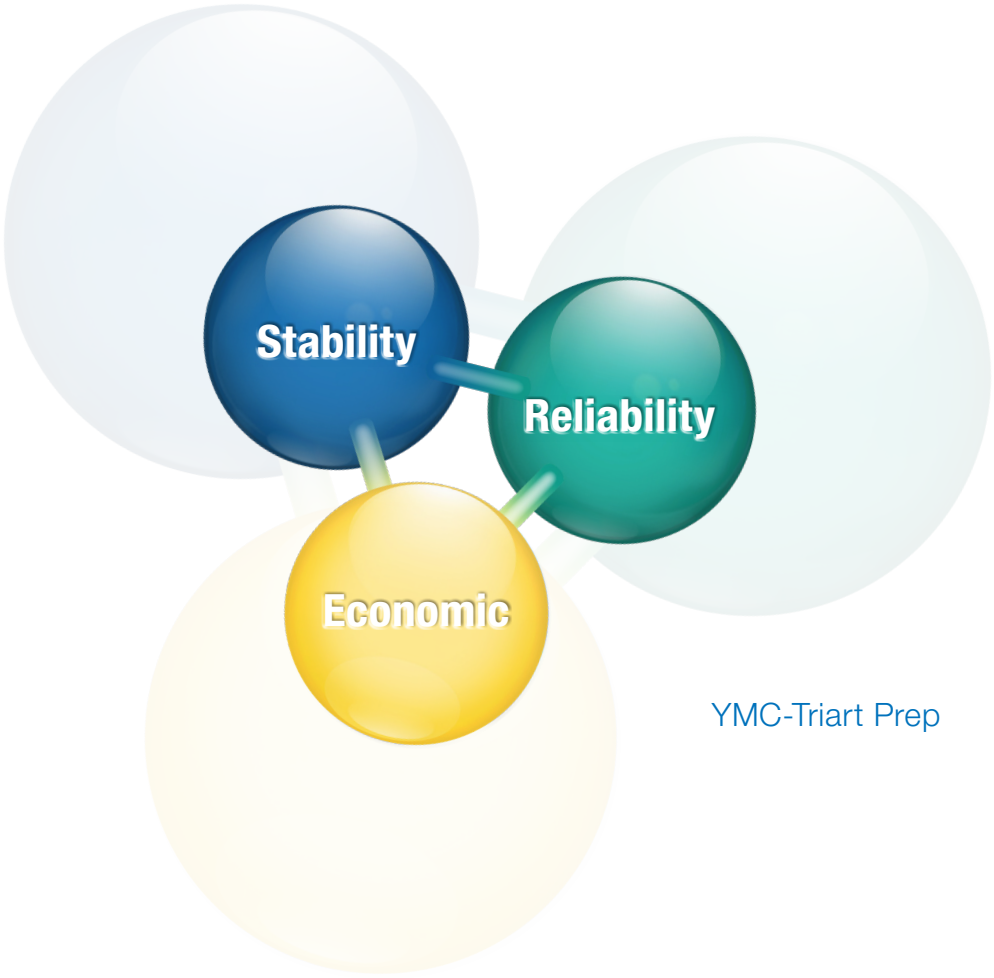
Excellent alkaline CIP-stability of YMC-Triart Prep leads to long lifetime

Abstract

Reversed phase chromatography is excellently suited for the purification of biomolecules such as peptides and oligonucleotides. This technique allows high separation efficiency and high loadability and is therefore used in various industrial scale processes.
The purification of these molecules has the general side effect of non-specific adsorption and precipitation. To maintain the high performance of RP media in such processes, cleaning-in-place (CIP) procedures with alkaline solution are used. These cleaning processes can restore the performance and therefore massively increase the life-time of the column and thereby the productivity of the process. This alkaline treatment is only possible with stationary phases with high chemical stability and resistance towards alkaline solutions typical of the hybrid-silica material **YMC-Triart Prep**. This application note demonstrates the alkaline stability of **YMC-Triart Prep** that allows for over 300 CIP cycles without loss of the high performance. With this chemical stability, this innovative stationary phase is the first choice for the purification of bio-molecules.



