucosidase inhibitory activity of the extract was analyzed by standard protocol. In a 96-well plate, a reaction mixture of 50  $\mu$ L phosphate buffer and 20  $\mu$ L extract at varying concentrations (0.1–0.5 mg/l) was preincubated at 37°C for 15 min. The substrate was then replaced with 20  $\mu$ L P-NPG and incubated for another 20 min at 37°C. The reaction was stopped with 50  $\mu$ L Na<sub>2</sub>CO<sub>3</sub> (0.1 M). As a control, acarbose was used at varying concentrations (0.1–0.5 mg/ml). The absorbance was measured at 540 nm using a microwell plate reader (Robonik). In this study, we used acarbose as a standard, and the percentage of inhibition was calculated as inhibitory activity (%) =  $(1 - As/Ac) \times 100$ .

### Statistical analysis

In this study, we used one-way analysis of variance (ANOVA) to see if the statistical significance between groups was determined using Duncan’s multiple range test. The significance thresholds were considered at the  $P < 0.05$  level.

## RESULTS

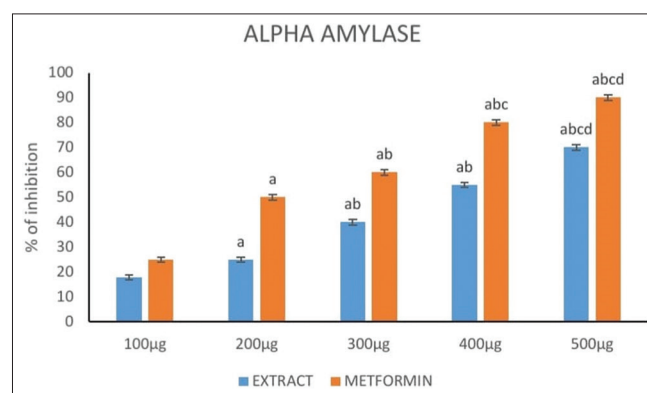
The results obtained are analyzed and are represented as bar graphs [Figures 1 and 2].

Figure 1 indicates the alpha amylase inhibitory and activity and Figure 2 indicates the alpha glucosidase inhibitory activity of kabasura kudineer. Both assays showed that the inhibitory activity of the kabasura kudineer increases with increase in concentration.

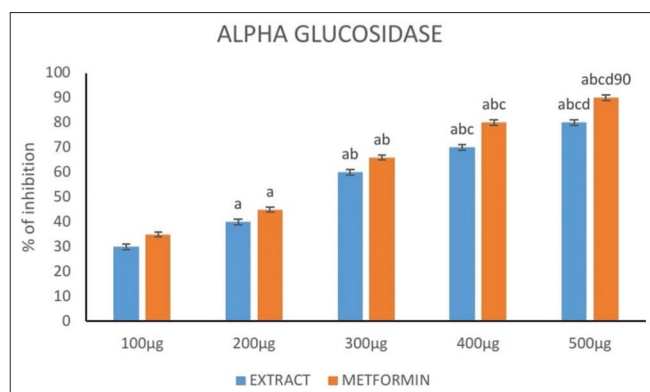
## DISCUSSION

Previous study reported that methanolic extract of Kabasura Kudineer showed good free-radical scavenging activity and its modulatory effect against streptozotocin showed good antidiabetic activity in male Wister rats. He concluded that the MEBD showed significant antidiabetic and antioxidant activity.<sup>[5,6,21]</sup> Similar results were obtained from the present study. In a present study, it is reported that Kabasura Kudineer Chooranam showed significant antidiabetic activity. In a previous study, it is reported that Kabasura Kudineer Chooranam is a traditional plant that is a good source of nutritional supplements. It showed therapeutic activities such as immunomodulatory, hepatoprotective activity, anticancer activity, spasmodic activity, antifibrinolytic activity, renal activity, antimicrobial activity, hypoglycemic activity, and anti-inflammatory activity.<sup>[5,6,21,22]</sup>

