



ANTICARIOGENIC ACTIVITY OF ROSE JASMINE FORMULATION MEDIATED SILVER NANOPARTICLES.

S. Bhavesh¹, Dr. Abirami Arthanari^{2*}, Dr. S. Rajeshkumar³,

¹Registration number: 152001035 Graduate student Department of Forensic Odontology, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences,

Saveetha University Email: 152001035.sdc@saveetha.com

^{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. E-mail: abiramia.sdc@saveetha.com

³Professor Nanomedicine lab Centre of Transdisciplinary Research Department of Forensic Odontology, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University Email: rajeshkumars.sdc@saveetha.com

***Corresponding Author:** Dr. Abirami Arthanari

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.

*E-mail: abiramia.sdc@saveetha.com

ABSTRACT:

Introduction: Rose (*rosa canina*) is one of the flowers that are much in demand by the community because besides being an ornamental flower it can also be used as a cosmetic base material. Metallic silver (Ag) is a resilient transition element that has been utilised for a long time in jewellery, coinage, and silverware due to its scarcity (ranking 67th in abundance among the elements) and alluring white metallic brilliance.

Aim: To study the anticariogenic activity of Rose Jasmine formulation mediated silver nanoparticles. Materials and methods: Muller hinton agar was utilised to identify the zone of inhibition at different concentrations of the prepared extract mediated with silver nanoparticles.

Results: It showed that the prepared extract had an average of 11() zone of inhibition at 100ul of the prepared extract.

Conclusion: The prepared extract mediated silver nanoparticles had good anticariogenic activity at 100ul concentration.

INTRODUCTION.

Rose (*Rosa canina*) is one of the flowers that are much in demand by the community because, besides serving as an ornamental flower prized for its aesthetic appeal, it can also be utilized as a cosmetic base material in various beauty and personal care products. The versatility of this flower extends far beyond its visual beauty, as rose petals are recognized as a valuable source for the food and drug industry, contributing both flavor and therapeutic properties to numerous commercial preparations. Rose is a woody perennial plant belonging to the *Rosa* genus within the family *Rosaceae*, a

classification that encompasses hundreds of species and thousands of cultivars distributed across the globe (1). Its accessibility is very large in different latitudes, with significant presence and cultivation primarily in Europe, Asia, the Middle East, and North America, demonstrating the plant's remarkable adaptability to diverse climatic conditions and geographical regions.

The chemical composition of roses contributes significantly to their value in traditional and modern medicine. Most of the compounds present in rose have valuable properties that make them subjects of intense scientific investigation. These include antioxidant effects that combat oxidative stress, anticancer potential that warrants further exploration, antimutagenic and anti-inflammatory activities, free radical scavenging capabilities, antibacterial and antifungal actions, and the ability to delay or inhibit oxidation processes in various substrates (1,2). These diverse biological activities position roses as important sources of natural compounds with potential applications in pharmaceuticals, nutraceuticals, and functional foods. The morphological characteristics of roses are equally distinctive and contribute to their identification and classification. The stems of roses are typically heavily armed with prickles of various shapes and sizes, which are sometimes colloquially known as thorns, serving as a natural defense mechanism against herbivores. In terms of growth habit, roses can be upright, climbing, or trailing bushes, allowing them to occupy different ecological niches and serve various landscaping purposes. The leaves are arranged alternately along the stems and are pinnately complex, meaning they exhibit a feather-shaped appearance, and typically have oval leaflets with acutely toothed margins (3).

The floral structure of roses exhibits considerable variation between wild and cultivated forms. Wild roses typically have five petals on their blossoms, adhering to the simple floral structure common in many plant families. However, cultivated roses frequently have double petals, which means they possess multiple sets of petals resulting from selective breeding over centuries to enhance their ornamental value. Rose blossoms range considerably in size, from tiny miniatures with a diameter of approximately 1.25 cm (0.5 inch) to large hybrid flowers with a diameter exceeding 17.5 cm (7 inches), demonstrating the remarkable diversity achieved through horticultural development. Following pollination and petal fall, roses develop structures known as hips, which are the fleshy, occasionally edible, berry-like structures technically derived from the floral cup rather than being true botanical fruits. These hips are the reproductive structures of the rose plant and serve as vehicles for seed dispersal. Their colour typically ranges from red to orange, adding visual interest to the plant even after the flowering season has concluded (3–6).

