Journal of Complementary Medicine Research, ISSN: 2146-8397 Vol. 14, No. 1, 2023 (pp. 133-136)

RESEARCH ARTICLE WWW.JOCMR.COM

Anti Inflammatory activity of AgNps synthesized using flower formulation (Rosa andJasminum)

R. Bharath[1], Abirami Arthanari[2*], S. Rajeshkumar[3]

[1]*Undergraduate, Department of Forensic Odontology, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences (SIMATS), Saveetha University, Chennai-600 077, Tamil Nadu, India.*

[2]*Senior lecturer, Department of Forensic Odontology, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences (SIMATS), Saveetha University, Chennai-600 077, Tamil Nadu, India.*

[3]*Professor, Department of Pharmacology, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences (SIMATS), Saveetha University, Chennai-600 077, Tamil Nadu, India.*

ABSTRACT

Introduction: In recent years, there has been a resurgence in the use of traditional medicinal herbs, and as a result, pharmaceutical companies are investing heavily in developing natural medications derived from plants. Nanoparticles act in a number of potential ways and fields. Chemical synthesis of nanoparticles is no longer advantageous compared to plant-based synthesis. The current study uses a green method to create silver nanoparticles (AgNPs) utilizing flower extract.

Materials and methods: The anti-inflammatory activity for gel was tested by the following convention proposed by Muzushima and Kabayashi with specific alterations. 0.05 mL of Rosa and jasminum jel of various fixations.

Result: Using rosa and jasminum extract in the manufacture of silver nanoparticles, the nanoparticles showed remarkable antioxidant and anti-inflammatory activity. It was discovered that the cytotoxic effect was less harmful, demonstrating biocompatibility. Rosa jasminum extract of AgNps showed good anti-inflammatory efficacy in the EA and BSA assays.

Conclusion: From our study we concluded that Silver nanoparticles were created using rosa and jasminum extract, and the nanoparticles displayed impressive anti-inflammatory.

Corresponding Author e-mail: abiramia.sdc@saveetha.com

How to cite this article: Bharath R, Arthanari A, Rajeshkumar S, Anti Inflammatory activity of AgNps synthesized using flower formulation (Rosa andJasminum). Journal of Complementary Medicine Research, Vol. 14, No. 1, 2023 (pp. 133-136)

KEYWORDS:
silver nanoparticle, rosa, jasminum, anti-inflammatory

ARTICLE HISTORY:
Received Nov 19, 2022
Accepted Dec 19, 2022
Published Jan 08, 2023

DOI:
10.5455/jcmr.2023.14.01.25

INTRODUCTION

Medicinal plants have been used to heal illnesses since the dawn of civilization in the Middle East, India, China, and the New World. In recent years, there has been a resurgence in the use of traditional medicinal herbs, and as a result, pharmaceutical companies are investing heavily in developing natural medications derived from plants. R. damascena was used to cure stomach and chest pain, menstruation issues, sadness, depression, anxiety, pressure, skin disorders, and migraine headaches in traditional medicine (1). Flowers' vibrant appearance and inviting scent uplift people's spirits. Flowers are abundant sources of plant essential oils, which have a variety of bioactivities and special benefits for medical cosmetology, health care, and adjuvant treatment of severe sickness. Theoretically, the anti-microbial, antioxidant, anti-inflammatory, anticancer, anti-obesity, neuroprotective, and visceral damage prevention actions of floral phytochemicals such flavonoids, anthocyanins, alkaloids, and phenolic acid give the theoretical basis for the health benefits of flowers (2).

The Jasmine flower, which belongs to the Oleaceae family and has over 200 kinds, is grown in temperate climates all over the world (3) .In India, jasmine (Jasminum sambac, sans-mallika) is widely employed in the production of high-quality aromatherapy products. Incenses, room fresheners, and soaps, for example, are made from a cheaper synthetic oil created by mixing a few ingredients. The juices of J. sambac leaves are used to cure ulcers, remove corns, expel worms, regulate menstrual flow, clean kidney waste, and treat inflamed and bloodshot eyes.(4)

Nanotechnology is a rapidly evolving technology, and its products are extremely valuable in a wide range of fields due to its small size (109 nm) and huge surface area. In comparison to bulk materials, nanoparticles have a higher surface-to-volume ratio and a higher concentration of partially coordinated surface sites. Nanoparticles have unique features due to a complex interplay of elastic, geometric, and electrical elements (5)(6). The most frequently used nanoparticles in both clinical practice and important therapeutic sciences are silver nanoparticles. In certain circumstances, silver particles are linked to altered cell death and increased cytotoxicity Metallic silver, silver nitrate, and silver sulfadiazine have all been used for the treatment of burns, wounds, and various bacterial illnesses from the beginning of time (7)(8)As a possible antibacterial agent, metallic silver in the form of silver nanoparticles has made an amazing comeback. Due to the development of antibiotic resistance in certain harmful microorganisms, the usage of silver nanoparticles is also crucial (2,9). The aim of this study To find anti inflammatory activity of Agnps synthesized using flower formulation.

