Electronic Supplementary Material (ESI) for Analyst.

Metal Nanoparticles Assisted Polymerase Chain Reaction for Strain Typing of *Salmonella* Typhi

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Abstract: *Salmonella* enterica serotype Typhi (*S*. Typhi) is the causative agent of typhoid fever and remains a major health threat in most of the developing countries. The prompt diagnosis of typhoid directly from the patient's blood requires high level of sensitivity and specificity. Some of us were the first to report PCR based diagnosis of typhoid. This approach has since then been reported by many scientists using different genomic targets. Since the number of bacteria circulating in blood of a patient can be as low as 0.3cfu/ml, there is always a room for improvement in diagnostic PCR. In the present study, the role of different types of nanoparticles was investigated to improve the existing PCR based methods for diagnosis and strain typing of *S*. Typhi (targeting Variable Number of Tandem Repeats [VNTR]) by using optimized PCR systems. Three different

types of nanoparticles were used i.e., citrate stabilized gold nanoparticles, rhamnolipid stabilized gold and silver nanoparticles, and magnetic iron oxide nanoparticles. The non-specific amplification was significantly reduced in VNTR typing when gold and silver nanoparticles were used in appropriate concentration. More importantly, the addition of nanoparticles decreased the non-specificity to a significant level in the case of multiplex PCR thus further validating the reliability of PCR for the diagnosis of typhoid.

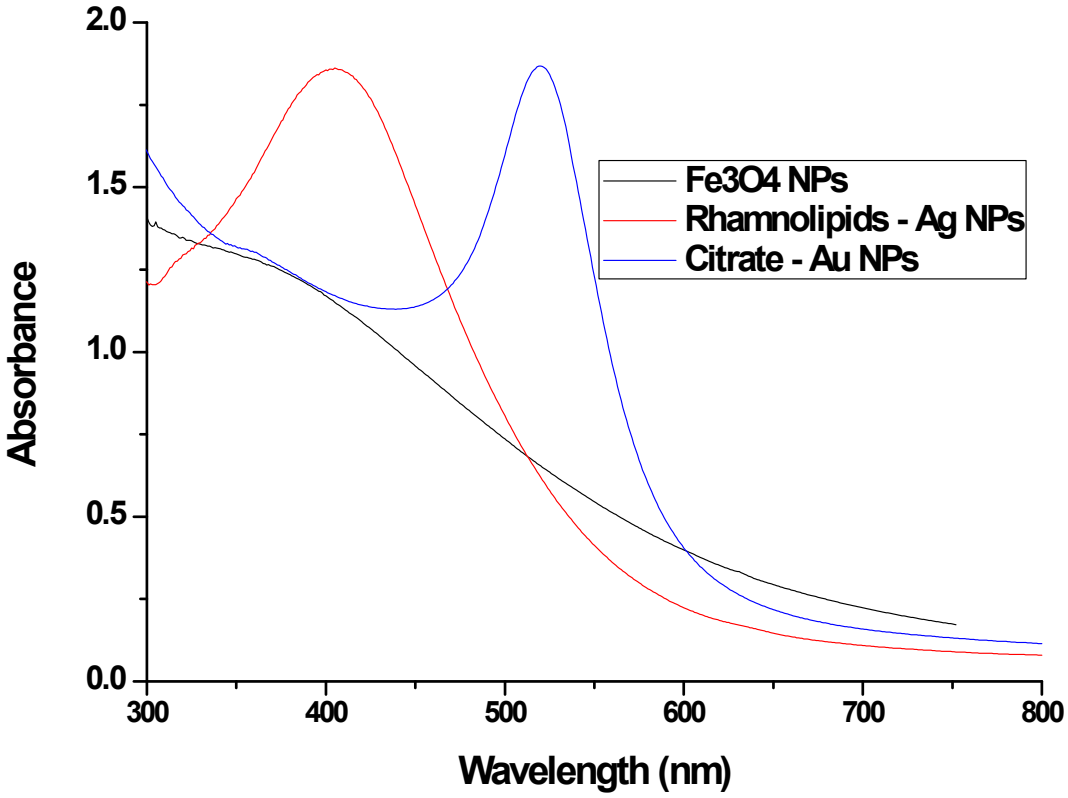

Figure 1. UV-visible absorption spectra of gold, silver and iron oxide nanoparticles

