

# AppliChrom®

## ABOA DMSO-Phil-P

New in January 2018: more porosities, new applications

For GPC / SEC analysis in DMSO, examples:

- amylose, amylopectin, starch
- urea-formaldehyd resins (UF-resins)
- melamin-urea-formaldehyd resins (MUF-resins)
- lignins, humic substances, humic acids, coniferous wood bark essences
- polysaccharide, polysaccharid derivatives
- poly(N-isopropylacrylamid) PNIPA
- poly-vinylpyridin
- *calibration*: pullulan, dextran, polyvinylpyridin et al.

Special GPC/SEC media for fast, accurate and robust GPC-analysis in DMSO

### Advantages:

- ✓ optimized for DMSO-GPC applications
- ✓ interreactionfree pure GPC/SEC
- ✓ easy, reliable and robust GPC/SEC-calibration by dextrans, pullulans et al.
- ✓ low column bleeding for low detector noise for improved lightscattering or viscosity detection
- ✓ 12µ particle technology for low backpressure
- ✓ large pore volume and optimized mass transfer for polymers giving optimized resolution
- ✓ low costs caused by long lifetime of column – result of combination of optimized proprietary particle and packing technology.
- ✓ **High degree of quality: Service, technology and produced in Germany „Made in Germany“.**

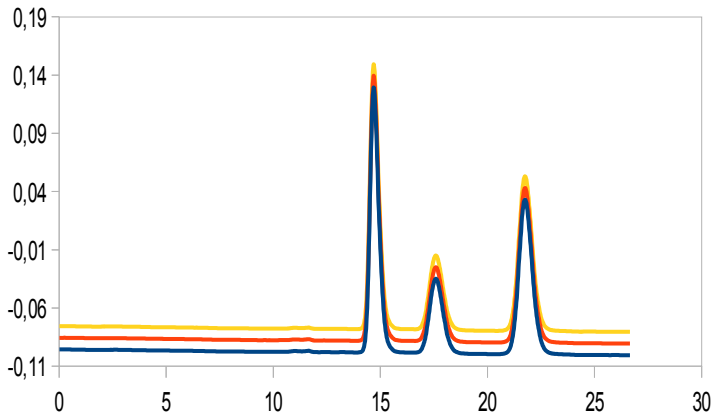
## Why AppliChrom products:

AppliChrom means:

high degree of reproducibility

column for column

lot for lot



Testing of 3 successive lots:

300x8mm,

0,4ml/min DMSO,

80°C,

RI-Detektion

AppliChrom means:

Own synthesis, development and servicecenter in Oranienburg (Germany/Europe)

at historical town where Prof. F.F. Runge invented the early form of 1850 paper chromatography.



Inhouse control about the whole production process + base for further innovative product families;

Laboratory figure taken from Märkische Allgemeine Zeitung, 15. März 2014,

Online report: 2014-02-27: <http://www.maz-online.de/Lokales/Oberhavel/Polymere-Multitalente>

## Separation Principle GPC / SEC Separation of molecules only by molecular size

Analytes can be low intruded (large analytes) or deep intruded (small molecules) into porous particles without adsorption. Small molecules are distributed in a large part of the pores of the GPC columns, larger molecules are distributed in a lower/smaller part of the pores. This is the base mechanism for separation according to molecular size (GPC / SEC).

Porous particle (GPC / SEC stationary phase) + possibilities of different sized analytes

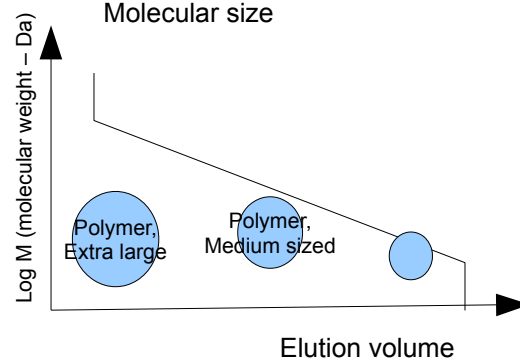
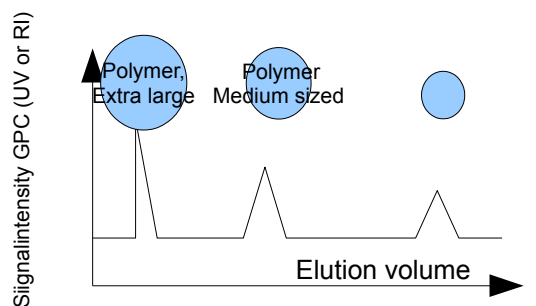
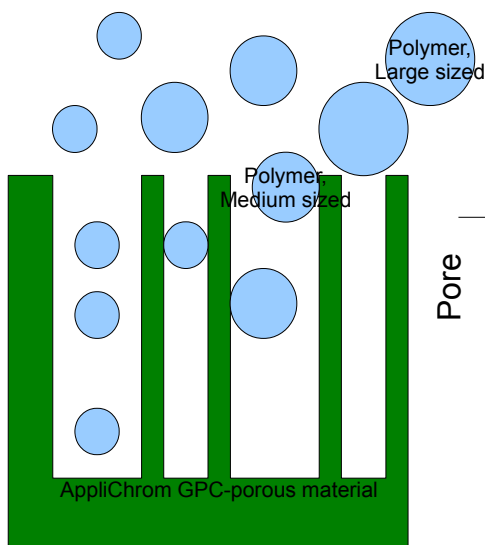