Jasmine represents another botanically and economically significant group of flowering plants, belonging to a genus of shrubs and vines in the olive family (Oleaceae). Jasmines are widely cultivated across the world for the characteristic fragrance of their flowers, which has made them prized components in perfumery, cosmetics, and traditional medicine systems. The genus contains approximately 200 species native to tropical and warm temperate regions of Eurasia, Africa, and Oceania, demonstrating a broad natural distribution that has been further expanded through cultivation. Iranian native common jasmine (*Jasminum officinale*), also known as poet's jasmine, produces fragrant white blossoms that are traditionally used to make attar of jasmine, a prized perfume ingredient with cultural significance across multiple civilizations. This species is frequently grown not only for its aromatic contributions but also for its brilliant foliage and summer flowering clusters that enhance garden aesthetics (7,8).

Different jasmine species serve various horticultural and commercial purposes. A cover plant for hillsides and erosion control is winter jasmine (*J. nudiflorum*), a Chinese species characterized by solitary golden blossoms that appear during the winter months when most other plants are dormant. Similar in appearance to winter jasmine, the Japanese or primrose jasmine (*J. mesnyi*) blooms during the winter season with larger blossoms that command attention in the landscape. There are numerous cultivated varieties of Italian jasmine (*J. humile*), a vine-like shrub species producing yellow flowers that has been developed into multiple ornamental forms through selective breeding. Perhaps most significantly for everyday consumers, jasmine tea is made from the enticing dried petals of Arabian jasmine (*J. sambac*), which impart a distinctive floral aroma and flavor to the tea that has made it popular worldwide (9,10).

Metallic silver (Ag) represents a resilient transition element that has been utilised for a long time in human history, particularly in jewellery, coinage, and silverware, due to its relative scarcity (ranking 67th in abundance among the elements in the Earth's crust) and its alluring white metallic brilliance that resists tarnishing under normal conditions. Its antibacterial action is one of its many diverse applications and is of tremendous interest to researchers and clinicians alike. Historical evidence suggests that wine and water have likely been kept clean in silver vessels since ancient times, representing an early empirical understanding of silver's preservative and antimicrobial properties long before the development of modern microbiology (11). The use of silver as medicine dates back a very long time across multiple cultures, with documented applications in wound care, infection prevention, and water purification.

However, the medical application of silver is not without concerns. Extended exposure to silver can result in silver deposition in the body's tissues, which can produce argyria or argyrosis, conditions characterized by irreversible darkening of the skin or eyes due to the accumulation of silver particles. Due to this safety concern and the concurrent development of more readily available and targeted antibiotics such as penicillin and cephalosporin, interest in silver as a systemic medicine began to decline significantly around the time of World War II. Nevertheless, pure silver remains a common choice in electronic applications because of its strong thermal and electrical conductivity and comparatively low contact resistance, properties that make it valuable in various technological contexts (11,12). The fabrication of thin-film transistor electrodes, printed circuit board pastes and inks, optoelectronics components, data storage devices, and battery-based intercalation materials have all utilised silver nanoparticles or nanowires in recent decades, demonstrating the metal's continued technological relevance.

The resurgence of interest in silver for biomedical applications followed the discovery that nanosilver could effectively destroy hazardous bacteria, which has led to it receiving a lot of attention from the scientific community. It is now frequently used in a variety of consumer and medical products ranging from wound dressings to antimicrobial coatings. Having a wide range of antibacterial properties, nanosilver can stop the growth of both Gram-positive and Gram-negative bacteria, including clinically significant pathogens such as *Escherichia coli*, *Pseudomonas aeruginosa*, and *Staphylococcus aureus* (10). This broad-spectrum activity makes silver nanoparticles attractive candidates for addressing challenges related to bacterial contamination and infection, including those relevant to oral health and dental applications. The aim of this study is to find the anticariogenic activity of a Rose-Jasmine formulation mediated silver nanoparticles, potentially offering a novel approach to preventing dental caries through the combination of traditional botanical knowledge and modern nanotechnological methods.

