



---

# Preparative & Process LC

## Contents

- General ..... 210-211
- YMC\*Gel HG-Series Silica ..... 212
- YMC-BioPro (IEX)..... 213
- YMC-Triart ..... 214

## Introduction

Since 1980, YMC has consistently developed to become one of the leading specialist vendors dedicated to providing chromatographic media solutions from R&D to industrial scale purification of high value compounds. The “Worlds of YMC” consist of both laboratory and academic environments as well as straightforward production conditions in pharmaceutical, biotech, chemical and other industries. Since 1986, YMC silica resins have been successfully adopted and validated in industrial processes and used reproducibly day after day, year after year.

These products are complemented by the newly developed hybrid phase, YMC-Triart, and the resin-based, strong ion-exchangers, YMC-BioPro.

---



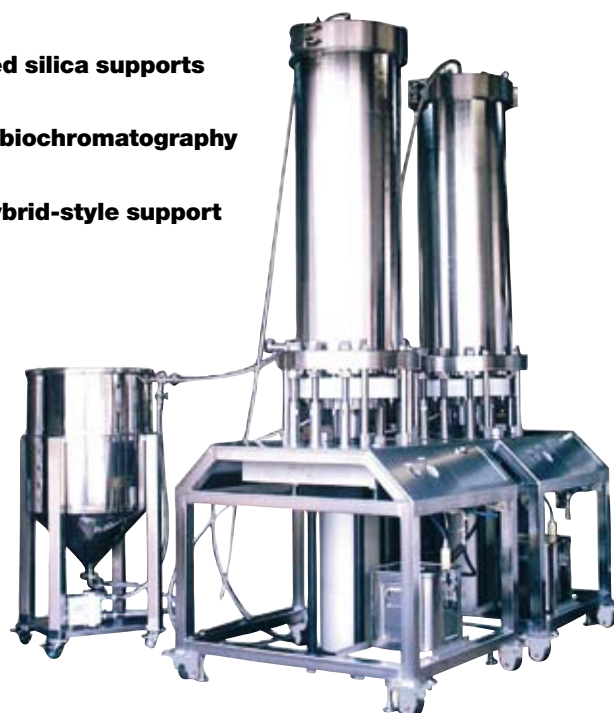
# Preparative & Process LC

Traditionally, the core focus was to provide ultrapure silica supports with highly selective surface chemistries in terms of bonding type and endcapping. YMC were first to set a milestone with the “legendary” YMC-Pack ODS-AQ, a C18 phase stable in aqueous conditions, for the reversed phase separation of polar compounds. YMC were first to set another milestone for a product dedicated specifically to the separation of basic compounds: YMCbasic. By nature of the overall vision, both these two products (and others) are available in preparative grades that made their way from the lab into various large-scale processes worldwide.



**YMC of today maintains  
three technology platforms:**

- **traditional, yet consistently improved silica supports**
- **hydrophilic polymer beads for IEX / biochromatography**
- **YMC-Triart; an organic/inorganic hybrid-style support with outstanding stability**



# Preparative & Process LC



All the above platforms are available not only as preparative grades by definition of the specification, but also by availability in multi-ton per year capacities, and large lot sizes.

With YMC-Triart, YMC has again set a milestone by being the first in presenting the benefits of hybrid-style media to the preparative community: enhanced pH-stability from pH1 to pH12, highly defined particle properties and excellent mechanical stability for long-term separation methods.



In addition to product supply, YMC is proud to be recognised for outstanding technical support by dedicated people with a mission to exceed expectations. YMC will happily share expertise and proactively contribute to make customers successful in their daily work. YMC support teams are located in Japan, China, Korea, Taiwan, India and the USA in addition to Germany which provides support for the EMEA countries together with a network of Authorised Distributors who provide additional local support.