Eluent-flowdirection →

Small sized molecules: larger retention

←

Large sized molecules: lower retention

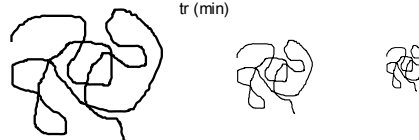
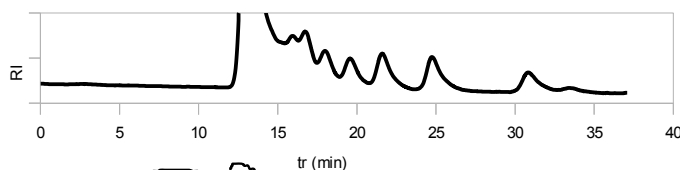


→  
Small sized molecules: larger retention

←

Large sized molecules: lower retention

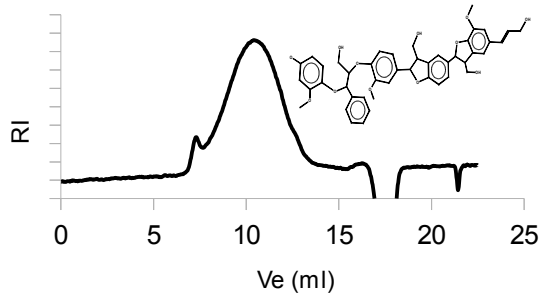
GPC / SEC Chromatogramm  
- Result -



## Applications - examples:

### Lignins & conifer bark extracts

#### Lignin GPC in DMSO – starting method



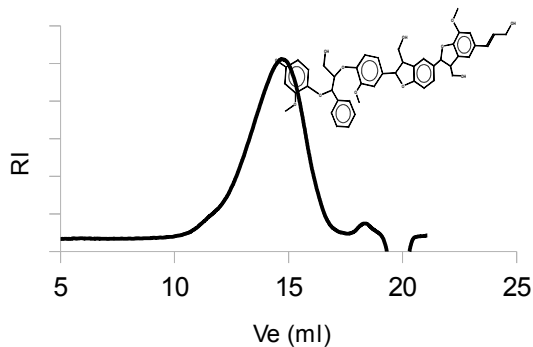
AppliChrom ABOA DMSO-Phil-P-250  
separation range 100-70.000Da

Analyte:  
Lignin I

AppliChrom ABOA DMSO-Phil-P-250  
2 x (300x8mm)  
0,5ml/min DMSO 0,075M NaNO<sub>3</sub>,  
80°C,  
RI-detection,  
Ve (ml) vs. RI,

Part.No.: 2 x SADP2503008

#### Lignin GPC in DMSO – optimized method



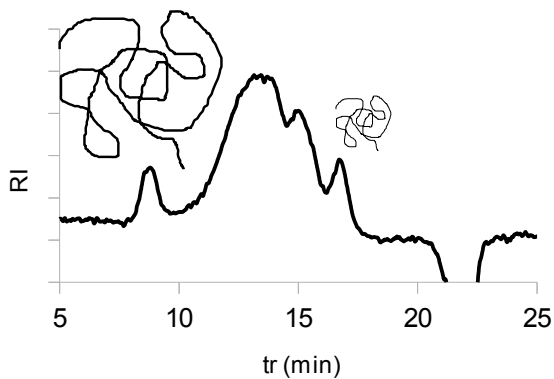
AppliChrom ABOA DMSO-Phil-P-250 +  
AppliChrom ABOA DMSO-Phil 350  
separation range 100-1.000.000Da

