Nanocare: Innovative Silver Nanoparticle Mouthwash for Oral Mucositis Treatment in Cancer Patients

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Oral mucositis is an inflammation that causes pain and ulcers that affect cancer patients undergoing radiotherapy and/or chemotherapy. The condition is marked by oral mucosa inflammation, which can progress to a local systemic infection. Available treatments for this inflamatory pathology, which is often neglected, are usually expensive and/or ineffective. This research aimeds to evaluate the feasibility of using silver nanoparticles (AgNPs) in developing a mouthwash (MW) to alleviate the symptoms of oral mucositis. AgNPs were synthesized instantaneously through a green method, and four MB formulations were produced with different AgNP concentrations (22, 44, 65, and 87 ppm). Stability was evaluated over 60 days through analyses of the UV-Vis spectrum, pH, and surface tension. The results demonstrated that MW remained stable regarding physicochemical parameters and that AgNPs maintained their stability, as confirmed by the presence of the plasmon band in all formulations. In the anti-inflammatory test, MW inhibited 56% of protein denaturation, indicating its potential anti-inflammatory effect. Toxicity tests with Allium cepa confirmed the safety of MW, as no significant cellular damage in the mitotic index were observed. Regarding antimicrobial activity, MW inhibited the growth of five microorganisms tested and showed bactericidal action against P. aeruginosa, a bacterium commonly resistant to antibiotics. Furthermore, MW was tested on an actual sample of oral microbiota, demonstrating a significant reduction in bacterial absorbance compared to the control. These promising findings highlight the potential of AgNP-based MW as an effective and affordable solution to improve the quality of life of oncology patients suffering from oral mucositis.

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