



AHLSTROM
MUNKSJÖ

LONG-TERM PRESERVATION OF DNA

Ahlstrom-Munksjö GenSaver™

Ahlstrom-Munksjö GenSaver™ 2.0

SPECIMEN COLLECTION CARDS



Simple collection

Long-term preservation

High quality genetic profiles

Ahlstrom-Munksjö GenSaver™ and GenSaver™ 2.0 collection cards are treated with a new-to-market proprietary chemistry intended to prevent environmentally induced degradation. Our cards allow long-term preservation of DNA from biological fluids stored at ambient temperature.

A few reasons why:

Long-term preservation of DNA:

The chemical treatment of our cards allows long-term ambient protection of DNA from dried matrix spots and improved qualitative and quantitative DNA recovery

ISO 18385 compliance:

Our cards are manufactured in accordance to the world's first international standard for forensic consumables, minimizing the risk of human DNA contamination

High quality NGS data:

DNA preserved on our cards can be used even after 20 years of ambient storage to generate high quality next generation sequencing data

We meet your needs:

Our cards are customizable and can be tailored to fully accommodate your biological fluids sampling needs



Our solutions to your needs:

HUMAN IDENTIFICATION

GENOMICS

ANIMAL IDENTIFICATION

PLASMID SCREENING

TRANSGENIC IDENTIFICATION

Customizable designs for Forensics and Biobanking markets

Ahlstrom-Munksjö **GenSaver™** and **GenSaver™ Color** cards are designed for the collection, transport and storage at ambient temperature of DNA from biological fluids. The fiber-based material of these cards is made of pure absorbent fibers, impregnated with a proprietary chemical formulation intended to prevent environmentally induced degradation for long-term ambient preservation of DNA.

- **GenSaver™** - suitable for collection of blood samples
- **GenSaver™ Color** - suitable for the collection of colorless biosamples, such as saliva, buccal cells and urine.

GenSaver™ 2.0 and **GenSaver™ Color 2.0** collection cards offer additional features, preventing the growth of microorganisms during the long-term ambient storage of DNA.

Typical characteristics

Product	Cards/Pack	Sample areas/card	Max. Vol loaded/sample area (µl)	Ref. Number	Samples type	Max. storage	Applications	
Ahlstrom-Munksjö GenSaver™	25/100	4	125	8.564.0002.B-G/8.564.0002.B-N	Blood	20 years	Human Identification (direct-multiplex PCR and quantitative PCR, STR & NGS genotyping)	
	25/100	2		8.564.0001.B-G/8.564.0001.B-N				
	25/100	1		8.564.0000.B-G/8.564.0000.B-N				
Ahlstrom-Munksjö GenSaver™ Color	25/100	4	70	8.565.0002.B-G/8.565.0002.B-N	Saliva Buccal cells Urine	20 years		
	25/100	2		8.565.0001.B-G/8.565.0001.B-N				
	25/100	1		8.565.0000.B-G/8.565.0000.B-N				
Ahlstrom-Munksjö GenSaver™ 2.0	25/50/100	96	5	8.566.0003.B-G/8.566.0003.B-K/ 8.566.0003.B-N	Blood	20 years		Genomics
	25/100	4		8.566.0002.B-G/8.566.0002.B-N				Animal identification
	25/100	2	125	8.566.0001.B-G/8.566.0001.B-N				Plasmid screening
	25/100	1		8.566.0000.B-G/8.566.0000.B-N				
Ahlstrom-Munksjö GenSaver™ Color 2.0	25/50/100	96	5	8.567.0003.B-G/8.567.0003.B-K/ 8.567.0003.B-N	Saliva Buccal cells Urine Bacterial suspension Cell lysate	20 years	Transgenic identification	
	25/100	4		70			8.567.0002.B-G/8.567.0002.B-N	
	25/100	2	8.567.0001.B-G/8.567.0001.B-N					
	25/100	1	8.567.0000.B-G/8.567.0000.B-N					