Analyte: (Ist das Lignin in die Abbild. geruscht?)  
Lignin I

AppliChrom ABOA DMSO-Phil-P-250 +  
AppliChrom ABOA DMSO-Phil 350  
2 x (300x8mm)  
0,5ml/min DMSO 0,075M NaNO<sub>3</sub>,  
80°C,  
RI-detection,  
Ve (ml) vs. RI,

Part.No.: SADP2503008 + SADP3503008

#### Spruce bark extract GPC in DMSO



2 x AppliChrom ABOA DMSO-Phil-P-250  
separation range 100-70.000Da

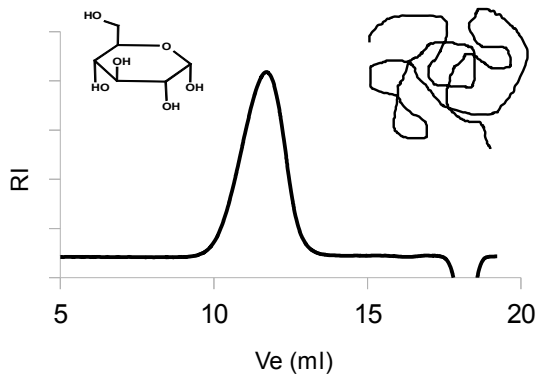
Analyte:  
spruce bark extract

2 x AppliChrom ABOA DMSO-Phil-P-250  
2 x (300x8mm)  
0,4ml/min DMSO 0,075M NaNO<sub>3</sub>,  
80°C  
RI-detection  
Ve (ml) vs. RI

Part.No.: 2 x SADP2503008

## Polysaccharides / starches

### Polysaccharide GPC in DMSO



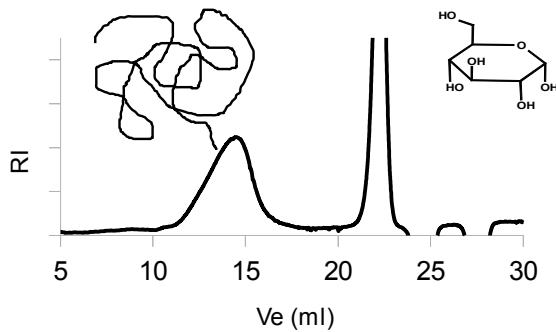
AppliChrom ABOA DMSO-Phil-P-200 +  
AppliChrom ABOA DMSO-Phil 350  
separation range 100-1.000.000Da

Analyte:  
soluble polysaccharide (M ca. 70kDa)

AppliChrom ABOA DMSO-Phil-P-200 +  
AppliChrom ABOA DMSO-Phil 350  
2 x (300x8mm)  
0,5ml/min DMSO 0,075M NaNO<sub>3</sub>,  
80°C,  
RI-detection,  
V<sub>e</sub> (ml) vs. RI,

Part.No.: SADP2003008 + SADP3503008

### Dextran 650 GPC in DMSO



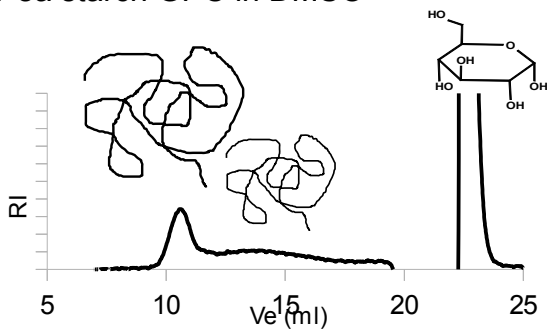
AppliChrom ABOA DMSO-Phil-P-200 +  
AppliChrom ABOA DMSO-Phil-P-250 +  
AppliChrom ABOA DMSO-Phil 350  
separation range 100-1.000.000Da

Analyte:  
Dextran from Leuconostoc spp., M = 450.000-650.000Da + fructose

AppliChrom ABOA DMSO-Phil-P-200 +  
AppliChrom ABOA DMSO-Phil-P-250 +  
AppliChrom ABOA DMSO-Phil 350  
3 x (300x8mm)  
0,5ml/min DMSO 0,075M NaNO<sub>3</sub>,  
80°C,  
RI-detection,  
V<sub>e</sub> (ml) vs. RI,

Part.No.: SADP2003008, SADP2503008 + SADP3503008

### Pea starch GPC in DMSO



AppliChrom ABOA DMSO-Phil-P-350 +  
AppliChrom ABOA DMSO-Phil-P-400  
separation range up to > estimated 20Mio Dalton

