

Structural insights and biomedical potential of biosynthesized silver nanoparticles: antibacterial activity, anti-biofilm and cancer cell inhibition

Overview

The present work reports the synthesis of AgONPs from three plant extracts and their biological properties (such as antibacterial, anti-biofilm, and anticancer) were studied.

Major Comments

1. Abstract: Methods: Should include methodology as indicated. Avoid including results in this part, such as plane values from XRD spectra. Results should include statistical data, rather than highlights of the experiment results or overall observations. Structured abstract should follow, Background, Introduction, Objectives, Methodology, Results, and Conclusion. If it is difficult to follow through, authors are encouraged to include unstructured abstract, which is more convenient and easier.
2. Title and work presented is about AgO NPs, but the introduction is about AgNPs. As there is a clear difference between Silver and Silver Oxide nanoparticles, authors should re-write the introduction related to Silver Oxide nanoparticles.
3. Rationale for choosing the plant extracts is not clear, as numerous works are already reported for the same.
4. Last Paragraph of Introduction: Clearly state the novelty or the new insights of the work. State the objectives of the work point wise.
5. Methodology should be clearer and in detail. Not just as highlights.
6. 3.4: Please include the details of DLS analysis, similar to that of other techniques. Mention the solvent used and conditions for DLS analysis.
7. Should include SEM and EDX analysis.
8. Where is UV-Vis and FTIR spectra results? They are mentioned in section 3.2. and 3.3. but not included in results section. Should be included.
9. Results and Discussion: Section 2 should be sub-sectioned. Antibacterial – Agar well diffusion assay, anti-biofilm activity, and Biofilm eradication, as stated in methodology.
10. PLEASE BE SPECIFIC ABOUT AgNPs and AgONPs in section 2.2. of Results and Discussion.
11. Table 3: What are concentrations of AgONPs and Chloramphenicol used? Methodology stated as 10 to 100 μ L for AgONPs, where 2.5 to 10 mg/ml for Chloramphenicol. Which is not the case observed in Table 3. Why no standard was used for MIC and MBC?
12. Figure 1: XRD pattern is similar to AgNPs, so what is the reason for stating them as “AgONPs”. please justify. Characterization data is not sufficient to consider them as AgONPs. Should include EDX spectra for confirmation.
13. Figure 2: All DLS spectra shows range between 10 to 100, whereas the right-hand information shows 197, 342, and 733 nm. Please justify.
14. Include Agar well diffusion assay images, i.e., Petri plates images.
15. Anticancer studies should include normal cell line as well, to determine the toxicity nature of AgONPs against normal cell line compared to cancerous cell line.
16. Representations of figures could be better.

Minor Comments

1. Line 28, 29, 38, 40: Scientific names should be in italics. Check the same in entire manuscript.
2. Avoid XRD and fcc abbreviations in abstract.
3. Line 87, 100: Uniform representation of AgNPs.
4. Line 130, 132: Either use full scientific names or abbreviations for the plant names. Do not interchange in between.
5. Scientific names should be stated in full at first mention, after that Genus should be abbreviated, for example, *Punica granatum* (Line 112 mentioned for first time in main body, after that it should be mentioned as *P. granatum* only in Line 132)
6. Line 137: DLS, expand and abbreviated.
7. Abbreviations should be mentioned in full at first mention. Phrases should only be abbreviated if the intended is being used more than thrice, otherwise state in full.
8. Line 147: “P.g”. Please make a uniform representation.
9. Line 146: Please include date and year.
10. Line 148: Please specify the volume and weight of powder used clearly.
11. Line 150: 100 °C. Space between value and unit. Check the same in entire manuscript.
12. Line 152: “pomegranate (P.g)”. Please be consistent with terminology.
13. Line 155: AgNO₃. 3 should be subscript.
14. Line 154: What is the volume of plant extract and silver nitrate used? Incubated in static incubator or orbital shaker or any other incubation conditions?
15. Line 156, 225: Ref. 36, 41, in line reference should be in journal format.
16. Line 156: Centrifugation conditions, rpm, time, temperature?
17. Line 156: pellet was washed, with what?
18. Line 156: dried? Where, using what?
19. Line 157: Pellet showed color change? Please be specific.
20. Line 166, 181: AgNPs or AgONPs?
21. Line 172: Instrument details of UV-Vis were provided. What about XRD?
22. Line 176: through the following equation. Where is the equation?
23. Line 179: AgONPs 5. What is 5 represent?
24. Line 186: Bold, heading.
25. Line 189: AgONPs, abbreviation.
26. Line 192: 10 to 100 µL.
27. Line 193: The inhibition zones should be not be measured in triplicates, instead the experiment should be performed in triplicates. Please modify the statement.
28. Line 194: What is the control used? Please specify.
29. Line 194: 2.5 to 10 mg/ml of Chloramphenicol was used. Ideally, it should be similar concentration range with AgONPs. Why there is a difference? Please justify.
30. Line 194: Open brackets were observed, what about Closing brackets?
31. Line 199 and 202: “A 100 µL aliquot of diluted bacterial culture was dispensed into each well” and “Each well was then supplemented with 80 µL of MHB and 20 µL of bacterial inoculum”. Which is true?
32. Line 211, 226: 24 h, 1 h. Please be consistent with representation.

33. Line 216: Why only *Pseudomonas aeruginosa* and *Staphylococcus aureus* were used in anti-biofilm activity?
34. Line 219: What is that appropriate solvent? This is not an exam, where readers have to guess. Please be specific when stating.
35. Line 233, 245, 259: Equation should be typed using MathType or Insert Equation option in MS word. Equations should be numbered as they appear.
36. Line 236: What about Pg-AgONPs? Why only *S. aureus*?
37. Line 237: What minor modifications? please specify.
38. Section 5, 6, 7: Why no standard was used to compare AgONPs activity?
39. Line 263: AgONPs.
40. Line 264: It is XRD data, not X-ray data.

Remark

The manuscript lacks structure, consistency, and organization.