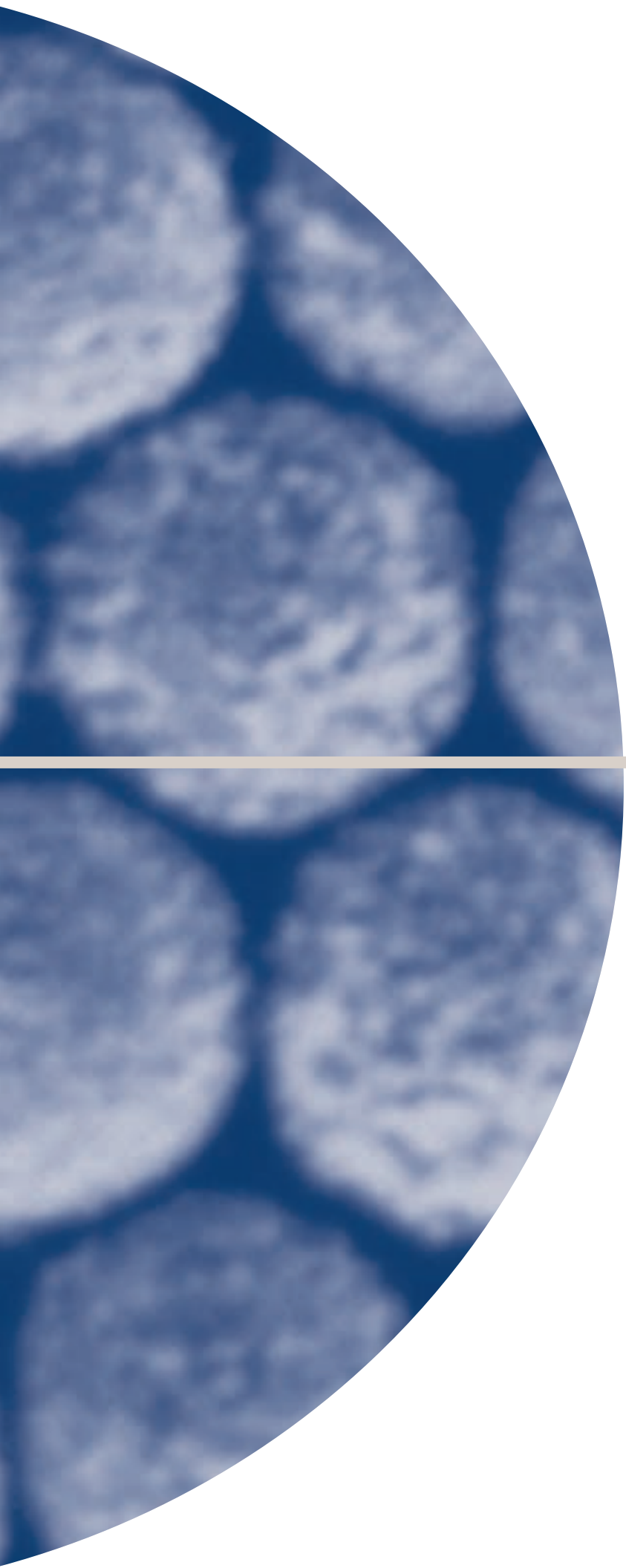


SPRI®

Cutting Edge Magnetic Bead Technology

Agencourt® Bioscience Corporation

SPRI Cutting Edge Magnetic Bead Technology

Solid **P**hase **R**eversible **I**mmobilization (SPRI®) is a patented, high performance nucleic acid purification technology invented at the Whitehead Institute (Hawkins, et al. *Nucleic Acids Res.* 1995; 23:22). Targeted nucleic acids are immobilized onto paramagnetic microparticles using specific buffer conditions. Sample contaminants are easily removed without the need for centrifugation or filtration, creating a streamlined, scalable and automation-compatible format. The SPRI technology continues to gain broad acceptance as a premier sample preparation method used by many pharmaceutical, biotechnology, academic and government organizations performing life science research.