Analyte:  
Pea starch

AppliChrom ABOA DMSO-Phil-P-350 +  
AppliChrom ABOA DMSO-Phil-P-400

2 x (300x8mm)  
0,5ml/min DMSO 0,075M NaNO<sub>3</sub>,  
80°C,  
RI-detection,  
V<sub>e</sub> (ml) vs. RI

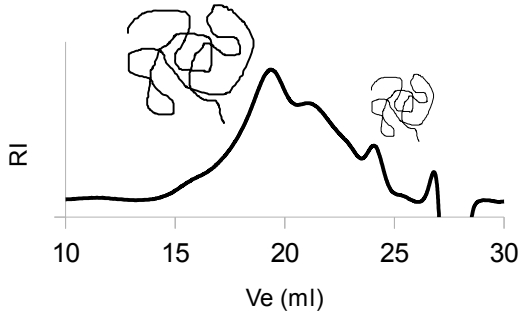
Part.No.: SADP3503008 + SADP4003008

## Polyvinylpyridine / Poly(N-isopropylacrylamid) Melamin-urea-formaldehyd resins / Urea formaldehyd resins...

### MUF-resin GPC in DMSO

Further denominations: Melamin urea formaldehyd resin, MUF-resin, urea-melamine-formaldehyd resin, CAS: 25036-13-9

AppliChrom ABOA DMSO-Phil-P-200 +  
AppliChrom ABOA DMSO-Phil-P-250 +  
AppliChrom ABOA DMSO-Phil-P-350  
separation range 100-1.000.000Da



Analyte:  
completely DMSO-soluble melamin-urea formaldehyd resin (MUF-resin)

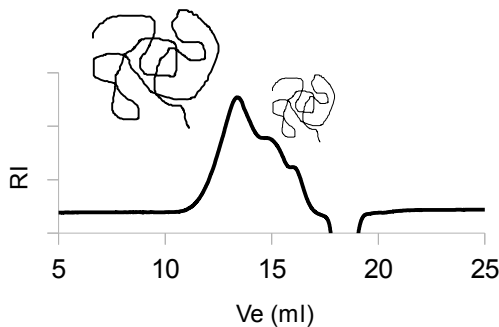
AppliChrom ABOA DMSO-Phil-P-200 +  
AppliChrom ABOA DMSO-Phil-P-250 +  
AppliChrom ABOA DMSO-Phil-P-350  
3 x (300x8mm)  
0,5ml/min DMSO 0,075M NaNO<sub>3</sub>,  
80°C,  
50µl sample,  
RI-detection,  
V<sub>e</sub> (ml) vs. RI,

Part.No.: SADP2003008, SADP2503008 + SADP3503008

### UF-resin GPC in DMSO

Further denominations: Urea formaldehyd resin, UF-resin, CAS: 9011-05-6

AppliChrom ABOA DMSO-Phil-P-200 +  
AppliChrom ABOA DMSO-Phil-P-350  
separation range 100-1.000.000Da



Analyte:  
DMSO-soluble urea formaldehyd resin (UF-resin, urea formaldehyd resin respective UF-Harz, Urea Formaldehyd Harz)

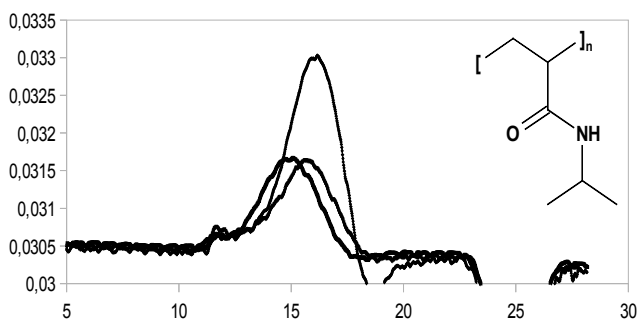
AppliChrom ABOA DMSO-Phil-P-200 +  
AppliChrom ABOA DMSO-Phil-P-350  
2 x (300x8mm)  
0,5ml/min DMSO 0,075M NaNO<sub>3</sub>  
80°C  
RI-detection  
V<sub>e</sub> (ml) vs. RI

Part.No.: SADP2003008 + SADP3503008

### Poly(N-isopropylacrylamid) GPC in DMSO

Further denominations: PNIPA, PNIPAAm, NIPA, PNIPAA or PNIPAm. CAS [25189-55-3], formula: (C<sub>6</sub>H<sub>11</sub>NO)<sub>n</sub>