The study reported that Kabasura Kudineer Chooranam showed a significant antidiabetic effect in rats. The extract has shown a 55.78% decrease in inflammatory activity in rat paw edema. They stated that it can be applied locally or orally in cases of snake and scorpion bites for wound healing.<sup>[21-23]</sup> Alloxan-induced diabetic rats showed a nondose-dependent reduction in sugar level upon administration of the extract of Kabasura



**Figure 1:** The figure shows the alpha amylase inhibitory activity of the plant material. Each value represents the mean  $\pm$  SD of six independent repeats.  $p < 0.05$  (significance). a in comparison to 100  $\mu$ g; b in comparison to 200  $\mu$ g; c in comparison to 300  $\mu$ g and d in comparison to 400  $\mu$ g



**Figure 2:** Kabasura kudineer extract has anti-alpha glucosidase action. Each value represents the mean  $\pm$  SD of six independent repeats.  $p < 0.05$  (significance). a in comparison to 100  $\mu\text{g}$ ; b in comparison to 200  $\mu\text{g}$ ; c in comparison to 300  $\mu\text{g}$  and d in comparison to 400  $\mu\text{g}$

Kudineer Chooranam. Both Kabasura Kudineer Chooranam and Nilavembu Kudineer Chooranam are polyherbal preparations made up of a dizzying array of phytochemicals whose synergistic effect is said to balance the tridoshas and restore normality to the body.<sup>[24]</sup> The author's ability to specify the mechanism of action is limited due to the intricacy of phytomolecules.

The Kabasura Kudineer Chooranam has shown potential antidiabetic activity.<sup>[25,26]</sup> There is no ethnobotanical and traditional evidence of the antidiabetic activity of Kabasura Kudineer Chooranam.<sup>[27]</sup> However, the present study reported that formulations of the Kabasura Kudineer Chooranam indicated significant antidiabetic activity. In a previous study, it is reported that Kabasura Kudineer Chooranam showed rotenoids which are interpreted by the spectroscopic data and resulted that the extract is rotenoid rich and it showed values of  $21.7 \pm 0.5 \pm 0.6 \mu\text{m}$  which exhibited a good antidiabetic activity when evaluated in carrageenan-induced raw paw models.<sup>[27,28]</sup> The drug proved to possess antidiabetic action in the current investigation in a concentration-dependent manner. That is at 50  $\mu\text{L}$  it showed 11% absorbance which depicts significant antidiabetic activity. In a study with the diabetic rat, the extract showed inhibitory effects on xanthine oxidase, lipoxygenase, and acetylcholinesterase enzymes.<sup>[29]</sup>

There are some potential drawbacks, such as the fact that the study solely considers the methanolic extract. Micro titrations have been performed in situations when there is a substantial risk of mistakes. The study was conducted *in vitro*, so the results of antidiabetic activities cannot be considered to be transferred into clinical effectiveness, which is a restriction. In future, the extract will need to be studied on a variety of cell lines to determine its efficacy and formulated as an alternative medication, and commercial items prepared, all of which will have a high potential value in the herbal market.

## CONCLUSION

As a result of the foregoing findings, the Kabasura Kudineer exhibited promising antidiabetic potential and hence it could be considered a therapeutic antidiabetic natural candidate.

## Acknowledgment

We are grateful to the Department of Microbiology at Saveetha Dental College and Hospitals for assisting us with the research.

## Financial support and sponsorship

The present study was supported by the following organizations.

- Saveetha Dental College
- Saveetha University
- SKR Pack Tech Pvt Limited, Thiruvallur, Tamil Nadu.

## Conflicts of interest

There are no conflicts of interest.