# YMC\*Gel HG-Series Silica



- ultra high purity silica
- high mechanical stability
- highly porous, totally spherical particles
- fully scalable for analytical, semi-prep, preparative and process scale applications
- convenient for separating small organic compounds with similar structures



*For more information about high grade silica phases for preparative HPLC please see our brochure: "YMC\*Gel HG-series"*

"YMC will never knowingly change or modify an existing product that has any customer base." This statement ensures that YMC maintains the constant production of traditional products that are subject to validated processes. It is also this statement that proves the level of control that YMC can guarantee for reproducing any product that it manufactured in the past. Continuity and consistency are live and routinely applied values with YMC.

As time passes, YMC nevertheless continues to seek opportunities to improve existing products further. The latest generation, HG-series silica, provides improved mechanical and chemical stability and represents the product of choice for new methods. The unbounded silica support is available in lots of up to 500 kgs whilst bonded products are routinely produced in lots of up to 200 kgs.

## YMC\*Gel HG-Series Product Range

PRODUCT	BONDING	PHASE DESCRIPTION	PORE SIZE* (nm)	PARTICLE SIZE* (µm spherical)	CARBON LOAD** (%C)	pH
ODS-A-HG	C18	high performance C18 silica	12; 20; 30	10; 15; 20; 50	17; 12; 7	2.0-7.5
ODS-AQ-HG	C18	"hydrophilic" endcapping, for 100% aqueous eluent systems, substantially increased retention of polar compounds	12; 20; (30)	10; 15; 20; 50	14; 10	2.0-7.5
C8-HG (Octyl)	C8	C8 phase, high coverage monomeric bonding chemistry	12; 20; 30	10; 15; 20; 50	10; 7; 4	2.0-7.5
C4-HG (Butyl)	C4	C4 phase, less hydrophobic surface structure than C8 packing material	12; 20; 30	10; 15; 20; 50	7; 5; 3	2.0-7.5
TMS-HG (C1)	C1	trimethylsilane bonding	12; (20; 30)	10; 15; 20; 50	4	2.0-7.5
Ph-HG (Phenyl)	Phenyl	monomeric bonded phenyl, the p electron interaction gives a separation selectivity different from ODS	12; (20; 30)	10; 15; 20; 50	9	2.0-7.5
NH <sub>2</sub> -HG (Amino)	Aminopropyl	primary amino derivative, high coverage monomeric bonding chemistry, suitable for HILIC	12; (20; 30)	10; 15; 20; 50	3	2.0-7.5
CN-HG (Cyano)	Cyanopropyl	for RP and NP applications, useful also for SFC and HILIC	12; (20; 30)	10; 15; 20; 50	7	2.0-7.5
Diol-HG	Diol	for normal phase applications, high recovery for biological material, suitable for HILIC and SFC	12; 20; 30	10; 15; 20; 50	–	2.0-7.5
SIL-HG (Silica)	—	ultra high purity, high mechanical stability, suitable for HILIC and SFC	12; 20; 30	10; 15; 20; 50	–	–

Analytical grades (3 and 5 µm) are routinely available in pre-packed columns. Particle sizes as indicated. If not listed, please ask for quotation. Multi-ton capacity. Customised packing materials available on request. Pore sizes in parenthesis on request.

\*Not all combinations of pore size and particle size are available.

\*\*With respect to pore size.

# YMC-BioPro - IEX Ion Exchange Media



- hydrophilic methacrylate polymer beads
- high dynamic binding capacity
- low non-specific adsorption
- excellent recovery
- stable to cleaning in place

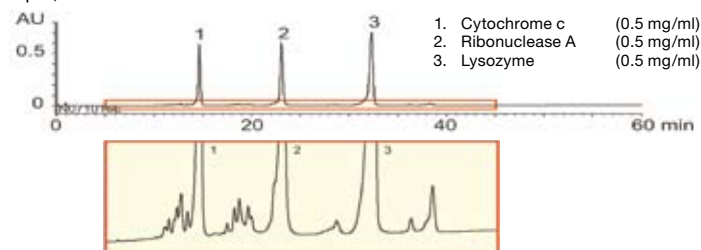
YMC BioPro is specifically designed for the cost-effective separation of proteins, antibodies, peptides and oligonucleotides.

