Title: Synthesis of Silver Nanoparticles Using Camellia sinensis Leaf Extract: Promising Particles for the Treatment of Cancer and Diabetes.

Author Name: Md Eram Hosen, Md Ataur Rahman, Md Sojiur Rahman, Shopnil Akash, Md Khalekuzzaman, Abdulaziz Abdullah Alsahli, Mohammed Bourhia, Hiba-Allah Nafidi, Md Asadul Islam, Rashed Zaman.

Abstract: Both diabetes and cancer pose significant threats to public health. To overcome these challenges, nanobiotechnology offers innovative solutions for the treatment of these diseases. However, the synthesis of nanoparticles can be complex, costly and environmentally toxic. Therefore, in this study, we successfully synthesized Camellia sinensis silver nanoparticles (CS-AgNPs) biologically from methanolic leaf extract of C. sinensis and as confirmed by the visual appearance which exhibited strong absorption at 456 nm in UV-visible spectroscopy. The fourier transform infrared spectroscopy (FTIR) analysis revealed that phytochemicals of C. sinensis were coated with AgNPs. Scanning electron microscopy (SEM) analysis showed the spherical shape of CS-AgNPs, with a size of 15.954 nm, while X-ray diffraction spectrometry (XRD) analysis detected a size of 20.32 nm. Thermogravimetric analysis (TGA) indicated the thermal stability of CS-AgNPs. The synthesized CS-AgNPs significantly inhibited the ehrlich ascites carcinoma (EAC) cell growth with 53.42±1.101 %. The EAC cell line induced mice exhibited increased level of the serum aspartate aminotransferase (AST), alanine transaminase (ALT), and alkaline phosphatase (ALP), however this elevated serum parameter significantly reduced and controlled by the treatment with CS-AgNPs. Moreover, in a streptozotocin-induced diabetic mice model, CS-AgNPs greatly reduced blood glucose, total cholesterol, triglyceride, low-density lipoprotein (LDL) and creatinine levels. These findings highlight that the synthesized CS-AgNPs have significant anticancer and antidiabetic activities that could be used as promising particles for the treatment of these major diseases. However, pre-clinical and clinical trial should be addressed before use this particles as therapeutics agents.

Keyword: Camellia Sinensis, Anticancer Activity, Antidiabetic Activity, Silver Nanoparticles.

DOI: [10.1002/cbdv.202301661](https://doi.org/10.1002/cbdv.202301661)