

5<sup>th</sup> International Conference on  
**Biomaterials and Nanomaterials**

March 10, 2022 | Webinar

## **Bio-inspired Gold and Silver Biomaterials from Selected South African Phytochemicals**

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Among nature's gifts to South Africa is biodiversity, the endemism of some plant's species, and its conservation among the world floristic regions. The richness of its eastern and the western cape are currently being explored to develop biomaterials at the nanoscale with functional properties as therapeutic agents, biosensors, catalysts etc.

*Aspalathus linearis* also known as green rooibos (GR), *Helichrysum foetidum* (HF), and *Pelargonium sidoides* (PS) are among endemic South African plants that are still under investigation as nano-biomaterials. The physicochemical and bio-evaluations of the total extracts and some major compounds isolated from HF (helichrysin, HA and helichrysetin, HB), and GR (aspalathin, ASP) were studied. This is following the demonstrated reducing and capping abilities of the plant phytochemicals for metallic gold and silver nanoparticles as described in this report.

The total extract of all the plant species yielded stable, crystalline, and non-agglomerated biomaterials of both gold (Au) and silver (Ag) metals in the size range 2 – 15 nm. The morphological distributions of GR and HF

biomaterials were polydisperse with triangular, spherically and rod shapes while PS showed mostly monodispersed spherical shape. These shapes could be attributed to the difference in the chemical profile of each plant. The results of the biosynthesized nanoparticles (NP) from isolated pure compounds confirmed their involvement in the synthesis and activities of the total extract. AuNPs images for both HA and HB revealed quasi-monodispersed hexagonal shapes. However, the Au and Ag of ASP showed polydisperse shapes. In vitro bio-evaluations of GR, and HF NPs for stability in biogenic media, toxicity against cancer cells, glucose uptake in kidney cells, and the enzymatic inhibitions of  $\alpha$ -glucosidase and  $\alpha$ -amylase showed promising results for drug formulations

### **Speaker Biography**

Akeem O Akinfenwa has completed his post-graduate at University of Ibadan, Ibadan Nigeria and got Post-Graduate Awardee 2021 from South African Chemical Institute (SACI). He has completed his ph.D recently at Cape Peninsula University of Technology, South Africa.

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