

## NANO-SILVER PHYTO-ANTIMICROBIALS

Phytomolecules in herbal extracts have been extensively used as dietary supplements and as natural pharmaceuticals in the treatment of various infectious/microbial diseases including human cancer. This is an eco-friendly, economically viable, green biochemistry based developed silver-nanomaterials capped with phytomolecules of herbal extract. This 'nano-silver phyto-antimicrobials' is having long-term stability and broad spectrum bactericidal effects. It can be employed at low cost manufacturing process without using chemical agents. This nanoantimicrobials has high surface charges ( $-29 \pm 0.11$  mV) and phytomolecules are tightly anchored onto the surface of silver-nanoparticles, as a result, the prepared silver-nanoparticles has highly stable, featuring high antibacterial activity. Antibacterial efficacy was >99.9% even after one-year storage and shown better as compared to other antimicrobials. Toxicity and biocompatibility evaluation studies exhibited that nano-silver phyto-antimicrobials has very high tissue biocompatibility and non-toxic to various in-vivo/in-vitro model. Therefore, products/formulations e.g. liquid animal feed additive, deodorant/spray, antibacterial paper, nano-disinfectants, etc. prepared using this nanoantimicrobial demonstrated a significant antibacterial efficacy. In addition, this nano-silver phyto-antimicrobial in the form of 'liquid and spray product' formulation has been thoroughly lab scale validated and prototype demonstrated for the efficacy and product stability against different kinds of microbial contamination.

### Utility:

Antimicrobials deodorant/spray

Inhibition of pathogenic gut-microbial load.

Reducing bacterial infection and wound healing.

Reducing bacterial growth in water/floor-surface, etc.

### Applications:

- i. Antimicrobials Spray/Deodorant
- ii. Medicated Floor Cleaner/Dressing
- iii. Veterinary Antimicrobial Feed Additive
- iv. Wound Healing Gel/Liquid
- v. Water Bacterial Decontaminant

**Available technical resources on this product:** One Indian patents filed [201611024033]. Two International publications [RSC Adv., 2017, 7, 51130-51141 & RSC Adv., 2018, 8, 23213-23229].



Figure: Nano-silver phyto-antimicrobials liquid/deodorant/spray