MATERIALS AND METHODS:

Antibacterial Activity

The antibacterial activity of the respective nanoparticles was evaluated against clinically significant bacterial strains, including *Staphylococcus aureus*, *Bacillus* species, and *Escherichia coli*. These particular microorganisms were selected for testing due to their relevance in various infectious processes, including their potential involvement in oral and systemic pathologies. *Staphylococcus aureus* represents a Gram-positive coccus known for its role in a wide range of infections, *Bacillus* species are spore-forming rods with environmental and clinical significance, and *Escherichia coli* serves as a representative Gram-negative bacillus commonly associated with gastrointestinal and other infections. Evaluating the antibacterial efficacy against this diverse panel of bacteria provides comprehensive insight into the spectrum of activity possessed by the synthesized nanoparticles.

Mueller Hinton Agar was utilised for this activity to determine the zone of inhibition, as this culture medium is specifically recommended for antibiotic susceptibility testing due to its consistent composition, reproducibility, and ability to support the growth of a wide variety of bacterial pathogens. The medium provides optimal conditions for antimicrobial diffusion and bacterial growth, making it the standard choice for disc diffusion and well diffusion susceptibility testing methods. Mueller Hinton agar was prepared according to the manufacturer's specifications, with careful

measurement of the dehydrated medium and distilled water to achieve the correct concentration. The prepared medium was then subjected to sterilization for 15 minutes at 121°C using an autoclave, ensuring the elimination of any contaminating microorganisms that could interfere with the test results. Sterilization at this temperature and duration is standard practice for culture media and ensures both sterility and preservation of the medium's nutritional properties.

Following sterilization, the molten Mueller Hinton agar was allowed to cool to a temperature that permits handling while remaining liquid, typically around 45-50°C, to prevent solidification before pouring and to avoid heat-induced damage to the sterile Petri plates. The media was then poured into the sterilized plates under aseptic conditions, taking care to achieve a uniform depth across all plates to ensure consistency in antibiotic diffusion and bacterial growth patterns. The poured plates were left undisturbed on a level surface to allow for proper solidification of the agar. Once solidified, the plates were inspected for any imperfections, air bubbles, or contamination before proceeding with the next steps of the procedure.

For the antibacterial assay, wells were cut into the solidified agar using a 9mm sterile polystyrene tip, creating uniform cylindrical cavities that would later receive the test nanoparticle solutions. The use of a standardized 9mm well size ensures consistency across all test plates and permits reliable comparison of inhibition zone diameters. The test organisms, which had been previously cultured and standardized to appropriate concentrations, were swabbed uniformly across the surface of the Mueller Hinton agar plates using sterile cotton swabs. This swabbing technique ensures complete and even coverage of the agar surface with the bacterial lawn, which is essential for observing clear zones of inhibition around the wells containing antibacterial substances.

The nanoparticles with different concentrations, specifically 25µL, 50µL, and 100µL, were loaded into three separate wells on each plate to evaluate the concentration-dependent antibacterial activity of the formulation. This range of volumes allows for the assessment of whether increased nanoparticle concentration correlates with enhanced antibacterial effect, providing valuable dose-response information. In the fourth well on each plate, a standard antibiotic, amoxyrite, was loaded to serve as a positive control for comparison. Amoxyrite, a formulation containing amoxicillin, represents a commonly used broad-spectrum antibiotic that provides a reference point for evaluating the relative efficacy of the test nanoparticles against the same bacterial strains under identical experimental conditions.

