Currently, green nanotechnology-based approaches using waste materials from food have been accepted as an environmentally friendly and cost-effective approach with various biomedical applications.Overall, the results highlight the effectiveness and potential applications of AC-AgNPs in biomedical fields such as in the treatment of acute illnesses as well as in drug formulation for treating various diseases such as cancer and diabetes.Characterization was done using UV-visible spectroscopy, X-ray diffraction (XRD), Fourier transform infrared (FT-IR) spectroscopy, scanning electronic microscopy (SEM) and energy-dispersive X-ray spectroscopy (EDX) analyses.The functional group existing in AC outer peel extract accountable for the reduction of Ag+ ion and the stabilization of AC-AgNPs was investigated through FT-IR.With the growing application of AgNPs in biomedical perspectives, the biosynthesized AC-AgNPs were evaluated for their antioxidative, antidiabetic, and cytotoxic potential against HepG2 cells along with their antibacterial potential.The formation of AgNPs has confirmed through UV-visible spectroscopy (at 485 nm) by the change of color owing to surface Plasmon resonance.In the current study, AgNPs were synthesized using the outer peel extract of the fruit Ananas comosus (AC), which is a food waste material.The results showed that AC-AgNPs are extremely effective with high antidiabetic potential at a very low concentration as well as it exhibited higher cytotoxic activity against the HepG2 cancer cells in a dose-dependent manner.The morphological structures and elemental composition was determined by SEM and EDX analysis.It also exhibited potential antioxidant activity and moderate antibacterial activity against the four tested foodborne pathogenic bacteria.Based on the XRD pattern, the crystalline property of AgNPs was .established.Further, it has applications in wound dressing or in treating bacterial related diseases