

Review of: "Synthesis of Nickel Nanoparticles Using Ionic Liquid-Based Extract from *Amaranthus viridis* and Their Antibacterial Activity"

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Potential competing interests: No potential competing interests to declare.

Comments

I have completed the review of the manuscript titled **Synthesis of Nickel Nanoparticles Using Ionic Liquid-Based Extract from *Amaranthus Viridis* and Their Antibacterial Activity.**"

This study describes the synthesis of Nickel Nanoparticles using plant extract as a reducing agent, characterizes these nickel nanoparticles, and applies them to some bacteria to check their antibacterial activity.

The following **major corrections are required before considering** this manuscript for publication in **Qeios**.

These are my overall observations of your document:

1. Poor abstract, poor conclusion, and poor citation, especially in the results and discussion parts, edition problems like subscripts, superscripts, units, etc., and the justification for the study is not sufficient.
2. The introduction is poorly written; it lacks a review of past works on the synthesis of Nickel Nanoparticles and its applications.
3. The materials and chemicals section is poorly written. Paraphrase it and look at other indexed papers to help you rewrite the Materials and Chemicals.
4. In section 2.2, Synthesis of Nickel Nanoparticles, there is no citation. Add it.

Questions:

The analysis of the paper is interesting. However, there are questions about the work that need to be addressed in the next revisions as follows:

1. The abstract must provide a brief overview of the paper. Here, the abstract is not telling what is actually in the main text. Thus, it should be rewritten and should be to the point. What the problem is, what you did to solve it, what the results are, and why they are important?

Your abstract must include the result of your main objective.

1. As you write, '*Amaranthus viridis* has anti-oxidant, antibacterial, and anti-cancer properties that make it useful in

medicine. However, how do you know the constituents that the *Amaranthus viridus* plant did have, or did you conduct the lab tests that confirm that *Amaranthus viridus* has ingredients that are responsible for the formation of nanoparticles?

2. In your introduction, it was also noted that there were no discussions about selection criteria and the importance of nickel in the synthesis of nanoparticles for antibacterial applications rather than silver, zinc, and other metal nanoparticles. Silver and zinc have more efficiency than nickel. How do you select nickel metal for antibacterial applications? Discuss briefly the reasons.
3. During the synthesis of Ni NPs, concentration, temperature, time, pH value, etc., have a significant effect on the properties of Ni NPs. Therefore, how did you set those parameters during synthesis?
4. In results and discussions, part 3.1 is about the UV-Vis analysis of Ni NPs. But you discuss antibacterial activity in this section. So this did not seem to be a discussion about UV-Vis analysis of Ni NPs within its graph. Please discuss the UV-Vis analysis of Ni NPs under the 3.1 section.
5. In 3.2, you said, "Figure 2 displays the FTIR spectra of Ni NPs both before and after washing". But the graph is only one line. If the line of the graph is two, you can say, FTIR spectra of Ni NPs both before and after washing, but how do you discuss or say FTIR spectra of Ni NPs both before and after washing"?
6. In 3.2, you said, "these bands show that the plant extract contains flavonoids, aldehydes, amines, and alkane chemicals". However, these FTIR spectra are not the FTIR spectra of oil extract. You said 'The plant extract has flavonoids, aldehydes, amines, and alkane chemicals'. How do you know without a test? Additionally, write the parameters of your graph on the x-axis and y-axis and specify whether the graph is for oil or Ni NPs.
7. On your XRD analysis of Ni NPs, you write "Sharp diffraction peaks at 2θ values of 33.3o, 45.5o, and 55.5o". Please rewrite the correct superscript of these angles (e.g. 33.3° , 45.5° , and 55.5°) and write the single number of the average crystallite size.
8. The surface area of the nanoparticle highly affects the antibacterial activity. Therefore, BET analysis of Ni NPs is required. Discuss briefly the surface area.
9. Discuss whether this nanoparticle is effective on gram-positive or gram-negative bacteria.

The overall recommendation is to accept this paper with major revision.