MATERIALS AND METHODS

Anti-inflammatory activity

Albumin Denaturation Assay

The anti-inflammatory activity for gel was tested by the following convention proposed by Muzushima and Kabayashi with specific alterations (Pratik Das et al.,2019). 0.05 mL of Rose and jasmine jel of various fixation (10µL,20µL,30µL,40µL,50µL)was added to 0.45 mL bovine serum albumin(1% aqueous solution) and the pH of the mixture was acclimated to 6.3 utilizing a modest quantity of 1N hydrochloric acid. These samples were incubated at room temperature for 20 min and then heated at 55 °C in a water bath for 30 min. The samples were cooled and the absorbance was estimated spectrophotometrically at 660 nm. Diclofenac Sodium was used as the standard. DMSO is utilized as a control.

Percentage of protein denaturation was determined utilizing following equation,

% inhibition= Absorbance of control- Absorbance of sample×100

Absorbance of control

Egg Albumin Denaturation Assay

A 5ml solution was made which consisted of 2.8ml of freshly prepared phosphate buffered saline of pH - 6.3, 0.2 ml of egg albumin extracted from hens egg. Specific concentrations were prepared separately for Rosa and jasminum as (10µL,20µL,30µL,40µL,50µL). Diclofenac Sodium was used as the positive control.. Then the mixtures were heated in water bath at 37ºC for 15 minutes. After which the samples were allowed to cool down to room temperature and absorption was measured at 660 nm.

RESULT

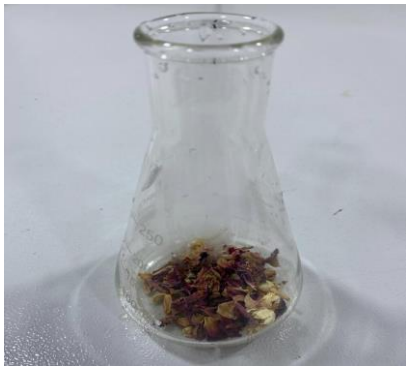

Figure 1: Dry rosa and Dry jasminum

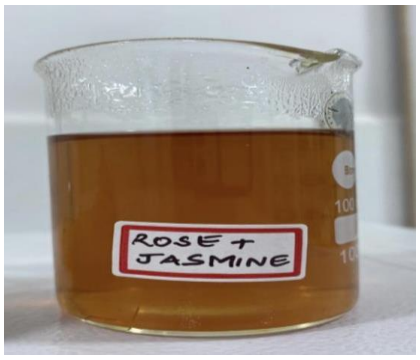

Figure 2: Flower extract

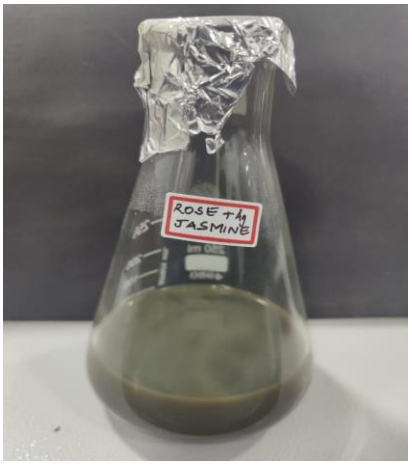

Figure 3: Silver Nanoparticles formation

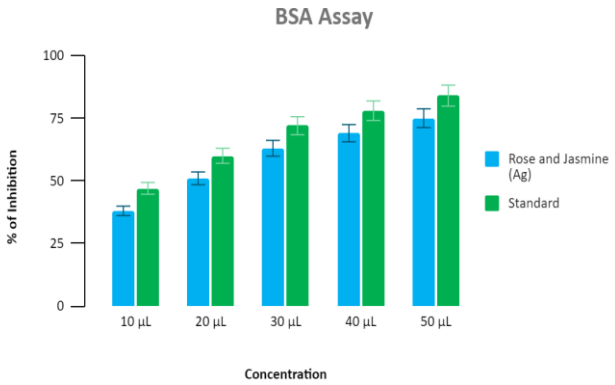

Figure 4: BSA assay of flower extraction with nanoparticle, comparing with standard drug

