

Salt Active Nuclease

High Quality (Bioprocessing grade)

ArcticZymes presents SAN High Quality (Bioprocessing grade), the ultimate solution for efficient removal of nucleic acids in manufacturing. This nonspecific, recombinant endonuclease has optimum activity at high salt concentrations, improving efficiency and yield in various workflows.



High salt tolerance can improve workflow and yield

Salt Active Nuclease (SAN) High Quality is a novel, engineered endonuclease that tolerates reaction conditions with high salt concentrations. The enzyme has optimal activity at 0.5 M NaCl and is an excellent choice for removal of nucleic acids in manufacturing and bioprocessing workflows.

Salt is an important component of various purification schemes. The presence of salt can minimize aggregation, increase target solubility and improve target yield. High salt enables contaminating DNA to dissociate from associated proteins and become available for degradation.

ArcticZymes utilizes SAN in its own manufacturing processes to produce high quality, nucleic acid-free enzymes

Why SAN High Quality (Bioprocessing grade)?

Removal of nucleic acid impurities is critical in manufacturing and bioprocessing of therapeutic proteins, viruses and similar compounds. The novel features of SAN High Quality ensure an effective enzymatic treatment in various buffer and operating conditions.

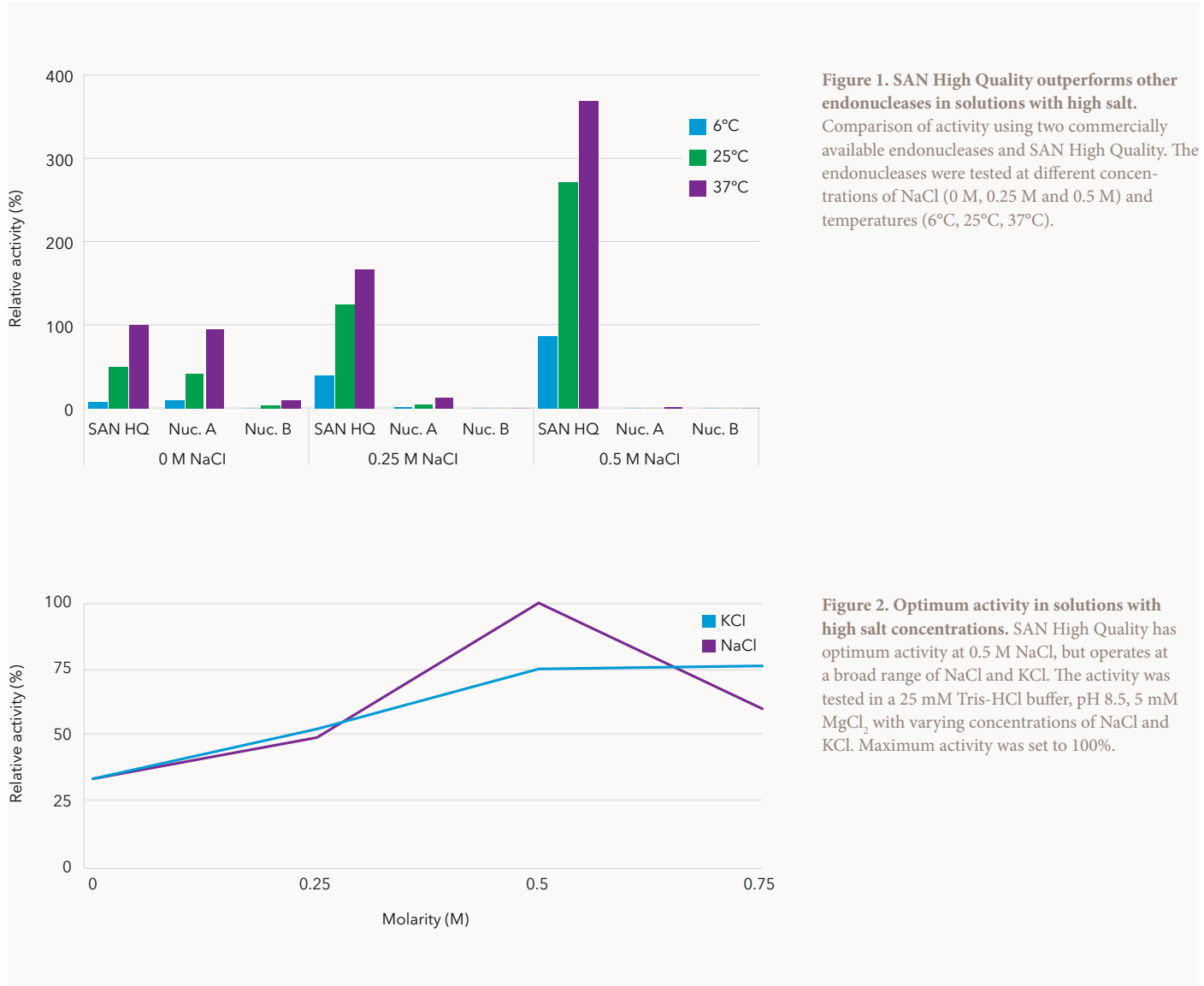
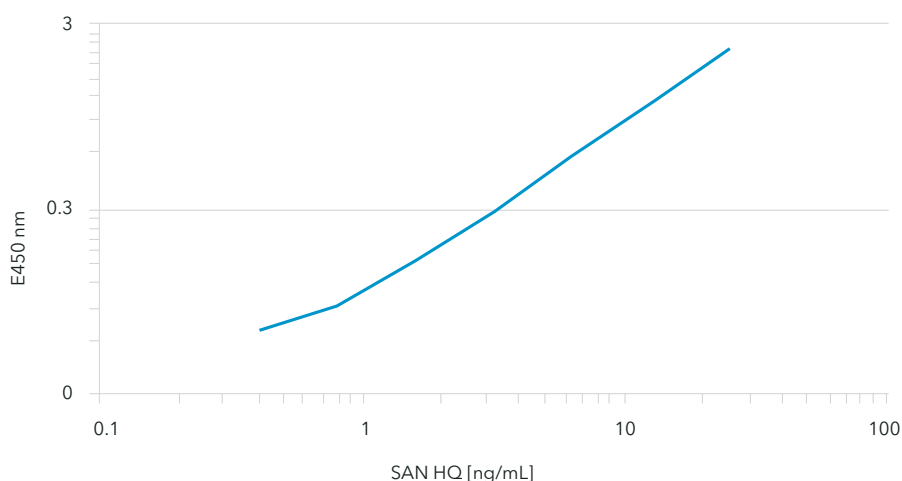