AppliChrom ABOA DMSO-Phil-P-300  
separation range 1.000-500.000Da



Analyte:  
3 different PNIPA fractions

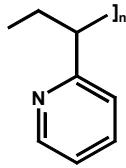
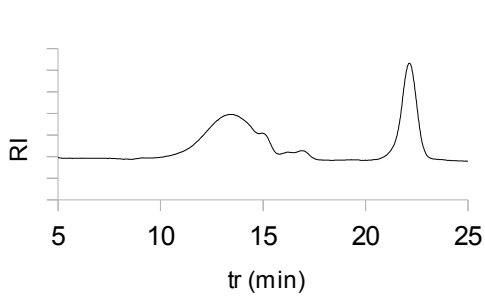
AppliChrom ABOA DMSO-Phil-P-300  
2 x (300x8mm),  
0,4ml/min,  
DMSO 0,075M NaNO<sub>3</sub>,  
50°C,  
RI-Detektion, V<sub>e</sub> (ml) vs. RI

Part.No.: 2 x SADP3003008

### Polyvinylpyridin degraded, GPC in DMSO

Further denominations: CAS 25014-15-7,  $(C_7H_7N)_n$ .

AppliChrom ABOA DMSO-Phil-P-250  
separation range 100-70.000Da



Analyte:  
low molecular weight (oligomeric) polyvinylpyridin fraction

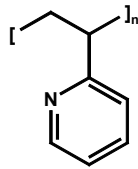
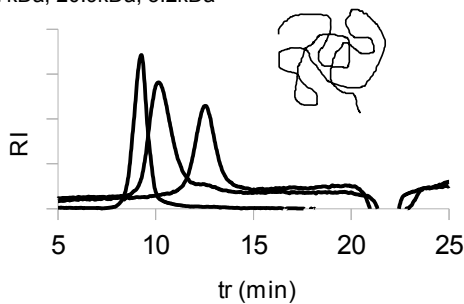
AppliChrom ABOA DMSO-Phil-P-250  
2 x (300x8mm),  
0,4ml/min,  
DMSO 0,075M NaNO<sub>3</sub>,  
50°C,  
RI-detection, Ve (ml) vs. RI

Part.No.: 2 x SADP2503008

### Poly(2-vinylpyridin) fractions, GPC in DMSO

Further denominations: CAS 25014-15-7,  $(C_7H_7N)_n$ ,  
75.7kDa, 20.9kDa, 3.2kDa

AppliChrom ABOA DMSO-Phil-P-250  
separation range 100-70.000Da

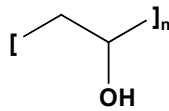
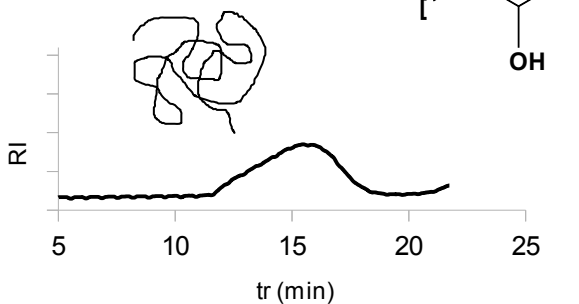


Superposition of 3 different polyvinylpyridin fractions

AppliChrom ABOA DMSO-Phil-P-250  
2 x (300x8mm),  
0,4ml/min,  
DMSO 0,075M NaNO<sub>3</sub>,  
50°C,  
RI-detection, Ve (ml) vs. RI

Part.No.: 2 x SADP2503008

### Polyvinylalcohol, GPC in DMSO



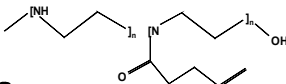
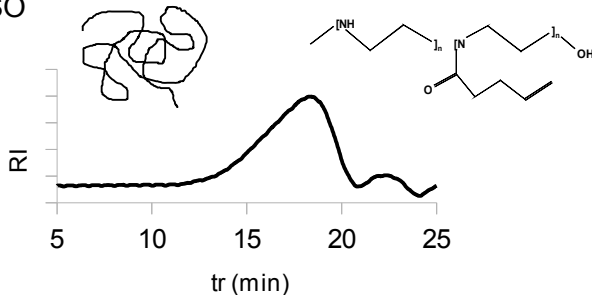
AppliChrom ABOA DMSO-Phil-P-300  
separation range 1.000-500.000Da

Analyte:  
Polyvinylalkohol 22kDa

AppliChrom ABOA DMSO-Phil-P-300  
2 x (300x8mm),  
0,4ml/min,  
DMSO 0,075M NaNO<sub>3</sub>,  
50°C,  
RI-detection, Ve (ml) vs. RI

