Automated Frozen Sample Aliquotter

No-Thaw Automated Extraction of Multiple Frozen Aliquots from One Frozen Sample

CRYOXTRACT

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introduction

Biotechnology tools hold potential for exponential progress in molecular medicine and biomarker discovery. Yet, quality results depend on quality materials, and optimal preservation and sampling are crucial to ensure banked sample integrity and promote ideal conditions for analysis.

Current methods and tools force biobanking into sample storage and processing trade-offs which can impact operations and costs significantly; sometimes affecting sample quality. For example, repeated freeze/thaw cycling may degrade critical biological molecules, and minimizing sampling frequency is recommended to reduce potential sample molecular damage.

the technology

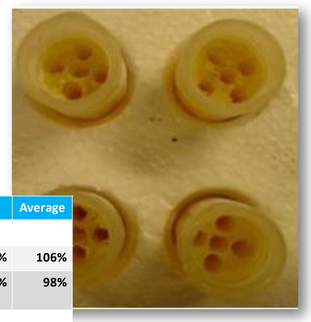
The Automated Frozen Sample Aliquotter enables the hands-free extraction of multiple frozen aliquots from one single vial of frozen serum or plasma sample without thawing it. A proprietary robotic probe cores a frozen sample under ultra-cold conditions and deposits the still-frozen cores into separate cryotubes for downstream analyses. The extracted cores remain frozen through the process. Any sample remaining may be returned to the freezer still frozen.

Robotic Coring Probe

frozen sample aliquotter

Conceived and designed to serve the needs of modern biobanking, the Automated Frozen Sample Aliquotter helps optimize frozen sample integrity and sampling efficiency:

- Extract multiple frozen cores from one single cryotube of frozen plasma or serum
- Deliver hands-free, automated operation (e.g. source vial selection, de-capping/capping, coring, dispensing, cleaning) after sample loading
- Achieve volumetric consistency on every extracted core (never <100µL from 1.8mL cryotube)
- Maintain ultra-cold conditions pre-, during, post-coring
- Avoid carryover between samples



	T-Chol	Trig	Glucose	IgG	Average
Reproducibility Study (few donors, many repeats)					
Cores vs. Controls	105%	108%	104%	108%	106%
Remainders vs. Controls	97%	100%	94%	100%	98%
Diversity Study (many donors, few repeats)					
Cores vs. Controls	101%	105%	102%	101%	102%
Remainders vs. Controls	98%	99%	99%	98%	98%
Reproducibility Study Coefficient of Variation (CV) (few donors, many repeats)					
Cores	4.4%	6.1%	6.6%	4.6%	5.4%
Remainders	1.9%	4.7%	3.5%	3.0%	3.3%

demonstrated capabilities

Independent evaluation of a proof-of-concept instrument at the R.I. BioBank successfully demonstrated that it can extract multiple frozen, uniformly-sized, consistently homogeneous frozen cores from one frozen plasma sample stored in a 1.8mL cryotube. The extracted cores give reproducible results with very low variability when analyzed for common analytes.

Consistently Homogenous Cores with Low Variability

NOTE: All results were normalized using the assay results from the controls

case studies

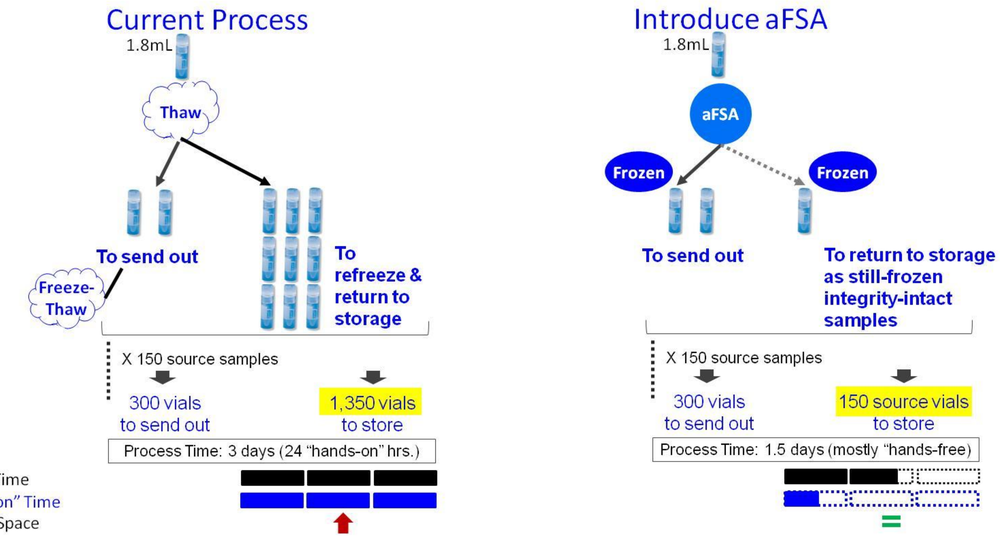
productivity gains

scenario

- Clinical biobank
- Samples frozen in 1.8mL/2.0mL tubes
- Request for 2 aliquots X150 samples = 300 aliquots

tasks

- Process 1 source/2 destinations
- Sub-aliquot remaining sample material
- Distribute samples
- Return unused sample to freezer



collection & storage optimization

scenario

20 donors/day
4.5mL serum/ea.

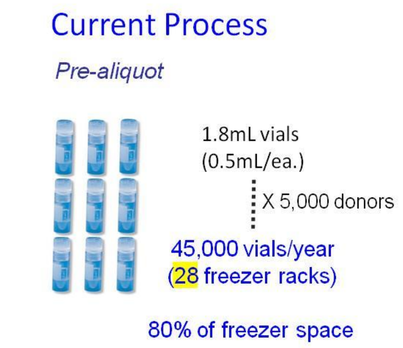
5,000 donors/Year

32 cu. ft. upright

35 racks
56,700 1.2-2.2 mL vial capacity

approach

- Freeze sample in multiple small aliquots (pre-aliquot)



- 18 racks "savings" (51% "savings")
- Cost of Plastics
- Up-front labor
- Sample tracking
- QA

egrity 🔵 extend sample usable life 🔵 standardize sample aliquotting 🔵 enhance lab productivity

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