## REFERENCES

1. Meenakumari R, Thangaraj K, Sundaram A, Sundaram MM, Shanmugapriya P, Mariappan A, *et al.* Clinical outcomes among COVID-19 patients managed with modern and traditional Siddha medicine – A retrospective cohort study. *J Ayurveda Integr Med* 2021;13:100470.
2. Jayaraj JM, Jothimani M, Palanisamy CP, Pentikäinen OT, Pannipara M, Al-Sehemi AG, *et al.* Computational study on the inhibitory effect of natural compounds against the SARS-CoV-2 proteins. *Bioinorg Chem Appl* 2022;2022:8635054.
3. Natarajan S, Anbarasi C, Sathiyarajeswaran P, Manickam P, Geetha S, Kathiravan R, *et al.* The efficacy of Siddha Medicine, Kabasura Kudineer (KSK) compared to Vitamin C & Zinc (CZ) supplementation in the management of asymptomatic COVID-19 cases: A structured summary of a study protocol for a randomised controlled trial. *Trials* 2020;21:892.
4. Shamim T, Asif HM, Shaheen G, Sumreen L, Ayaz S, Qureshi T, *et al.* Anti-diabetic potential of indigenous medicinal plants of Cholistan Desert, Pakistan: A review. *Rev Diabet Stud* 2022;18:93-9.
5. Kiran G, Karthik L, Shree Devi MS, Sathiyarajeswaran P, Kanakavalli K, Kumar KM, *et al.* *In Silico* computational screening of Kabasura Kudineer – Official Siddha Formulation and JACOM against SARS-CoV-2 spike protein. *J Ayurveda Integr Med* 2022;13:100324.
6. Narrain Shree S, Sathiyarajeswaran P, Kirthi AV, Shree Devi MS, Chaskar AC, Karthik L. Antioxidative potential of Kabasura Kudineer (KSK), an official Siddha polyherbal formulation. *Int J Pharm Res* 2021;13:3034-42.
7. Nambi G, Kamal W, Es S, Joshi S, Trivedi P. Spinal manipulation plus laser therapy versus laser therapy alone in the treatment of chronic non-specific low back pain: A randomized controlled study. *Eur J Phys Rehabil Med* 2018;54:880-9.
8. Mohanavel V, Ashraff Ali KS, Prasath S, Sathish T, Ravichandran M. Microstructural and tribological characteristics of AA6351/Si3N4 composites manufactured by stir casting. *J Mater Res Technol* 2020;9:14662-72.
9. Vijayashree Priyadharsini J, Smiline Girija AS, Paramasivam A. An insight into the emergence of *Acinetobacter baumannii* as an