The effect of alkaline cleaning-in-place

From the initial injection of a crude biomolecule sample, non-specific adsorption of feed components is a huge issue. This non-specific binding leads to a continuous loss of the chromatographic performance because more and more binding sites of the stationary phase are occupied by non-specific contaminants.

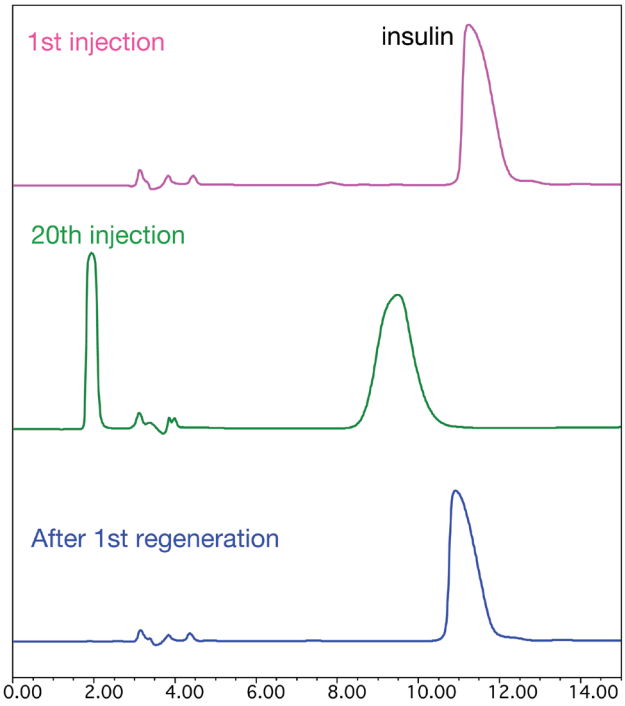
Flushing of the column with alkaline solutions such as 0.1 M NaOH can dissolve the precipitants and elute the unspecific bound materials resulting in the restoration of the chromatographic performance. After this CIP cycle, the column shows an elution profile that is comparable to the initial one.

Effect of CIP with alkaline solution

The Effect:
Continuous non-specific adsorption and precipitations from the 1st injection

The Result:
Changed retention behaviour of the target and peak broadening

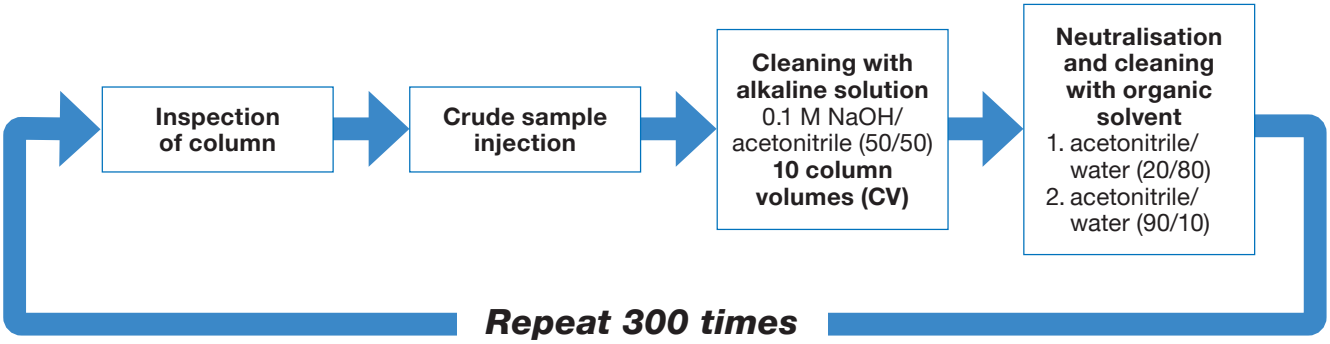
The Solution:
Alkaline cleaning-inplace procedures (CIP) restore chromatographic performance



CIP-stability study with alkaline solutions

For efficient processes, the CIP procedures have to be used regularly to ensure a long column lifetime. A stability study was performed to test the long-term stability of **YMC-Triart Prep** and alternative materials towards repetitive alkaline CIP-procedures.