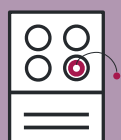
Your results are a few steps away

How to – simplified collection and analysis

- 1.** Collect biosample and let it dry



- 2.** Punch a 1.2 mm paper disc



- 3.** Add the disc to PCR reagents



- 4.** Amplify genomic DNA



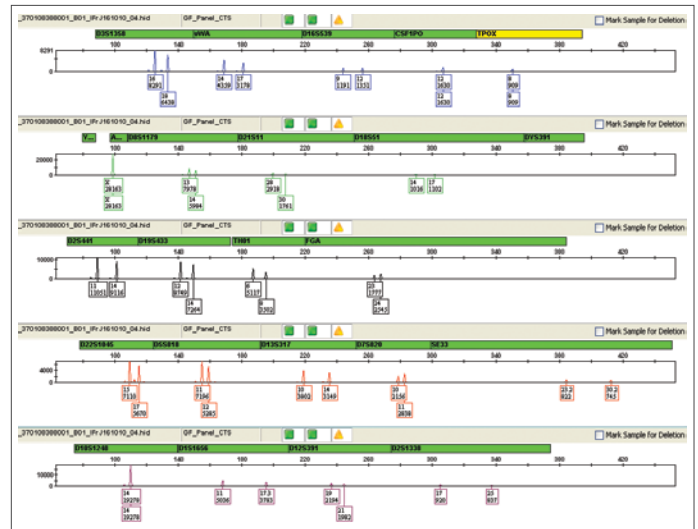
High-quality STR Profile

These data have been obtained from genomic DNA purified from 7 µl of female human saliva spotted on GenSaver™ Color 2.0 card, air dried, then stored at room temperature for 10 years*.

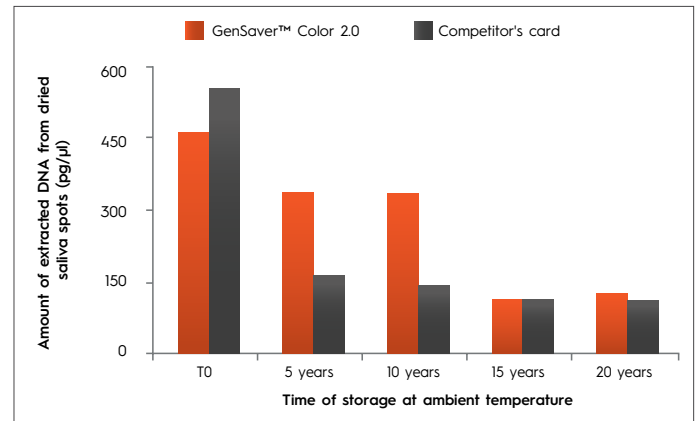
Locus	Allele 1	Allele 2	Summary
DS1358	100%	100%	4 correct calls out of 4
vWA	100%	100%	4 correct calls out of 4
D16S539	100%	100%	4 correct calls out of 4
CSFIPO	100%	N/A	2 correct calls out of 2
TPOX	100%	N/A	2 correct calls out of 2
Yindel	N/A	N/A	0 correct calls out of 0
AMEL	100%	N/A	2 correct calls out of 2
D8S1179	100%	100%	4 correct calls out of 4
D21S11	100%	100%	4 correct calls out of 4
D18S51	100%	100%	4 correct calls out of 4
DYS391	N/A	N/A	0 correct calls out of 0
D2S441	100%	100%	4 correct calls out of 4
D19S433	100%	100%	4 correct calls out of 4
TH01	100%	N/A	2 correct calls out of 2
FGA	100%	100%	4 correct calls out of 4
D22S1045	100%	100%	4 correct calls out of 4
D5S818	100%	100%	4 correct calls out of 4
D13S317	100%	N/A	2 correct calls out of 2
D7S820	100%	100%	4 correct calls out of 4
SE33	100%	100%	4 correct calls out of 4
D10S1248	100%	N/A	2 correct calls out of 2
DIS1656	100%	100%	4 correct calls out of 4
D12S391	100%	100%	4 correct calls out of 4
D2S1338	100%	100%	4 correct calls out of 4

Total numbers of sample	2
Total of possible allele calls	76
Total correct allele calls	76
Percentage of Accuracy N/A: Non Applicable	100%

Percentage accuracy of allele calls for 20 loci determined by STR profiling of purified DNA.