Figure 1. SAN High Quality outperforms other endonucleases in solutions with high salt. Comparison of activity using two commercially available endonucleases and SAN High Quality. The endonucleases were tested at different concentrations of NaCl (0 M, 0.25 M and 0.5 M) and temperatures (6°C, 25°C, 37°C).

Figure 2. Optimum activity in solutions with high salt concentrations. SAN High Quality has optimum activity at 0.5 M NaCl, but operates at a broad range of NaCl and KCl. The activity was tested in a 25 mM Tris-HCl buffer, pH 8.5, 5 mM MgCl₂ with varying concentrations of NaCl and KCl. Maximum activity was set to 100%.

Detection of SAN High Quality with the SAN HQ ELISA kit



SAN HQ ELISA detects and quantifies residual SAN HQ nuclease post treatment. The ELISA Kit consists of monoclonal antibodies coated on a polystyrene microtiter plate.

Figure 3. SAN HQ ELISA uses monoclonal antibodies for the specific detection and quantification of SAN High Quality. The figure illustrates a typical calibration curve for SAN High Quality, showing a calibration range of 0.4-25.6 ng/mL.

Quality control

ArcticZymes is dedicated to product quality, consistency and reliability. ArcticZymes is certified according to ISO 13485:2016, and all our products are developed, manufactured and distributed according to the requirements of this Quality Management System standard.

We are the sole producer of SAN High Quality, ensuring high and reliable quality of the product. SAN High Quality is supplied with extended product documentation describing product quality.