Within this study, columns packed with the stationary phases were flushed with 0.1 M NaOH according to the following protocol and subsequently, the chromatographic performance was monitored by crude sample injection. The procedure was repeated multiple times.

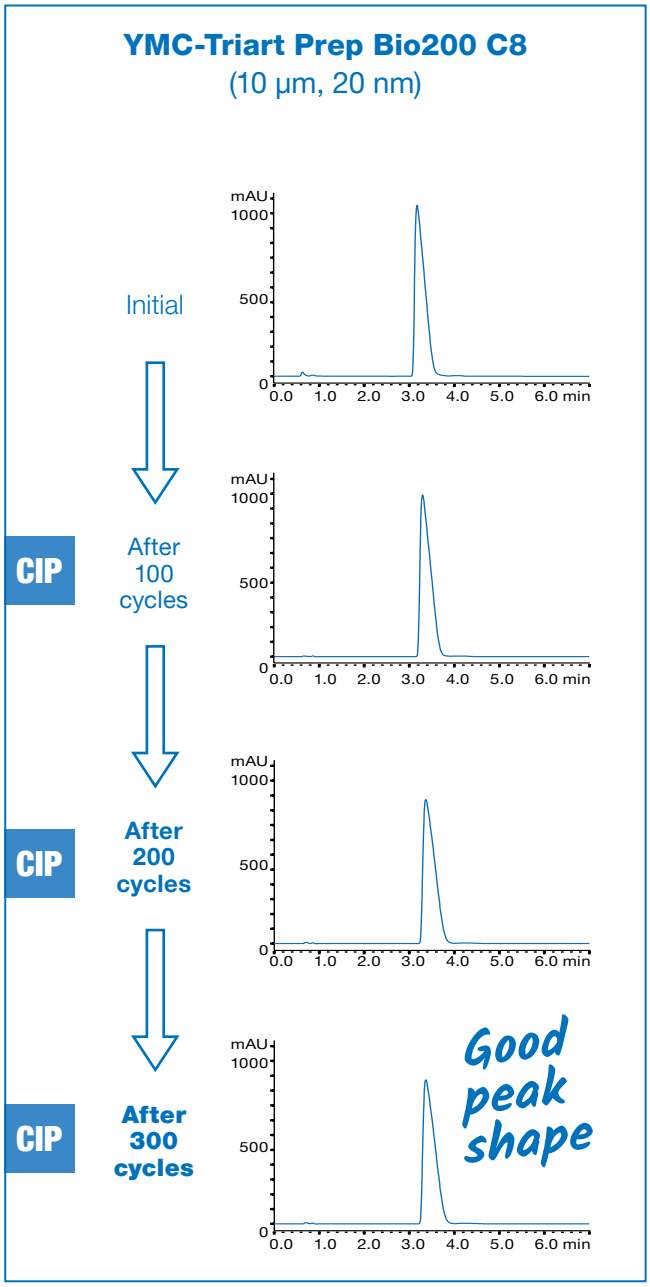


Results:

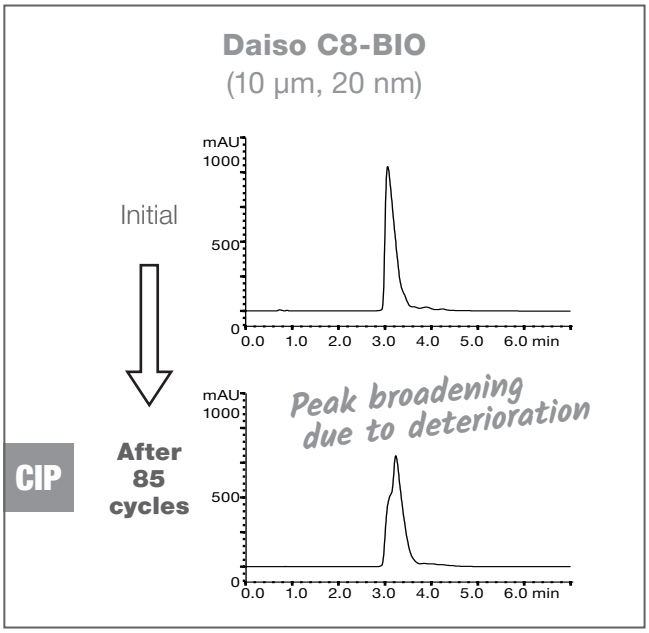
YMC-Triart Prep shows the highest stability towards alkaline CIP-procedures