Part.No.: 2 x SADP3003008

### Poly[2-(3butenyl)2-oxazoline-co-ethylene imine], GPC in DMSO



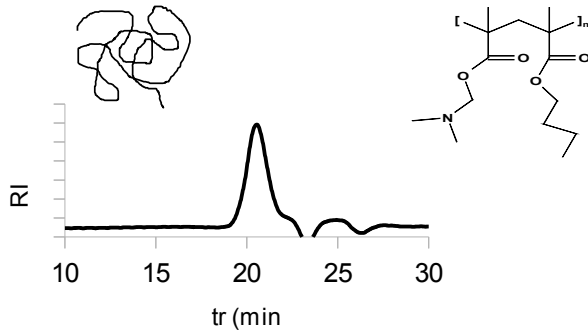
AppliChrom ABOA DMSO-Phil-P-300  
separation range 1.000-500.000Da

Analyte:  
Poly[2-(butenyl)2-oxazoline-co-ethylenimine] M = 50.000Da

AppliChrom ABOA DMSO-Phil-P-300  
2 x (300x8mm),  
0,4ml/min,  
DMSO 0,075M NaNO<sub>3</sub>,  
50°C,  
RI-detection, Ve (ml) vs. RI

Part.No.: 2 x SADP3003008

Poly(dimethylaminoethylmethacrylate) / Polybutyl methacrylate, GPC in DMSO



AppliChrom ABOA DMSO-Phil-P-300  
separation range 1.000-500.000Da

Analyte:

Poly(dimethylaminoethylmethacrylate) polybutylmethacrylate M = 22.000Da

AppliChrom ABOA DMSO-Phil-P-300

2 x (300x8mm),  
0,4ml/min,  
DMSO 0,075M NaNO<sub>3</sub>,  
50°C,  
RI-detection, V<sub>e</sub> (ml) vs. RI

Part.No.: 2 x SADP3003008

**Please continue reading the following pages:**

**Special Biopolymers**

**Comparison - plantproteins**

**Comparison honeyproteins**

**Comparison aramel colour**

**Comparison humic substances / humic acids**

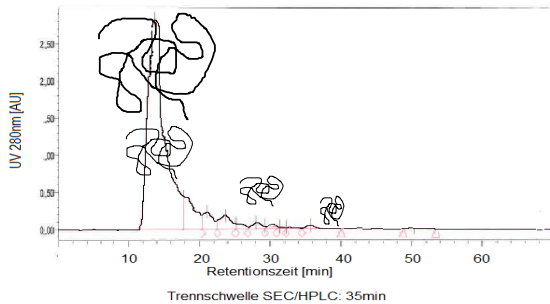
....

**+ extra: Biopolymers & degradation products**



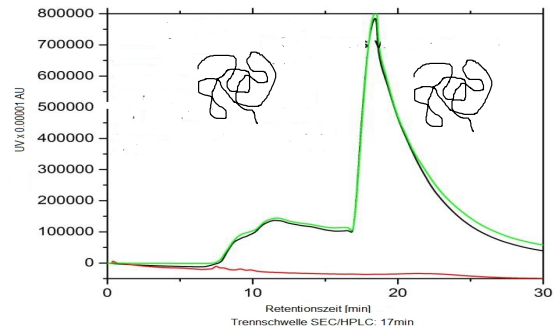
- Plantprotein GPC / SEC conventional but correct ? -  
Plant Proteins (Pea and Soy) in GPC – results from early times columns,  
but are you satisfied by accuracy of conventional old data?

Competing early column + method 1:  
Pure aqueous method – Peaprotein I GPC / SEC



Result: Good resolution for oligomers, missing resolution for high molecular weight fractions

Competing early column + method 2:  
Aqueous method plus organic modifier –  
Peaprotein I, GPC /SEC



Result: approx 30% of protein separated according to molecular size 100-1.000.000Da (7-17min) based on dextrans, but > 17min: approx 70% of protein is separated according to HPLC (thus missing in GPC / SEC analysis).