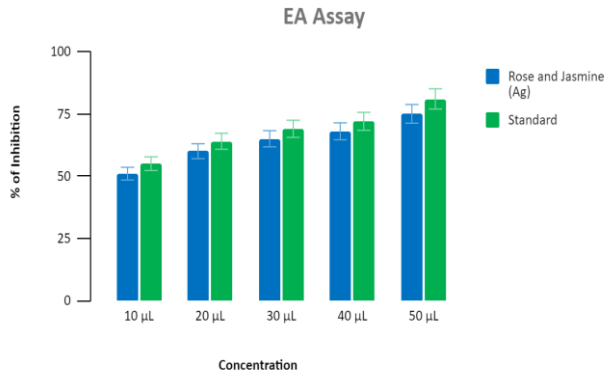

Figure 5: EA assay of rosa and jasminum AgNps, comparing with standard drug

Using rosa and jasminum extract in the manufacture of silver nanoparticles, the nanoparticles showed remarkable antioxidant and anti-inflammatory activity. It was discovered that the cytotoxic effect was less harmful, demonstrating biocompatibility. Rosa jasminum extract of AgNps showed good anti-inflammatory efficacy in the EA and BSA assays.

DISCUSSION

In a previous study They used CtAgNPs that demonstrated notable antibacterial activity on bacteria that are multidrug resistant in earlier studies. Strong antioxidant (DPPH, H2O2 scavenging, nitric oxide scavenging, and reducing power) activities had been demonstrated by the CtAgNPs (10). In another prior study The synthesis AgNPs showed significant antibacterial efficacy against the bacterial strains of Staphylococcus aureus, Escherichia coli, and Klebsiella pneumonia. Synthesized AgNPs also showed strong anti-inflammatory potential (10,11). In a different study, the potential of an aqueous extract of Melissa officinalis cultivated in vitro for the environmentally friendly production of silver nanoparticles was demonstrated (AgNPs). Additionally, it demonstrated the anti-acute myeloid leukemia, anti-oxidant, and cytotoxic properties of AgNPs in comparison to mitoxantrone (12).

In a different study, AgNPs made from Calotropis gigantea L. latex aqueous extract demonstrate exceptional antibacterial efficacy (13). In another study The aqueous extract of the Cassia fistula flower was utilized to create silver nanoparticles (AgNPs), which demonstrated effective cytotoxic potential against MCF7 and can be used to create new anticancer medications (13,14). In another studyIn produced AgNPs, protein denaturation was inhibited by 68.92% and 72.1%, as well as antiproteinase activity by 68.9% and 72.9%. Significant 2,2-diphenyl-1-picrylhydrazyl-hydrate radical scavenging activity was seen in the plant extract, with a value of 62.7-98.5 g/mL (15). In another study Silver nanoparticles mediated by Madhuca longifolia extract have the potential to be a therapeutic antibacterial agent. Gram-positive and Gram-negative microorganisms are both susceptible to the antibacterial effects of synthesis AgNPs (7) (16).

In another study AgNPs were created using A. esculentus flower extracts as a moderating agent. All of the examined gram-positive and gram-negative microbial pathogens were resistant to the NPs' antibacterial activities. The synthesised NPs' IC50 values for the examined cell lines were comparable to those of a common medication(16,17). In another study done by (16–18) Against this ESKAPE pathogen, the biogenic NPs demonstrated substantial antibacterial activity. Furthermore, compared to bigger AgNPs, smaller AgNPs with a higher surface area would show a more notable microbicidal activity. In another study, Jasminum officinale L. produces silver nanoparticles in this way. demonstrated strong cytotoxic effects against the MCF-7 and 5637 cell lines and may be used as a new cytotoxic drug option (19).

CONCLUSION

From our study we concluded that Silver nanoparticles were created using rose and jasmine extract, and the nanoparticles displayed impressive anti-inflammatory and antioxidant properties. The fact that the cytotoxic effect was less detrimental was found to be a sign of biocompatibility.

ACKNOWLEDGEMENT

We acknowledge and thank all the participants for their cooperation in the study

CONFLICT OF INTEREST

The authors reported no conflict of interest while performing this study.

Funding Agency

The present project is supported/funded/sponsored by Saveetha Institute of Medical and Technical Sciences

SaveethaDental College and Hospitals, Saveetha University and Bhagavan Healthcare

