# Fabrication of highly stable silver nanoparticles with shape-dependent electrochemical efficacy

Design of effective and efficient nanoscale sensor for the selective monitoring of [hydrogen peroxide](https://www.sciencedirect.com/topics/chemistry/hydrogen-peroxide) (H2O2) in environmental samples is of great requirement to avoid several diseases; not only but also include diabetes, cancer, cardiovascular [disorders](https://www.sciencedirect.com/topics/chemistry/disorder), aging and Alzheimer. Herein, we report the fabrication of highly stable [silver nanoparticles](https://www.sciencedirect.com/topics/chemistry/silver-nanoparticle) (Ag NPs) with three different phases (i.e. spherical (Sp), star (St) and pyramidal (Py) via simple wet chemical approach. Among all the three phases, St-Ag-NPs with more exposed catalytic active sites, poor dipolar non-radiative [plasmons](https://www.sciencedirect.com/topics/chemistry/plasmon) [multipoles](https://www.sciencedirect.com/topics/chemistry/multipole) and large number of [surface defects](https://www.sciencedirect.com/topics/chemistry/surface-defect) which in turn enhance ion(s) [diffusion](https://www.sciencedirect.com/topics/chemistry/diffusion) between [electrode-electrolyte interfaces](https://www.sciencedirect.com/topics/chemistry/electrode-electrolyte-interface); shows highest performance in terms of linear range, limit of detection and sensitivity. We observe no interference between electro-active organic compounds (ascorbic acid (AA), [uric acid](https://www.sciencedirect.com/topics/chemistry/uric-acid)(UA), [dopamine](https://www.sciencedirect.com/topics/chemistry/dopamine) (DA) and glucose) and inorganic (NaCl, KCl, Na2SO4 and K2SO4) species on the as-fabricated St-Ag-NPs based [electrode](https://www.sciencedirect.com/topics/chemistry/behavior-as-electrode). Furthermore, we were able to account for the amount of H2O2 generated in the discharged water (effluent) from a poultry firm using the designed St-Ag-NPs based electrode over a wide linear range (∼5 mM) in the presence of co-existing electro-active species. These results show reliability of our designed electrode as useful sensing materials for the detection and monitoring of H2O2 mismanagement in an immediate environment.