Electropherogram for the STR amplification from purified DNA.

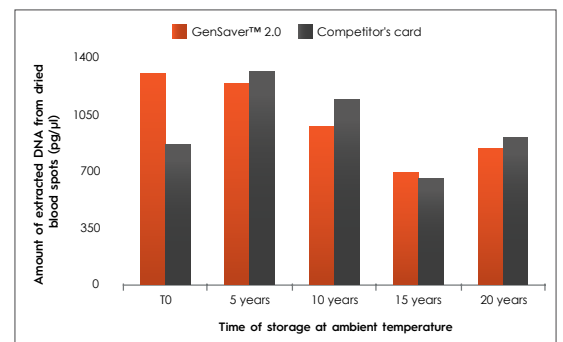


Total yield of genomic DNA quantified by real-time PCR.

Next Generation Sequencing Data

Ahlstrom-Munksjö card	Years of storage	Bases	≥ Q20	Reads	Mean Read Length
GenSaver™ 2.0	15	35 899 842	34 420 724 (96%)	439 855	82 bp
	20	37 970 318	35 669 237 (95%)	472 610	80 bp
GenSaver™ Color 2.0	15	25 613 871	24 621 019 (96%)	325 937	79 bp
	29	38 027 859	35 628 198 (94%)	490 048	78 bp

NGS data obtained from DNA purified from blood (GenSaver™ 2.0) or saliva (GenSaver™ Color 2.0) stored at ambient temperature for 15 and 20 years. The high quantity and quality of DNA stored and extracted is correlated with high number of Reads and a Quality test (Q20) value at 95%. This high data quality is consistent and demonstrates that NGS is achievable even after long-term storage of DNA at ambient temperature on Ahlstrom-Munksjö cards.



Total yield of genomic DNA purified from paper discs taken from the center of 80 µl human blood spotted on GenSaver™ card, air dried, then stored at ambient temperature for 20 years*. DNA has been quantified by real-time PCR.

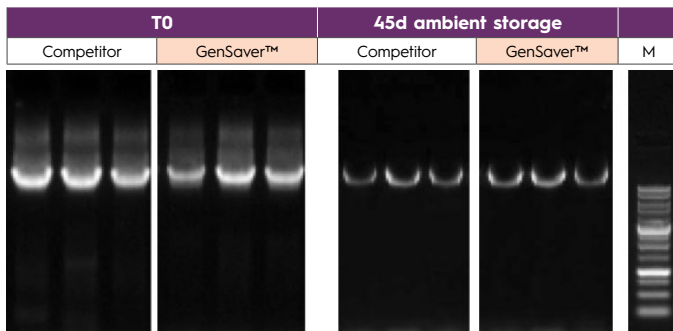
* Test performed with accelerated ageing conditions. * Real-time stability studies are ongoing to confirm these results.

Stability for direct DNA amplification

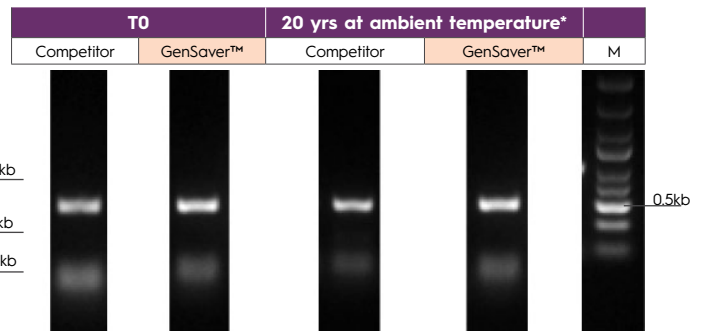
Locus	Allele 1	Allele 2	Summary
DS1358	100%	100%	6 correct calls out of 6
vWA	100%	100%	6 correct calls out of 6
D16S539	100%	100%	6 correct calls out of 6
CSFIPO	100%	100%	6 correct calls out of 6
TPOX	100%	100%	6 correct calls out of 6
Yindel	100%	N/A	3 correct calls out of 3
AMEL	100%	100%	6 correct calls out of 6
D8S1179	100%	100%	6 correct calls out of 6
D21S11	100%	100%	6 correct calls out of 6
D18S51	100%	100%	6 correct calls out of 6
DYS391	100%	N/A	3 correct calls out of 3
D2S441	100%	100%	6 correct calls out of 6
D19S433	100%	100%	6 correct calls out of 6
TH01	100%	N/A	3 correct calls out of 3
FGA	100%	100%	6 correct calls out of 6
D22S1045	100%	100%	6 correct calls out of 6
D5S818	100%	100%	6 correct calls out of 6
D13S317	100%	N/A	3 correct calls out of 3
D7S820	100%	100%	6 correct calls out of 6
SE33	100%	100%	6 correct calls out of 6
D10S1248	100%	100%	6 correct calls out of 6
DIS1656	100%	100%	6 correct calls out of 6
D12S391	100%	100%	6 correct calls out of 6
D2S1338	100%	100%	6 correct calls out of 6
Total numbers of sample			3
Total of possible allele calls			132
Total correct allele calls			132
Percentage of Accuracy			100%
N/A: Non Applicable			



