

## **Green Synthesis of Silver Nanoparticles using *Terminalia ferdinandiana* (Kakadu plum) Leaf and Fruit Extracts**

*Terminalia ferdinandiana* is native to Australia and has been used as a food source and traditional medicine from the early years by indigenous Australians. In modern times, it is used to produce value-added products due to its high Vitamin C, and antioxidant content. However, if it is consumed directly, the efficacy of active components is low. Hence, this research aims to investigate a novel method of synthesis of silver nanoparticles with *Terminalia ferdinandiana* leaf and fruit extracts to examine the possibility of increasing the efficacy of potential medicinal properties, including antioxidant and antimicrobial properties of those extracts.

### **Abstract**

*Terminalia ferdinandiana* is an Australian native plant endemic to the Northern Territory and plum has been used as a food source and traditional medicine from the early years by indigenous Australians. Recently, it is used to produce value-added products such as food and cosmetics due to its high Vitamin C and antioxidant. While fruits have high levels of vitamin C, leaves are rich in bioactive flavonoids, phenolic acids, and tannins. However, when they are consumed directly the efficacy of active components is low due to poor absorption and low bioavailability. Hence, incorporating the active constituents into suitable metallic nanoparticles can significantly enhance the targeted delivery and combination therapy of the active components. In this study, we investigate the possibility of increasing the efficacy of potential medicinal properties, including antioxidant and antimicrobial, in the *Terminalia ferdinandiana* leaves and fruit extracts by conjugation with Ag-NPs. The effect of various parameters such as the ratio of extracts to Ag<sup>+</sup> solution, contact time and pH of the mixture, on the synthesis of Ag-NPs, was studied. The nature of synthesized Ag-NPs were analyzed by UV-vis spectroscopy, TEM and DLS analyzer. The results showed that the formation of uniform-sized Ag-NPs increases significantly in the basic medium (pH 8) and Ag-NPs with leaf extracts gave uniform-sized, well-stabilized Ag-NPs than fruit extracts. This project will enhance the biomedical value of *Terminalia ferdinandiana* and will introduce a medicinal product that will benefit the indigenous communities that harvest the fruits and have a direct economic impact on the indigenous livelihoods of the NT communities.