

## Investigation and Optimization of DNA Isolation Efficiency Using Ferrite-Based Magnetic Nanoparticles

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**Abstract :** DNA isolation is a crucial step in many molecular biological applications for diagnostic and research purposes. However, traditional extraction requires toxic reagents, and commercially available kits are expensive, this leading to the recently wide-spread method, the magnetic nanoparticle (MNP)-based DNA isolation. Different ferrite containing MNPs were examined and compared in their plasmid DNA isolation efficiency. Among the tested MNPs, one has never been used for the extraction of plasmid molecules, marking a distinct application. pDNA isolation process was optimized for each type of nanoparticle and the best protocol was selected based on different criteria: DNA quantity, quality and integrity. With the best-performing magnetic nanoparticle, which excelled in all aspects, further tests were performed to recover genomic DNA from bacterial cells and a protocol was developed.

**Keywords :** DNA isolation, nanobiotechnology, magnetic nanoparticles, protocol optimization, pDNA, gDNA

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