- oro-dental pathogen and its drug resistance gene profile – An *in silico* approach. *Heliyon* 2018;4:e01051.
10. Packiri S, Gurunathan D, Selvarasu K. Management of paediatric oral ranula: A systematic review. *J Clin Diagn Res* 2017;11:ZE06-9.
  11. Babu S, Jayaraman S. An update on  $\beta$ -sitosterol: A potential herbal nutraceutical for diabetic management. *Biomed Pharmacother* 2020;131:110702.
  12. Rajakumari R, Volova T, Oluwafemi OS, Rajesh Kumar S, Thomas S, Kalarikkal N. Grape seed extract-soluplus dispersion and its antioxidant activity. *Drug Dev Ind Pharm* 2020;46:1219-29.
  13. Ramamoorthi S, Nivedhitha MS, Divyanand MJ. Comparative evaluation of postoperative pain after using endodontic needle and EndoActivator during root canal irrigation: A randomised controlled trial. *Aust Endod J* 2015;41:78-87.
  14. Iswarya Jaisankar A, Smiline Girija AS, Gunasekaran S, Vijayashree Priyadharsini J. Molecular characterisation of *csgA* gene among ESBL strains of *A. baumannii* and targeting with essential oil compounds from *Azadirachta indica*. *J King Saud Univ Sci* 2020;32:3380-7.
  15. Wadhwa R, Paudel KR, Chin LH, Hon CM, Madheswaran T, Gupta G, *et al.* Anti-inflammatory and anticancer activities of Naringenin-loaded liquid crystalline nanoparticles *in vitro*. *J Food Biochem* 2021;45:e13572.
  16. Mudigonda SK, Murugan S, Velavan K, Thulasiraman S, Krishna Kumar Raja VB. Non-suturing microvascular anastomosis in maxillofacial reconstruction – A comparative study. *J Craniomaxillofac Surg* 2020;48:599-606.
  17. Paramasivam A, Priyadharsini JV, Raghunandhakumar S. Implications of m6A modification in autoimmune disorders. *Cell Mol Immunol* 2020;17:550-1.
  18. Barabadi H, Mojab F, Vahidi H, Marashi B, Talank N, Hosseini O, *et al.* Green synthesis, characterization, antibacterial and biofilm inhibitory activity of silver nanoparticles compared to commercial silver nanoparticles. *Inorg Chem Commun* 2021;129:108647.
  19. Tahmasebi S, Qasim MT, Krivenkova MV, Zekiy AO, Thangavelu L, Aravindhan S, *et al.* The effects of oxygen-ozone therapy on regulatory T-cell responses in multiple sclerosis patients. *Cell Biol Int* 2021;45:1498-509.
  20. Markov A, Thangavelu L, Aravindhan S, Zekiy AO, Jarahian M, Chartrand MS, *et al.* Mesenchymal stem/stromal cells as a valuable source for the treatment of immune-mediated disorders. *Stem Cell Res Ther* 2021;12:192.
  21. Jabaris SL, Kudineer VK. A Siddha medicine against COVID-19 infection: Scope and future perspective. *Int J Complement Alt Med* 2021;14:173-4.
  22. Gopalsatheeskumar K, Lakshmanan K, Moulishankar A, Suresh J, Kumuthaveni Babu D, Kalaichelvan VK. Screening of Kabasura Kudineer Chooranam against COVID-19 through targeting of main protease and RNA-dependent RNA polymerase of SARS-CoV-2 by molecular docking studies. *Asian J Organic Med Chem* 2021;5:319-31.
  23. Nirmala A, Ravikumar T, Kanakavalli K, Pathiban P, Babu K, Jamuna D, *et al.* Survival analysis to assess the length of stay of novel coronavirus (COVID-19) patients under Integrated Medicine – Zinc, Vitamin C & Kabasura Kudineer (ZVcKK). *Curr Tradit Med* 2021;7:1375-87.
  24. Kiran G, Karthik L, Devi MS, Sathiyarajeswaran P, Kanakavalli K, Kumar KM, *et al.* *In silico* computational screening of Kabasura Kudineer-official Siddha formulation and JACOM against SARS-CoV-2 spike protein. *Journal of Ayurveda and integrative medicine*. 2020;13:100324.
  25. Natarajan S, Anbarasi C, Sathiyarajeswaran P, Manickam P, Geetha S, Kathiravan R, *et al.* The efficacy of Siddha Medicine, Kabasura Kudineer (KSK) compared to Vitamin C & Zinc (CZ) supplementation in the management of asymptomatic COVID-19 cases: A structured summary of a study protocol for a randomised controlled trial. *Trials* 2020;21:892.
  26. Parameswaran S, Ramulu SD, Arivarasan VK, Kadarkarai K, Dhanakoti RK, Loganathan K. Evaluation of *in-vitro* Immunomodulatory Activity and Thrombolytic Potential of Kabasura Kudineer (KSK): An Official Siddha Polyherbal Formulation. *Indian Journal of Pharmaceutical Education and Research* 2021;55:774-81.
  27. Bala D. Attitudes, beliefs, and self-use of Kabasura Kudineer among urban and rural population in Tamil Nadu, India: A comparative cross-sectional study. *J Family Med Prim Care* 2021;10:158-66.
  28. Vincent S, Arokiyaraj S, Saravanan M, Dhanraj M. Molecular docking studies on the anti-viral effects of compounds from Kabasura Kudineer on SARS-CoV-2 3CL. *Front Mol Biosci* 2020;7:613401.
  29. Maideen NM. Therapeutic efficacy of kabasura kudineer (siddha formulation), in covid-19—a review of clinical and molecular docking studies. *Asian Journal of Advances in Research* 2021:68-75.