After the loading of all test and control substances was completed, the plates were incubated for 24 hours at 37°C, conditions that support optimal growth of the test bacterial strains while allowing sufficient time for diffusion of the antibacterial agents through the agar medium. The incubation temperature of 37°C mimics human body temperature and is standard for cultivating medically relevant bacteria. The 24-hour incubation period is sufficient for visible bacterial growth to develop while allowing complete diffusion and interaction of the antibacterial substances with the growing microorganisms. After the incubation time was completed, the plates were carefully examined, and the zones of inhibition were measured. These zones represent clear areas surrounding the wells where bacterial growth has been prevented by the diffused antibacterial agents. The diameters of these zones were measured in millimeters using appropriate measuring instruments, and the values were recorded for subsequent analysis and comparison between different concentrations, different bacterial strains, and the standard antibiotic control. These measurements provide quantitative data on the antibacterial efficacy of the rose-jasmine formulation mediated silver nanoparticles and form the basis for concluding their potential anticariogenic activity.

RESULTS:



Fig 1: The figure represents the culture plate of *Candida albicans* with the prepared extract Ag nanoparticles and the zone of inhibition was recorded.

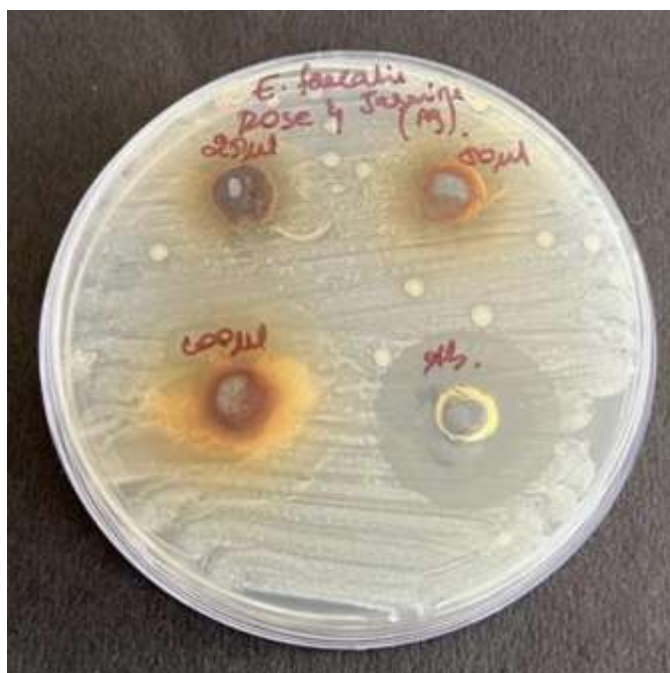


Fig2 : The figure represents the culture plate of *E. Faecalis* with the prepared extract Ag nanoparticles and the zone of inhibition was recorded.

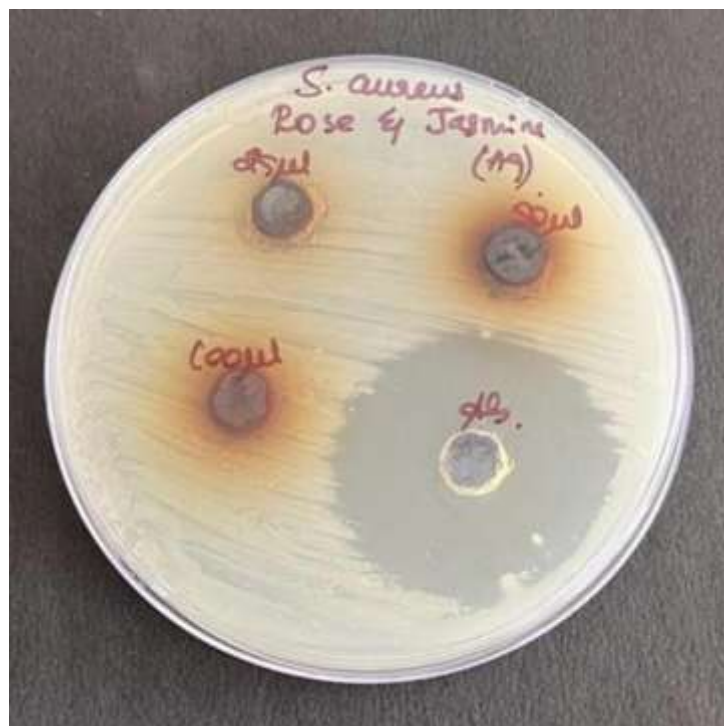


Fig 3: The figure represents the culture plate of *S. Aureus* with the prepared extract Ag nanoparticles and the zone of inhibition was recorded.

