

Green Synthesis of Gold Nanoparticles using Neem Leaf Extract for Potential Skin Cancer Treatment

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Abstract

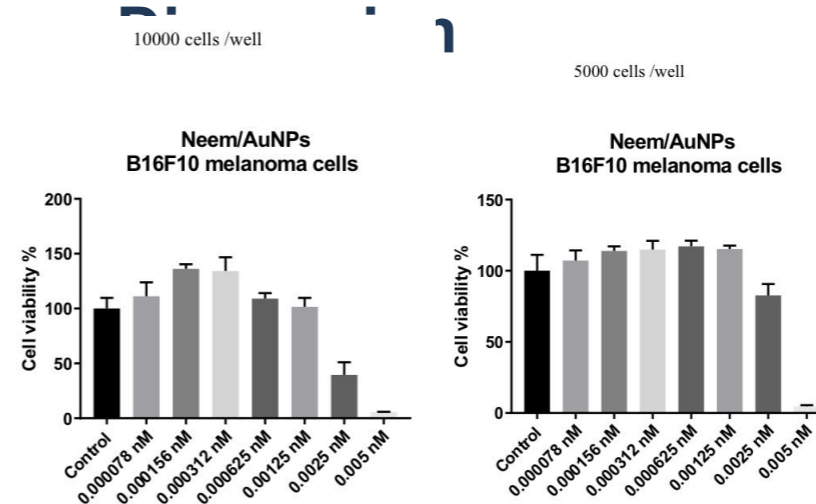
Being outside in the sun is an everyday occurrence of our days, which can have both beneficial and harmful effects on our health. Unfortunately, at least 65 percent of skin cancer cases are brought on by excessive sun's ultraviolet (UV) rays exposure, tanning beds, or sunlamps, all of which can harm the skin cells. The more the skin has been harmed, the more likely it is to develop skin cancer, premature aging, and texture changes. All parts of the Neem tree (leaves, bark, flowers, and seeds) are known to treat a variety of skin diseases and infections as they consist of anti-inflammatory, antibacterial, analgesic, antiviral, antifungal, immunomodulatory, and antioxidant properties. These properties make Neem used greatly in modern medicine for different purposes, including creams, soaps, and shampoos. Here, we used green synthesis method to fabricate gold nanoparticles using the Neem extract.

Introductio

Due to the significant sun exposure that leads to skin cancer, skin cancers treatment is needed much more urgently especially for those living in areas with high degrees. Neem is known to help treat skin cells as it is used in many different treatment methods in which this experiment will test the Neem extraction with gold nanoparticles for a potential skin cancer treatment.

The extract used in this experiment is the Neem extract, contains compounds with antibacterial, antiviral, anti-fungal, and anti-inflammatory properties. 5 grams of the Neem plant was inserted into the 500 flask as well as 100ml of distilled water which was then set on the hot plate for 15 minutes. To extract the Neem we used filter paper and assured the extraction by filtering it out through a syringe and kept in a 4 degree fridge. Green synthesis method has been used for decades to synthesise nanoparticles using biological materials such as plant extracts, microorganisms, and enzymes. The advantages of green synthesis method are being environmentally friendly, cost effective, and more efficient. The materials used reduces metal ions into their elemental form which is then converted into nano particles which are smaller and more uniform in size. For the green synthesis method, after cleansing the equipment that will be used we inserted 40 grams of HAuCL3 (precursor of gold nanoparticles in salt form) that had 1mM total concentration which was dissolved with 100ml of distilled water in a flask and boiled at 200c and 250Rpm. After boiling the Neem extraction was added gradually at 200ul, 500ul, 500ul which led to a total of 1200ul. There are many different ways to evaluate the sizing such as the SLS, DLS, SEM, TEM, UV, etc... however in this experiment, the SEM was used. The SEM images the nano particles in with great detail and measured the nanoparticles through the average diameter of the particles in the imaging in which the mixture of gold nanoparticles and Neem was measured to be 80, and we could infer that the sizing was ~560nm using the UV-Vis. The cell plates were then used for seeding which consisted of having 500ul of fresh media, 1ml of the extraction for Hugh concentration, positive control as fresh media, and the negative control as Triton x. The serial dilution process occurred by adding 500ul of the extraction onto the 500ul of fresh media to each well until the last one was 1ml/1000ul and then 100ul of the mixture onto the cell plate for the process of seeding.

Results and



Conclusion

As both graphs show similar trends, the lower concentrations (0.000078nM ,0.000156nm ,0.000312nm ,0.000625nm and 0.00125nm) had no anti-cancer effects, however, we can tell that there were results of anti-cancer effects in the high concentrations of Neem-gold nanoparticles extraction such as the reduction of cell viability towards the cells within the high concentration. This leads to show that green synthesis of gold nanoparticles using Neem extracts can be used as a potential skin cancer treatment for melanoma cells.

References

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- 02 [Melissa Petruzzello](#) Jul 5, 2023 neem