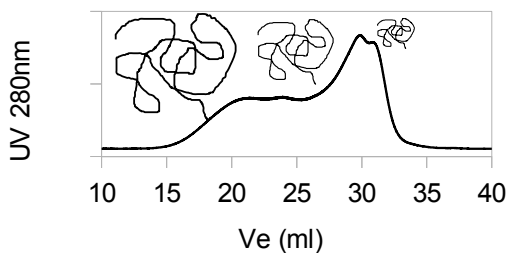
**New tools for Plantprotein GPC SEC (Peaprotein, Soyprotein)**

the solution for Pea- and Soyprotein (full range of molecular sizes + no observation of losing sample by HPLC mechanism)

AppliChrom ABOA DMSO-Phil GPC column series – results:

Peaprotein GPC in DMSO

AppliChrom ABOA DMSO-Phil-P-Multipore  
separation range 100-1.000.000Da



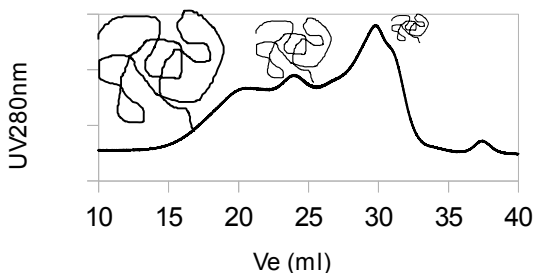
Analyte:  
Peaprotein GPC covering the calibration range of 100-1.000.000Da  
(based on dextrans)

AppliChrom ABOA DMSO-Phil-P-Multipore  
3 x (300x8mm),  
0,4ml/min,  
DMSO,  
55°C,  
UV280nm-detection, Ve (ml) vs. UV (280nm)  
Calibration vs. Dextran, pullulan or protein

Part.No.: 3 x SADPM3008

Soyprotein GPC in DMSO

AppliChrom ABOA DMSO-Phil-P-Multipore  
separation range 100-1.000.000Da



Analyte:  
Soyprotein GPC covering the calibration range of 100-1.000.000Da  
(based on dextrans)

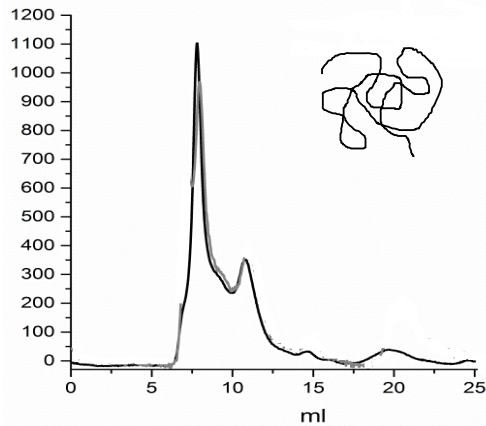
AppliChrom ABOA DMSO-Phil-P-Multipore  
3 x (300x8mm),  
0,4ml/min,  
DMSO,  
55°C,  
UV280nm-detection, Ve (ml) vs. UV (280nm)  
Calibration vs. Dextran, pullulan or protein

Part.No.: 3 x SADPM3008

## New tools for analyses of honey proteins by GPC / SEC

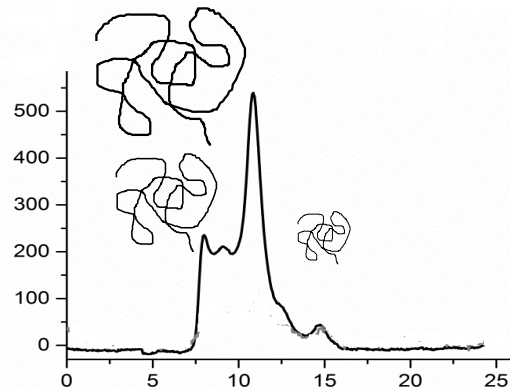
- no exclusion observed - full range of molecular sizes are analyzed
- no adsorption observed – real distribution of molecular sizes can be analysed

GPC-UV (220nm) result of manuka honey protein (classical aqueous method) covering up to 1,3Mio Da (based on globular proteins – corresponding to approx. 100.000Da based on dextrans)



UV 220nm vs Ve (ml)

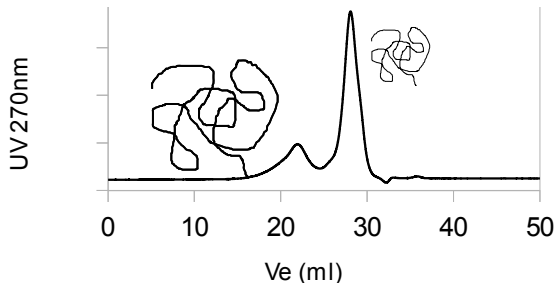
GPC-UV (220nm) result of a standard honey protein (classical aqueous method) covering up to 1,3Mio Da (based on globular proteins – corresponding to approx 100.000Da based on dextrans)



UV 220nm vs Ve (ml) – maybe proteinsize of honey protein hits exclusion limit at 7,5ml?

