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Isolating High-Quality RNA from Cells Exposed to Soils, Clays, or Metal Ion Solutions

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Inventors

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Invention Description

Microarrays and high-throughput transcriptomic analyses require high quality RNA samples for accurate results. Extracting high quality RNA is notoriously difficult and can be further complicated by high clay or metal ion concentrations. Nucleic acids are difficult to separate from clay particles and metal ions may bind irreversibly to RNA and cause degradation. Additionally, lengthy wash steps are typically required for RNA isolation and purification, which may alter or degrade RNA populations, and are therefore undesirable for transcriptomic experiments.

Researchers at the Biodesign Institute of Arizona State University have developed an extraction buffer and protocol for functional, rapid, and efficient isolation of total microbial RNA from samples containing high concentrations of aqueous metal chlorides or clay. This method has been demonstrated to yield approximately 80-200 µg of high quality RNA with limited genomic DNA contamination in less than 90 minutes from approximately $1x10^9$ *E. coli* cells.

This optimized protocol allows for the efficient extraction of ribonucleic acids from cell pellets containing high concentrations of aqueous transition metal chlorides as well as from clay mixtures.

Potential Applications

- High-quality microbial RNA extraction
- Transcriptomic analyses

Benefits and Advantages

- Efficient and high-yield extraction of intact RNA
  - The entire protocol takes less than 90 minutes
- Does not require lengthy wash steps prior to cell lysis
- Contamination of genomic DNA is minimized
- Precipitation of nucleic acids, salts, and surfactants is limited

Intellectual Property Status:

Patent Pending

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