STR Electropherogram from direct DNA amplification from a 1.2 mm paper disc taken from the center of dried blood spots collected on GenSaver™ card.

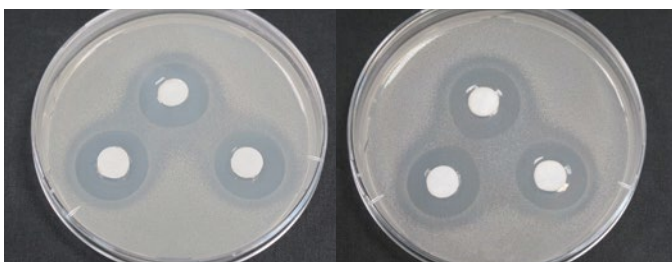


Agarose gel analysis (1XTAE, 0.8% agarose) of a direct amplification of a 7.5 kb PCR product (Beta-globin gene, single copy gene) from 1.2 mm discs taken from the center of 80 µl dried blood spots collected on GenSaver™ card.

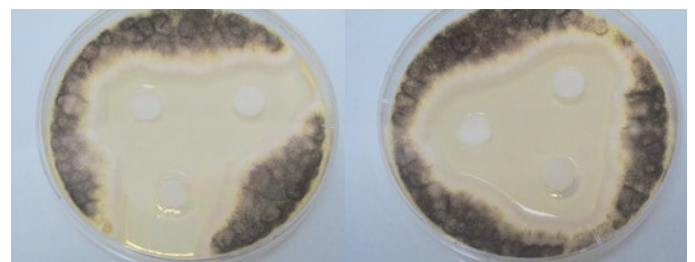


Agarose gel analysis (1XTAE, 1.2% agarose) of a direct amplification of a 500 bp PCR product (Cathepsin K gene, single copy gene) from 1.2 mm discs taken from the center of 80 µl dried blood spots collected on GenSaver™ card.

Antimicrobial activity of GenSaver™ 2.0 and GenSaver™ Color 2.0



Zones of growth inhibition for *Bacillus subtilis* (seeded on classic nutrient medium 10^5 CFU/ml) grown in the presence of GenSaver™ 2.0 (left) and GenSaver™ Color 2.0 (right) discs.



Zones of growth inhibition for *Aspergillus niger* (seeded on sabouraud nutrient medium 10^5 spores/ml) grown in the presence of GenSaver™ 2.0 (left) and GenSaver™ Color 2.0 (right) discs.

Ahlstrom-Munksjö is a global leader in fiber-based materials, supplying innovative and sustainable solutions to customers worldwide. Our offerings include decor paper, filter media, release liners, abrasive backings, nonwovens, electrotechnical paper, glass fiber materials, food packaging and labeling, tape, medical fiber materials and solutions for diagnostics. Combined annual net sales are about EUR 2.15 billion and we employ 6,000 people. The Ahlstrom-Munksjö share is listed on the Nasdaq Helsinki and Stockholm. The company was formed on April 1, 2017 through the merger of Ahlstrom Corporation and Munksjö Oyj.



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