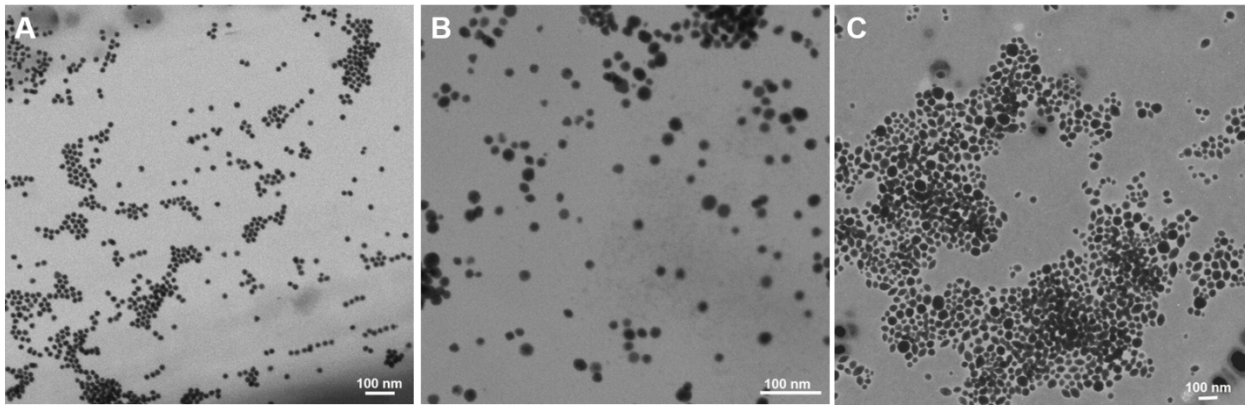

Figure 2. Transmission electron micrographs of gold (a), silver (b) and Fe_2O_3 (C) nanoparticles

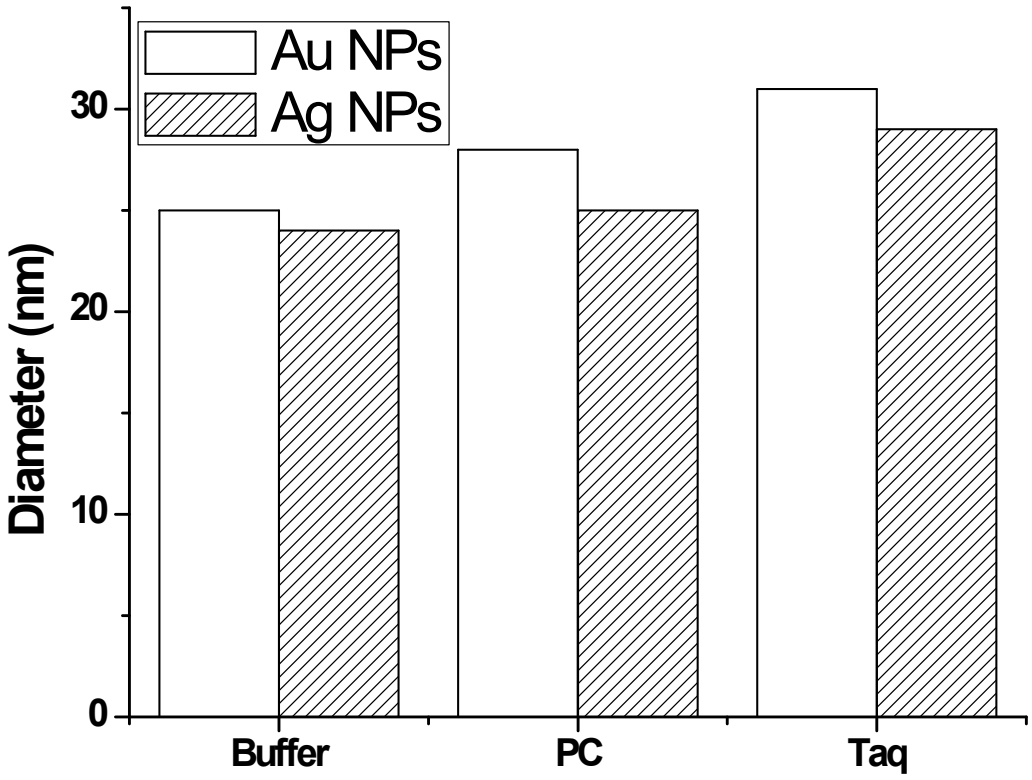

Fig. S3. Hydrodynamic diameter of gold and silver nanoparticle in PCR buffer, that in PCR buffer containing primers and dNTPs (PC) and that in PCR buffer containing primers, dNTPs and Taq polymerase (Taq).