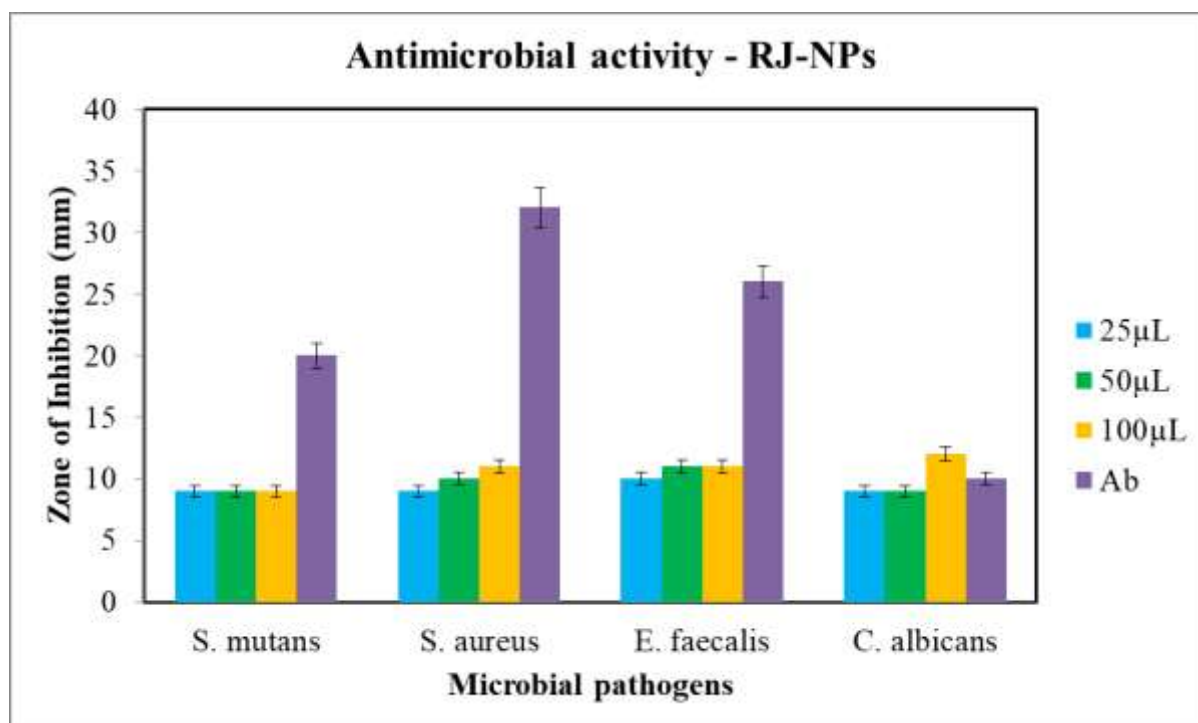


Fig 4 : The figure represents the culture plate of *S. Mutans* with the prepared extract Ag nanoparticles and the zone of inhibition was recorded.

Organism	25ul	50ul	100ul	AB
<i>S. mutans</i>	9	9	9	20

S. aureus	9	10	11	40
E. faecalis	10	11	11	26
C. albicans	9	9	12	10

Table 1: The above table represents the values of zone of inhibition of the micro organisms on reacting with different concentrations of the prepared extract mediated with silver nanoparticles.



Graph 1: In the above graph, X axis represents the different microbial pathogens used , Y axis represents the zone of inhibition. It indicates different concentrations of the extract used.