Quality control parameters for SAN High Quality

- Purity: $\geq 98\%$ by SDS-PAGE
- No protease activity detected
- Ph.Eur methods for endotoxin, aerobic bacteria, yeast and mold counts



Properties

Source	Recombinantly produced in <i>Pichia pastoris</i>
Specific activity	$\geq 175\ 000$ Units/mg
Size	The protein is glycosylated. Protein size without glycosylation is 26 kDa
Unit definition	One Unit is defined as an increase in absorbance at 260 nm of 1 A in 30 minutes at 37°C, using 50 $\mu\text{g/ml}$ calf thymus DNA in a buffer consisting of 25 mM Tris-HCl, pH 8.5 (25°C), 5 mM MgCl_2 , 500 mM NaCl
Specificity	Nonspecific endonuclease cleaving single- and double stranded DNA and RNA. The enzyme degrades DNA vs. RNA in a 10:1 ratio
End-product	Following complete degradation, the end product consist of a majority of 5 nucleotide oligos
Activity	<ul style="list-style-type: none">• Tmp: 0–40°C, optimal is 35°C• NaCl: 50 mM–1 M, optimal NaCl is 0.5 M• Mg^{2+} (>1 mM) is required for activity, optimal Mg^{2+} is 20 mM• pH: 7.0–9.5, optimal pH is 9
Tolerance to typical buffer additives	<ul style="list-style-type: none">• Imidazole: 20% activity at 350 mM Imidazole• Glycerol: 20% activity at 35% glycerol• Triton X-100: No reduction in activity (tested up to 15%)• SDS: Not recommended• Urea: Not recommended• Reducing agents (e.g. DTT, TCEP): will result in inactivation

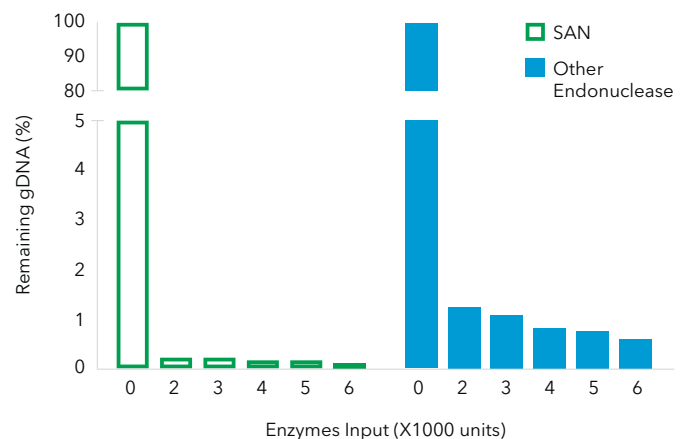
AAV application

One application of SAN High Quality is the removal of DNA impurities during AAV purification. In one example, a customer tested SAN High Quality and another endonuclease in their AAV-workflow. Material was sampled both before and after endonuclease treatment (at 37°C for 1hr) at optimum buffer conditions. Five Different enzyme amounts (6K, 5K, 4K, 3K, 2K) were used per 150 million HEK293 cells harvested. Genomic DNA was quantified using the Quant-iT dsDNA High Sensitivity Assay Kit (Invitrogen) and normalized to pre-enzyme treatment samples. The Lab Director commented "Given its optimal activity in high salt conditions, SAN High Quality improves downstream processes and reduces purification time without loss of vector yield and activity. SAN HQ's improved efficiency is serotype independent". The data opposite is a courtesy of a viral vector core at a major academic center in the mid-Atlantic region.



ArcticZymes®

Enzyme innovations from the Arctic



Product information

ArcticZymes understands and values the need to quickly mobilize products for commercial partners. We offer the convenience of providing standard bulk enzymes as off the shelf products. In addition, ArcticZymes offers our enzymes in customized formats. Please contact us for additional information.

Ordering information

Product name	Catalogue #	Concentration	Size	Units
SAN HQ 25-25k	70920-202	25-30 U/μl	1 ml	25 kU
SAN HQ 500k	70920-150	>250 U/μl		500 kU
SAN HQ 5M	70920-160	>250 U/μl		5 MU
SAN HQ custom	70920-100	Per agreement	Per agreement	Per agreement
SAN HQ 25-25k Triton FREE	70921-202	25-30 U/μl	1 ml	25 kU
SAN HQ 500k Triton FREE	70921-150	>250 U/μl		500 kU
SAN HQ 5M Triton FREE	70921-160	>250 U/μl		5 MU
SAN HQ custom Triton FREE	70921-100	Per agreement	Per agreement	Per agreement
SAN HQ ELISA	70930-001	1-96 well strip plate		

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