REFERENCE

1. Malik S. Essential Oil Research: Trends in Biosynthesis, Analytics, Industrial Applications and Biotechnological Production. Springer; 2019. 449 p.
2. Yuan H, Jiang S, Liu Y, Daniyal M, Jian Y, Peng C, et al. The flower head of Chrysanthemum morifolium Ramat. (Juhua): A paradigm of flowers serving as Chinese dietary herbal medicine. J Ethnopharmacol. 2020 Oct 28;261:113043.
3. Asao T, Asaduzzaman M. Phytochemicals: Source of Antioxidants and Role in Disease Prevention. BoD – Books on Demand; 2018. 218 p.
4. Rath CC, Devi S, Dash SK, Mishra RK. Antibacterial potential assessment of jasmine essential oil against e. Coli. Indian J Pharm Sci. 2008 Mar;70(2):238–41.
5. Shukla AK, Iravani S. Green Synthesis, Characterization and Applications of Nanoparticles. Elsevier; 2018. 548 p.
6. Swain S, Barik SK, Behera T, Nayak SK, Sahoo SK, Mishra SS, et al. Green Synthesis of Gold Nanoparticles Using Root and Leaf Extracts of Vetiveria zizanioides and Cannabis sativa and its Antifungal Activities [Internet]. Vol. 6, BioNanoScience. 2016. p. 205–13. Available from: http://dx.doi.org/10.1007/s12668-016-0208-y
7. Jain A, Anitha R, Rajeshkumar S. Anti inflammatory activity of Silver nanoparticles synthesised using Cumin oil. Research Journal of Pharmacy and Technology. 2019;12(6):2790–3.
8. Krishnaraj RN, Navanietha Krishnaraj R, Berchmans S. In vitro antiplatelet activity of silver nanoparticles synthesized using the microorganism Gluconobacter roseus: an AFM-based study [Internet]. Vol. 3, RSC Advances. 2013. p. 8953. Available from: http://dx.doi.org/10.1039/c3ra41246f
9. Silver nanoparticles as a new generation of antimicrobials. Biotechnol Adv. 2009 Jan 1;27(1):76–83.
10. Characterization, antibacterial, antioxidant, antidiabetic, anti-inflammatory and antityrosinase activity of green synthesized silver nanoparticles using Calophyllum tomentosum leaves extract. Results in Physics. 2018 Jun 1;9:400–8.
11. Jyoti K, Arora D, Fekete G, Lendvai L, Dogossy G, Singh T. Antibacterial and anti-inflammatory activities of Cassia fistula fungal broth-capped silver nanoparticles [Internet]. Vol. 36, Materials Technology. 2021. p. 883–93. Available from: http://dx.doi.org/10.1080/10667857.2020.1802841
12. Ahmeda A, Zangeneh A, Zangeneh MM. Preparation, formulation, and chemical characterization of silver nanoparticles using Melissa officinalis leaf aqueous extract for the treatment of acute myeloid leukemia in vitro and in vivo conditions [Internet]. Vol. 34, Applied Organometallic Chemistry. 2020. Available from: http://dx.doi.org/10.1002/aoc.5378
13. Rajkuberan C, Sudha K, Sathishkumar G, Sivaramakrishnan S. Antibacterial and cytotoxic potential of silver nanoparticles synthesized using latex of Calotropis gigantea L. Spectrochim Acta A Mol Biomol Spectrosc. 2015 Feb 5;136 Pt B:924–30.
14. Remya RR, Rajasree SRR, Aranganathan L, Suman TY. An investigation on cytotoxic effect of bioactive AgNPs synthesized using flower extract on breast cancer cell MCF-7. Biotechnol Rep (Amst). 2015 Dec;8:110–5.
15. Sri Kumaran N. In vitro anti-inflammatory activity of silver nanoparticle synthesized Avicennia marina (Forssk.) Vierh.: A green synthetic approach. International Journal of Green Pharmacy (IJGP) [Internet]. 2018 Nov 6 [cited 2022 Nov 3];12(03). Available from: http://www.greenpharmacy.info/index.php/ijgp/article/view/2014
16. Antibacterial potential of silver nanoparticles synthesized using Madhuca longifolia flower extract as a green resource. Microb Pathog. 2018 Aug 1;121:184–9.
17. Devanesan S, AlSalhi MS. Green Synthesis of Silver Nanoparticles Using the Flower Extract of Abelmoschus esculentus for Cytotoxicity and Antimicrobial Studies [Internet]. Vol. 16, International Journal of Nanomedicine. 2021. p. 3343–56. Available from: http://dx.doi.org/10.2147/ijn.s307676
18. Abootalebi SN, Mousavi SM, Hashemi SA, Shorafa E, Omidifar N, Gholami A. Antibacterial Effects of Green-Synthesized Silver Nanoparticles Using Ferula asafoetida against Acinetobacter baumannii Isolated from the Hospital Environment and Assessment of Their Cytotoxicity on the Human Cell Lines. J Nanomater [Internet]. 2021 May 3 [cited 2022 Nov 3];2021. Available from: https://doi.org/10.1155/2021/6676555
19. Elhawary S, El-Hefnawy H, Mokhtar FA, Sobeh M, Mostafa E, Osman S, et al. Green Synthesis of Silver Nanoparticles Using Extract of L. Leaves and Evaluation of Cytotoxic Activity Towards Bladder (5637) and Breast Cancer (MCF-7) Cell Lines. Int J Nanomedicine. 2020 Dec 4;15:9771–81.