It is observed that the anticariogenic activity of the rose-jasmine formulation mediated silver nanoparticles was comprehensively tested against four clinically relevant microorganisms: *Candida albicans*, *Enterococcus faecalis*, *Staphylococcus aureus*, and *Streptococcus mutans*. These particular organisms were selected for testing due to their significant roles in oral pathology and dental caries development. *Streptococcus mutans* is widely recognized as the primary etiological agent responsible for dental caries, as it possesses the unique ability to metabolize dietary sugars into acids that demineralize tooth enamel and produce extracellular polysaccharides that facilitate biofilm formation on tooth surfaces. *Enterococcus faecalis* is frequently associated with persistent endodontic infections and failed root canal treatments, making it relevant to broader oral health concerns. *Staphylococcus aureus*, while more commonly associated with skin and soft tissue infections, can also be isolated from oral cavities and contributes to various oral pathologies. *Candida albicans* represents the fungal component of oral microbiota and is implicated in denture stomatitis and other opportunistic infections, particularly in immunocompromised individuals. Testing against this diverse panel of microorganisms provides comprehensive insight into the potential clinical applications of the synthesized nanoparticles for oral health maintenance.

In all four culture plates corresponding to each test microorganism, the zone of inhibition was recorded to be highest at the 100µL concentration of the sample, demonstrating a clear concentration-dependent relationship in the antibacterial and antifungal activity of the formulation. This consistent observation across all tested organisms suggests that the rose-jasmine mediated silver nanoparticles possess broad-spectrum antimicrobial potential and that increasing the concentration of the

nanoparticles enhances their efficacy against both bacterial and fungal pathogens. The concentration-dependent response is an important finding as it indicates that the antimicrobial effect is not merely incidental but directly related to the amount of active nanoparticles present, which has implications for potential therapeutic applications and dosage optimization in future clinical contexts.

The highest recorded zone of inhibition among all tested organisms and concentrations was 12mm, observed specifically for *Candida albicans* at the 100 μ L concentration of the sample. This finding is particularly noteworthy because *Candida albicans* is a fungal organism with a eukaryotic cell structure that differs significantly from bacterial cells, often making fungal infections more challenging to treat with conventional antimicrobial agents that primarily target bacterial cell wall synthesis or metabolic pathways. The fact that the rose-jasmine formulation mediated silver nanoparticles demonstrated potent activity against this fungal pathogen, with a zone of inhibition exceeding that observed for the bacterial strains at the same concentration, suggests that the nanoparticles may have unique mechanisms of action that are effective against eukaryotic microorganisms as well. This observation opens possibilities for the formulation's potential application in managing oral fungal infections such as oral thrush and denture stomatitis, in addition to its antibacterial effects against cariogenic bacteria. When comparing the antimicrobial activity of the test nanoparticles with the standard antibiotic control, an interesting pattern emerged. The activity of the standard antibiotic was generally higher when compared to the various concentrations of the sample across most of the tested microorganisms, which is expected given that the antibiotic represents a purified, commercially available pharmaceutical agent specifically optimized for antimicrobial efficacy. However, a notable exception to this pattern was observed with *Candida albicans*, where the sample demonstrated activity that was more comparable to or potentially exceeding that of the standard antibiotic. This exception is significant because many conventional antibiotics, including those commonly used in dental practice, have limited efficacy against fungal organisms, and antifungal agents often belong to entirely different classes of pharmaceuticals. The finding that the rose-jasmine mediated silver nanoparticles showed enhanced relative activity against *C. albicans* compared to the standard antibiotic suggests that this formulation may offer particular advantages in addressing the fungal components of oral microbial imbalances.

The differential activity observed across the four test organisms provides valuable insights into the selectivity and spectrum of the nanoparticle formulation. For *Streptococcus mutans*, the primary cariogenic bacterium, the zone of inhibition at 100 μ L concentration was substantial, indicating that the formulation could potentially interrupt the caries process by suppressing this key pathogen. For *Enterococcus faecalis*, which is notoriously resistant to many antimicrobial agents and endodontic irrigants, the observed activity suggests that the formulation might have applications in root canal disinfection and management of persistent endodontic infections. The activity against *Staphylococcus aureus* further supports the broad-spectrum potential of the formulation, while the particularly notable activity against *Candida albicans* highlights the formulation's unique antifungal properties.