It is available at analytical scale in porous or non-porous versions of a 5 µm bead, whilst preparative grade media is available in 10 µm, 30 µm and 75 µm porous beads for polishing, purification or capture. Based on a hydrophilic polymer, these strong ion exchange materials frequently demonstrate impressive recoveries and high dynamic binding capacities, even at higher than normal linear flow rates.

## Excellent resolution

### Standard protein separation on porous YMC-BioPro SP

YMC-BioPro SP  
5 µm, 50 x 4.6 mm ID



Eluent: A) 20 mM  $\text{KH}_2\text{PO}_4$ - $\text{K}_2\text{HPO}_4$  (pH 6.8)  
B) 20 mM  $\text{KH}_2\text{PO}_4$ - $\text{K}_2\text{HPO}_4$  (pH 6.8) containing 0.5M NaCl  
0-100% B (0-60 min., linear)

Flow rate: 0.5 ml/min (4.6 mm ID column)

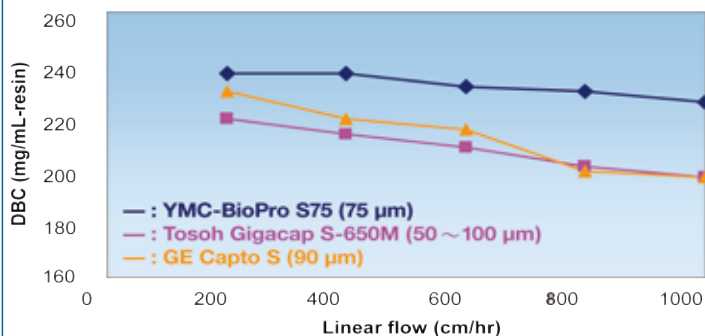
Temperature: 25 °C

Detection: UV at 220 nm

Injection: 20 µl (4.6 mm ID column)

Further details about YMC-BioPro can be found in our brochure: "YMC preparative phases for biochromatography"

## Excellent Binding Capacity



Column: 50 x 50 mm ID  
Sample: 1.0 mg/ml Lysozym in equilibration buffer  
Equilibration buffer: 20 mM Glycine-NaOH (pH 9.0)  
Elution buffer: 20 mM Glycine-NaOH (pH 9.0) with 0.5 M NaCl  
Detection: UV at 300 nm

YMC-BioPro 75 µm higher DBC at every flow

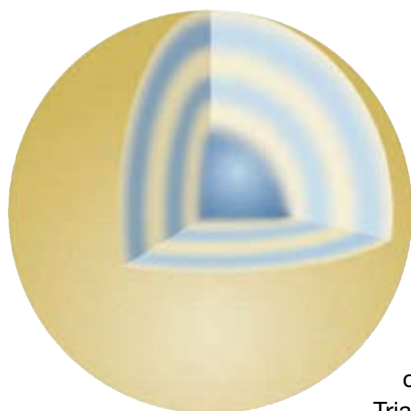
## YMC-BioPro Product Range

Product	Chemistry	Phase Description	Pore Size [nm]	Particle Size [µm]	pH Stability
YMC-BioPro Q	Quaternary amine	Strong anion exchanger	100	10; 30; 75	2.0 - 12.0
YMC-BioPro S	Sulfobutyl	Strong cation exchanger	100	10; 30; 75	2.0 - 12.0



# YMC-Triart Prep

- organic/inorganic hybrid-style support
- universal applicability for acidic, basic & neutral compounds
- extremely stable: pH 1-12 & temperature up to 70° C



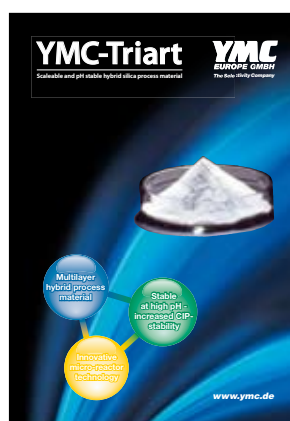
Flow chemistry using micro-reactor technology is key to the production of YMC-Triart. The droplet formation process in micro-structured synthesis reactors is highly controllable, resulting in the tight specification for particle size distribution and pore size distribution. Consequently, YMC-Triart generates low backpressure so that small particles can be applied at higher flow rates with high resolution.