SPRI Bead Key Benefits

- High yield and purity nucleic acid isolation
- Robust and consistent performance
- Automation or manual-compatible methods
- Easily scalable reaction volumes and sample throughputs

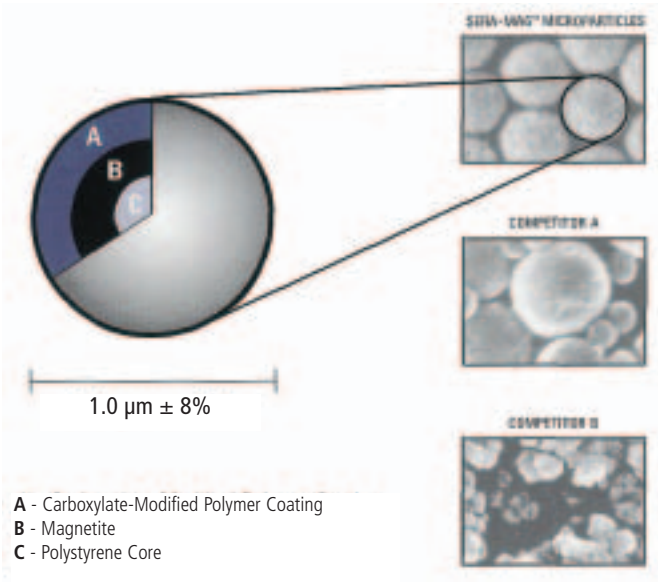
Flexibility

- Automated
- Manual
- 2 mL tubes
- 96- and/or 384-well microplates

Core SPRI Bead Design

SPRI beads are constructed using a core shell process that begins with a polystyrene core that is first coated with a layer of magnetite (iron) and then finally encapsulated with a polymer layer that contains carboxyl functional groups. This patented process produces magnetic beads that are superior for automation. Each bead has an average uniformity of 1 micron in diameter with a standard deviation of +/- 8%, and is colloidably stable in standard biological solutions. The bead's high uniformity imparts reproducible performance characteristics. The production process utilizes very small particles of fully formed magnetite that are layered onto the polystyrene core particle. As a result, the beads retain little residual magnetism when not subjected to a magnetic field, which prevents clumping and falling out of solution. Their 40% iron content gives the beads a very quick magnetic response time so that they are easily and effectively separated from solution in a tube or microplate. The functionalized polymer coating and small bead size give them a high non-specific binding capacity for nucleic acids.

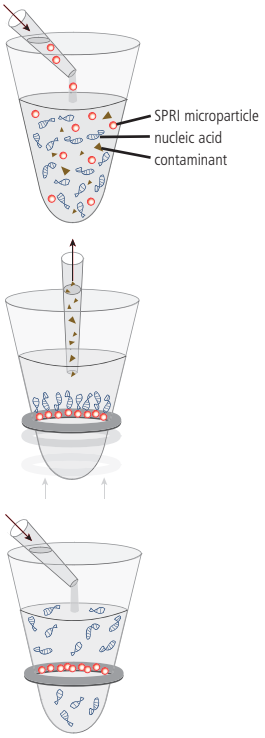
Superior Magnetic Particles Produce Superior Purification



A - Carboxylate-Modified Polymer Coating
B - Magnetite
C - Polystyrene Core

SPRI Methodology

A typical SPRI protocol is fast and easy, involving only a few simple steps.



Step 1: Nucleic acid immobilization

SPRI beads are directly added to sample reactions. Nucleic acids are selectively immobilized onto SPRI beads, leaving contaminants in solution.

Step 2: Contaminant removal

A magnetic field is used to pull the microparticles out of solution. Contaminants are aspirated and microparticles are thoroughly washed, yielding high quality nucleic acids.

Step 3: Nucleic acid elution

Purified nucleic acids are easily eluted from the microparticles under aqueous conditions, which provides maximum flexibility for downstream applications.

Why does SPRI outperform others?

1. SPRI vs. Filtration Columns

Many filtration column methods utilize size and/or charge to capture nucleic acids. This generally requires larger elution volumes in order to retrieve all of the bound nucleic acids, which can result in a more dilute final sample concentration. Columns can also easily clog when working with viscous sample materials such as blood and digested tissues. This clogging can contribute to poor recovery and large variation in sample purity. SPRI beads avoid these challenges since they do not utilize cationic-anionic charge separation or size exclusion. In addition, SPRI beads do not require expensive centrifugation or vacuum filtration hardware.

2. SPRI vs. Silica Beads

The manufacturing process of silica-based beads generates bead sizes ranging from 10–150 microns in diameter. Silica bead isolations are difficult to reproduce, since the amount of nucleic acid that binds to a bead depends on the bead size. Silica beads retain a higher nonspecific binding in comparison to SPRI beads, which may result in a lower final purity of isolated material. In addition, large silica beads can increase the precipitation or clumping from proteins and other biological materials present in a sample. The uniformity and small shape of SPRI beads allow them to maximize data reproducibility while minimizing contaminant precipitation or bead clumping.

3. SPRI vs. Other Magnetic Beads

SPRI beads utilize a unique combination of size, bead composition, and a carboxyl surface to maximize isolation and purification of nucleic acids. Other magnetic beads are generally larger; utilize a different functional group such as NH_4-, SO_4-, or OH-; or contain a different core makeup such as silica or styrene that do not perform as well as SPRI beads in direct comparisons.