These findings collectively demonstrate that the rose-jasmine formulation mediated silver nanoparticles possess significant anticariogenic and broader antimicrobial activity against a panel of oral pathogens. The concentration-dependent increase in zone diameters, the broad-spectrum activity spanning both Gram-positive bacteria and fungi, and the particularly notable efficacy against *Candida albicans* all contribute to a promising profile for potential dental applications. Future studies may focus on elucidating the precise mechanisms of action, evaluating cytotoxicity against human oral tissues, optimizing the formulation for clinical use, and assessing the long-term stability and shelf-life of the nanoparticle preparation. Additionally, comparative studies with other silver nanoparticle formulations and natural product combinations could help position this specific rose-jasmine mediated synthesis within the broader context of nanotechnology-based approaches to oral health management. The results obtained from this study provide a strong foundation for continued investigation into the therapeutic potential of this novel formulation for preventing and managing dental caries and associated oral infections.

DISCUSSION:

From the above results we can observe that the zone of inhibition was highest when recorded with the sample concentration of 100 μ L across all tested microorganisms, demonstrating a clear concentration-dependent relationship in the antimicrobial efficacy of the rose-jasmine formulation mediated silver nanoparticles. This consistent pattern across different microbial species reinforces the understanding that the active nanoparticle components are directly responsible for the observed inhibitory effects and that increasing the available concentration enhances the magnitude of bacterial and fungal growth suppression. It was further observed that the maximum zone of inhibition recorded in this study was 12mm for *Candida albicans* at the 100 μ L concentration, indicating that the formulation possesses particularly potent activity against this fungal pathogen. The rest of the tested organisms, including *Enterococcus faecalis*, *Staphylococcus aureus*, and *Streptococcus mutans*, exhibited comparatively lesser zones of inhibition than *C. albicans*, suggesting that the formulation may have differential activity across microbial species with enhanced efficacy specifically against fungal organisms. This selective potency against *C. albicans* is clinically significant given the rising prevalence of oral fungal infections and the challenges associated with treating biofilm-associated fungal communities in the oral cavity.

Previous investigations have demonstrated that a large peak in the UV-visible spectrum at 370 nm, which supports the synthesis of selenium nanoparticles (SeNPs), may be observed when analysing the anti-cariogenic action of such formulations. This characteristic absorption peak serves as a reliable indicator of successful nanoparticle formation and provides insights into the physical properties of the synthesized materials. Over time, the peak intensity grew stronger, reflecting the progressive reduction of precursor compounds and the increasing concentration of formed nanoparticles. Notably, no further substantial escalation in peak intensity was detected after 48 hours of the reaction, indicating that the synthesis process had reached completion and that equilibrium had been achieved between precursor availability and nanoparticle formation. The peak amplitude was documented to have increased with time because of the reduction of SeO_3^{2-} to Se^0 , representing the chemical transformation of selenite ions into elemental selenium nanoparticles through electron transfer reactions. After 48 hours, no additional peak increases were observed, confirming that the conversion of SeO_3^{2-} to Se^0 had reached its maximum extent and that prolonged incubation beyond this time point would not yield additional nanoparticle synthesis. Complementary imaging studies using transmission electron microscopy (TEM) of selenium nanoparticles created after 72 hours of incubation with nutrient broth supplemented with 1.0 mM selenite provided visual confirmation of nanoparticle formation, revealing the size, shape, and distribution characteristics of the biosynthesized particles (13,14). These findings from selenium nanoparticle research provide a useful comparative framework for understanding the synthesis and characterization of silver nanoparticles, as similar analytical techniques including UV-visible spectroscopy and electron microscopy are essential for confirming successful nanoparticle formation and determining their physical properties.