The organic/inorganic “multi-layered” hybrid particle in conjunction with proprietary endcapping delivers unrivalled mechanical and chemical strength. From real life process development work, YMC-Triart has been shown to outperform traditional silica-based materials 2- to 4-fold in terms of long-term stability. This data relates to reaching “end-of-life”-criteria after repeated purification, equilibration and CIP-cleaning cycles, where the column packing needs to be replaced either because the purity of the target compound is decreasing or due to an increase of backpressure. As a result, the economy of the purification process is favourably affected when looking at the amount of target compound achieved per kg of sorbent or cost per kg/kg of target compound.

The pH-range for the optimum stability of YMC-Triart is from pH1 to pH 12 at temperatures up to 70°C. This enables a high level of freedom of choice in selecting the most efficient method conditions with regard to efficiency and robustness in method development. Therefore, YMC-Triart is recommended as one of the first choices for method development.

Product-related documentation such as a Regulatory Support File and column packing recommendations are readily available. YMC will happily provide scouting columns and technical assistance in method development, scale-up and actual production – worldwide, day after day, year after year.

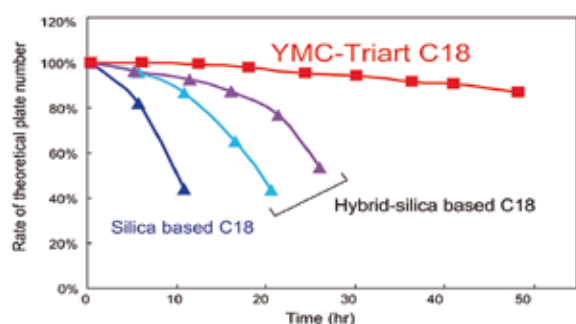
*Detailed information about our innovative Triart technology is available in the dedicated brochure: "YMC-Triart Prep"*



# YMC-Triart Prep

## High pH Stability\*

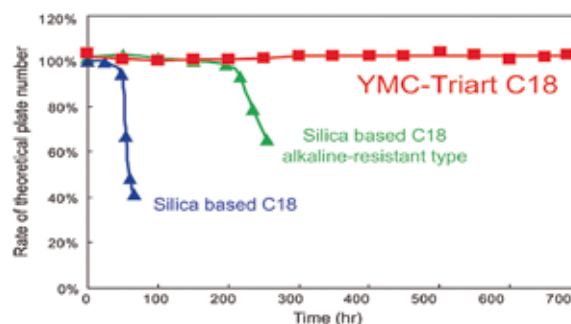
### Phosphate buffer (pH 11.5, 40 °C)



Column: 5  $\mu\text{m}$ , 150 x 4.6 mm ID  
 Eluent: 50 mM  $\text{K}_2\text{HPO}_4$ - $\text{K}_3\text{PO}_4$  (pH 11.5) / methanol (90/10)  
 Flow rate: 1.0 ml/min  
 Temperature: 40 °C  
 Sample: benzyl alcohol

## Temperature Stability\*

### pH 6.9, 70 °C



Column: 5  $\mu\text{m}$ , 50 x 2.0 mm ID  
 Eluent: 20 mM  $\text{KH}_2\text{PO}_4$ - $\text{K}_2\text{HPO}_4$  (pH 6.9) / acetonitrile (90/10)  
 Flow rate: 0.2 ml/min  
 Temperature: 70 °C  
 Sample: phenol

## YMC-Triart Prep Product Range

Product	Bonding	Phase Description	Pore Size [nm]	Particle Size [ $\mu\text{m}$ ]	pH Stability
YMC-Triart Prep C18-S	C18	multilayered hybrid particle, polymeric bonding	12; 20	10; 15; 20; 50	1.0 - 12.0
YCM-Triart Prep C8-S	C8	multilayered hybrid particle, polymeric bonding	12; 20	10; 15; 20	1.0 - 12.0