Supported Applications

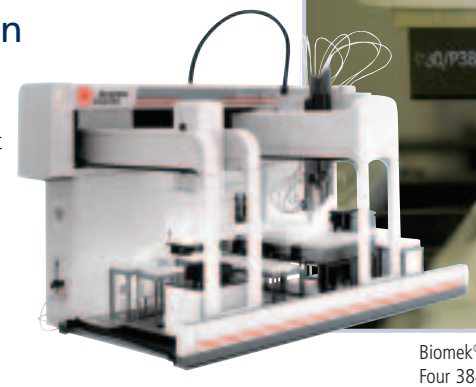
- **Genomic DNA** – PCR and Genotyping
- **cDNA and cRNA** – RNA Amplification for Gene Expression Profiling
- **RNA** – Gene Expression Profiling
- **PCR Amplicons** – Gene Identification and Examination
- **Plasmids** – Sequencing
- **BACs, Fosmids and Cosmids** – Sequencing
- **Sequencing Reaction Extension Products** – Sequencing

SPRI Bead Feature	Benefit
• Paramagnetic microparticles – 40% encapsulated iron content with fast magnetic response time	• Automation-friendly • Minimized purification time • Reproducible results • No need for vacuum filtration or centrifugation instrumentation
• Uniform bead size – 1 µm microparticles ± 8% – Highly engineered manufacturing process	• Reproducible purification • Automation-friendly
• High surface area to mass ratio – Large binding capacity	• High yield and recovery
• Carboxy-modified polystyrene polymer	• High purity of final isolated nucleic acids • No need for corrosive chaotropic salts • Minimized nonspecific contaminant binding

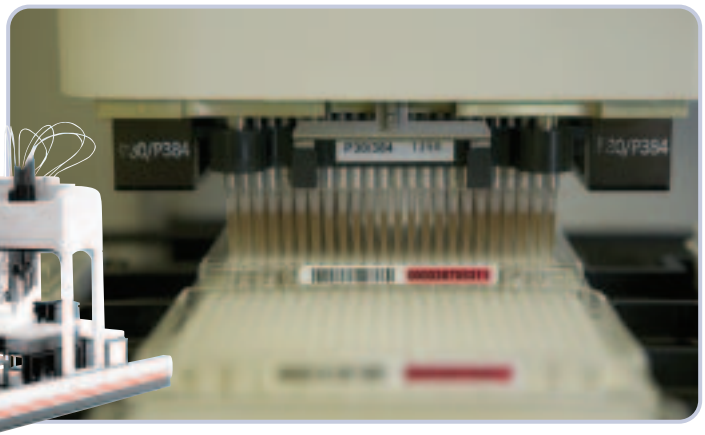
Automation Solutions

Plug and Play Automation

SPRI reagents have been successfully automated on the Beckman-Coulter Biomek® FX and NX systems. Agencourt offers a suite of automation scripts developed to support the variety of available SPRI-based applications. Each automation script has been programmed, tested and validated prior to release. For an updated list of available automation scripts, please visit our website.



Several SPRI applications have been successfully automated on the Biomek FX from Beckman Coulter. (Photo courtesy of Beckman Coulter.)



Biomek® FX with P30 384 head processing CleanSEQ in batch mode. Four 384-well plates are processed in parallel in approximately 25 minutes.

SPRI-based Products

DNA Sequencing

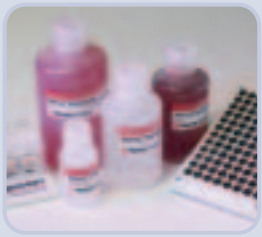
CleanSEQ®: Dye-Terminator Removal
SprintPrep®: Single Step Plasmid Purification
CosMCPrep®: Low & High Copy Plasmid Purification

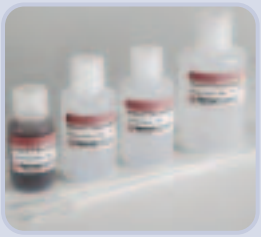
RNA Isolation and Purification

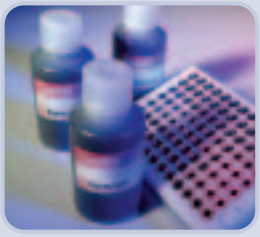
RNAPrep™: Total RNA Isolation from Cells
RNAClean™: *In vitro* cDNA & RNA Purification

PCR

AMPure®: PCR Purification







Please visit our website www.agencourt.com for detailed product information.

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