Hybrid-silica-based **YMC-Triart Prep** has an excellent stability at high pH. It is stable to alkaline wash conditions which enables longer column lifetime. A good peak shape is maintained even after 300 alkaline cleaning cycles. This in turn reduces production costs due to lower consumption of packing material and less downtime due to column repacking.

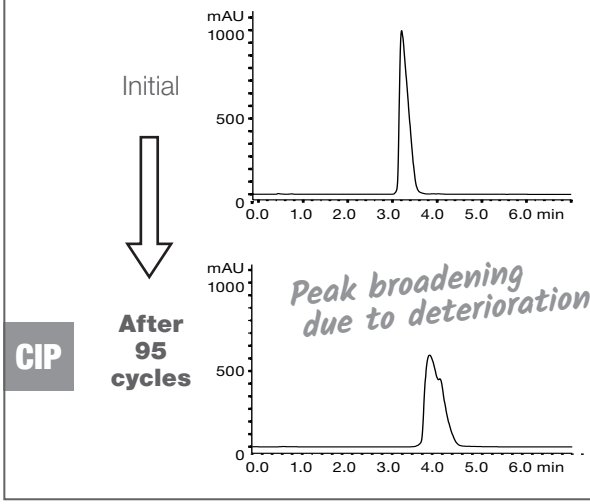
YMC-Triart Prep Bio200 C8
(10 µm, 20 nm)



Daiso C8-BIO
(10 µm, 20 nm)



Kromasil 100-10-C8
(10 µm, 10 nm)



YMC-Triart Prep shows up to 4 times longer lifetimes compared to the alternative materials!

Conclusion

The CIP-stability study of **YMC-Triart Prep** clearly demonstrates its excellent stability towards alkaline cleaning procedures with 0.1 M NaOH and its superior performance:

- **YMC-Triart Prep** maintains good peak shape even after 300 alkaline cleaning cycles
- Alternative materials show peak shape deterioration after < 100 cycles
- **YMC-Triart Prep** is ideally suited to the purification of biomolecules

Therefore, YMC-Triart Prep is the first-choice stationary phase for productive bioseparations!

Specifications

	YMC-Triart Prep C18-S	YMC-Triart Prep C8-S	YMC-Triart Prep Bio200 C8	YMC-Triart Prep Phenyl-S
Base material	inorganic / organic hybrid silica			
Particle size [µm]	7, 10, 15, 20	10, 15, 20	10	10
Pore size [nm]	12	12	20	12
Specific surface area [m^2/g]	360	360	proprietary	360
Bonding	trifunctional C18	trifunctional C8	trifunctional C8	trifunctional Phenyl
End-capping	yes	yes	yes	yes
Flexible pH range	2.0 ~ 10.0	2.0 ~ 10.0	2.0 ~ 10.0	2.0 ~ 10.0
Column cleaning	common procedures up to pH 12	common procedures up to pH 12	common procedures up to pH 12	common procedures up to pH 12

Order information

YMC-Triart Prep C18-S			YMC-Triart Prep C8-S		
Pore size [nm]	**Particle size** [µm]	**Product Code**	**Pore size** [nm]	**Particle size** [µm]	**ProductCode**
12	7	TAS12S07	12	10	TOS12S11
	10	TAS12S11		15	TOS12S16
	15	TAS12S16		20	TOS12S21
	20	TAS12S21			

YMC-Triart Prep Bio200 C8			YMC-Triart Prep Phenyl-S		
Pore size [nm]	**Particle size** [µm]	**Product Code**	**Pore size** [nm]	**Particle size** [µm]	**ProductCode**
20	10	TOB20S11	12	10	TPS12S11

More information on the benefits of the YMC-Triart Prep materials can be found on the YMC website www.ymc.eu or just please contact your YMC representative.