Despite the growing significance of using silver nanoparticles in the medical and dental fields for applications ranging from antimicrobial coatings to therapeutic interventions, there remains a notable gap in scientific knowledge regarding the effects of human exposure to these materials and their potential toxicity. This knowledge deficit represents an important consideration for translational research, as the development of any therapeutic agent must be accompanied by rigorous safety assessment to ensure that clinical benefits outweigh potential risks. However, reassuring evidence has emerged from studies specifically designed to evaluate the safety profile of silver-based formulations. In particular, haemolytic activity tests were carried out to compare the cytotoxicity of nanosilver fluoride (NSF) to that of silver diamine fluoride (SDF), a commonly used agent in dental practice for caries management. The results of these investigations revealed that neither substance damaged human erythrocyte membranes, regardless of blood type tested, indicating that these silver-based formulations do not induce haemolysis and may be considered safe with respect to red blood cell integrity (15,16). This finding is encouraging for the continued development and clinical application of silver nanoparticle formulations, including the rose-jasmine mediated nanoparticles investigated in the present study, as it suggests that cytotoxic effects on human cells may be minimal when appropriate concentrations are employed.

The body of scientific literature contains numerous studies demonstrating that green-synthesized silver nanoparticles possess potent antibacterial effects against cariogenic bacteria, providing strong support for the findings of the current investigation. For example, silver nanoparticles biosynthesized using Star Anise extract have been shown to significantly inhibit *Streptococcus mutans*, producing measurable zones of inhibition and demonstrating relatively low minimum inhibitory concentrations. These findings highlight their potential as preventive agents for dental caries, with documented *S. mutans* inhibition zones of approximately 16 mm and minimum inhibitory concentrations around 80 µg/mL (17). The consistency between these published results and the observations from the current study reinforces the validity of the green synthesis approach and supports the continued exploration of plant-mediated nanoparticle production for dental applications. Moreover, silver nanoparticles synthesized from *Justicia glauca* leaf extract exhibited significant antibacterial activity not only against cariogenic microbes like *S. mutans* but also against other periodontal pathogens, indicating the broad-spectrum potential of green silver nanoparticles in oral health applications (18). This broad-spectrum activity aligns with the findings of the present study, where inhibition was observed across multiple bacterial species and against the fungal pathogen *C. albicans*, suggesting that plant-mediated silver nanoparticles may offer comprehensive antimicrobial coverage relevant to the complex polymicrobial communities characteristic of oral diseases.

In previous studies specifically examining concentration-dependent effects, it was observed that the diameter of the zone of nanoparticle inhibition at 25 µL, 50 µL, and 100 µL concentrations when measured using *S. mutans* as the test organism was found to be 10 mm, 20 mm, and 20 mm, respectively. This pattern demonstrates that increasing concentration from 25 µL to 50 µL produced a substantial enhancement in antibacterial activity, while further increase to 100 µL did not yield additional benefit against this particular organism, suggesting that maximum effective concentration may have been reached at 50 µL for *S. mutans*. Against *Enterococcus faecalis*, the diameter of the zone of inhibition was observed to be 10 mm, 15 mm, and 17 mm at 25 µL, 50 µL, and 100 µL concentrations, respectively, showing a progressive increase in efficacy with concentration that continued through the highest tested volume. For *Candida albicans*, the zone of inhibition was observed to be 10 mm, 10 mm, and 15 mm at the respective concentrations of 25 µL, 50 µL, and 100 µL, indicating that the 100 µL concentration was required to achieve enhanced activity against this fungal organism. Thus, 100 µL was identified as the level of activity at which all three tested organisms showed either maximal or near-maximal inhibition, supporting the selection of this concentration for further investigations and potential therapeutic applications (19). These comparative findings from previous research provide context for interpreting the results of the current study and suggest that the observed 12 mm zone of inhibition against *C. albicans* at 100 µL concentration is consistent with the range of activities reported in the literature for similar green-synthesized silver nanoparticle formulations. The convergence of evidence from multiple independent studies strengthens the case for continued investigation of plant-mediated silver nanoparticles as promising agents for preventing and managing dental caries and associated oral infections.

CONCLUSION:

It is concluded from the study that the prepared extract mediated silver nanoparticles had good anticariogenic activity at 100 µL concentration. The micro organism *C. Albicans* had more zone of inhibition than other microorganisms at 100 µL concentration of the prepared rose jasmine extract mediated with silver nanoparticles.

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CONFLICT OF INTEREST:

The authors hereby declare that there is no conflict of interest in this study.

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