## Honey Protein GPC / SEC on new designed GPC columns plus methods from AppliChrom

### Manuka honey protein, GPC / SEC



Higher molecular weight fraktionen (from 15-20ml) do not show any indication of exclusion phenomena => good GPC / SEC separation also in the range (if wanted or needed) up to 1Mio Da (based on dextrans).

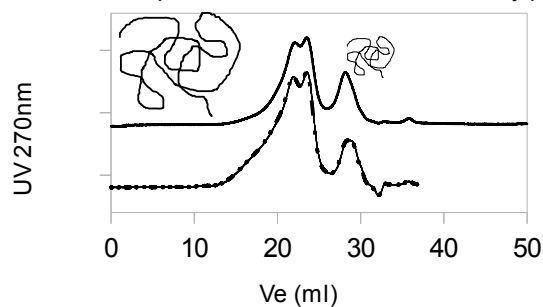
AppliChrom ABOA DMSO-Phil-P-Multipore  
separation range 100-1.000.000Da (based on dextran)

Analyte:  
Manuka honey protein GPC (calibration range 100-1.000.000Da (based on dextran)

AppliChrom ABOA DMSO-Phil-P-Multipore GPC column  
3 x (300x8mm),  
0,4ml/min,  
DMSO  
40°C,  
UV270nm-detection, Ve (ml) vs. UV (280nm)  
Calibration vs. Dextran, pullulan or proteins

Part.No.: 3 x SADPM3008

### GPC / SEC Comparison of two Non-manuka honey proteins



Higher molecular weight fraktionen (from 15-20ml) do not show any indication of exclusion phenomena (compared to conventional method)=> good GPC / SEC separation also in the range (if wanted or needed) up to 1Mio Da (based on dextrans).

AppliChrom ABOA DMSO-Phil-P-Multipore  
separation range 100-1.000.000Da based on dextran

Analyte:  
Non-Manuka honey protein GPC (calibration range: 100-1.000.000Da based on dextran)

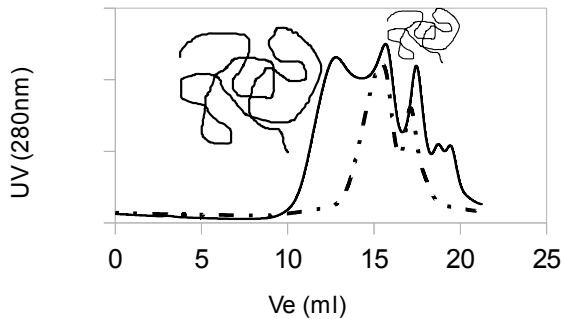
AppliChrom ABOA DMSO-Phil-P-Multipore GPC column  
3 x (300x8mm),  
0,4ml/min,  
DMSO  
40°C,  
UV270nm-detection, Ve (ml) vs. UV (280nm)  
Calibration vs. dextran, pullulan or proteins

Part.No.: 3 x SADPM3008

## GPC / SEC of Caramel Coulor

### SEC / GPC comparison of 2 Caramel Coulor

AppliChrom ABOA DMSO-Phil-P-100 & 350  
separation range 100-1.500.000Da (based on dextrans)



Analyte:  
Caramel coulor GPC (range: 100-1.500.000Da)

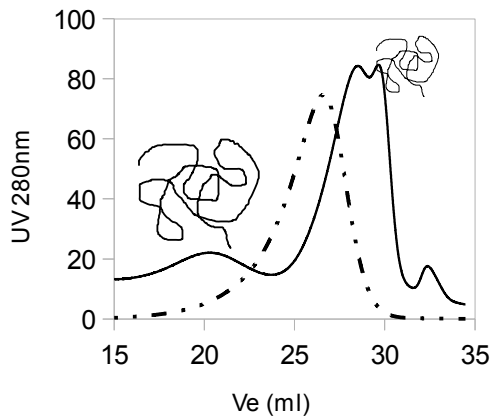
AppliChrom ABOA DMSO-Phil-P-100 & AppliChrom ABOA DMSO-Phil-P-350 GPC column  
2 x (300x8mm),  
0,3ml/min,  
DMSO 0,075M NaNO<sub>3</sub>,  
60°C,  
UV280nm-detection, Ve (ml) vs. UV (280nm)

Part.No.: SADP1003008 + SDAP3503008

## GPC / SEC of humic acids / humates

### GPC / SEC comparison of 2 different humic acids/humates

Analyte:  
Humic acids / humates GPC (calibration range 100-1.000.000Da (based on dextran)



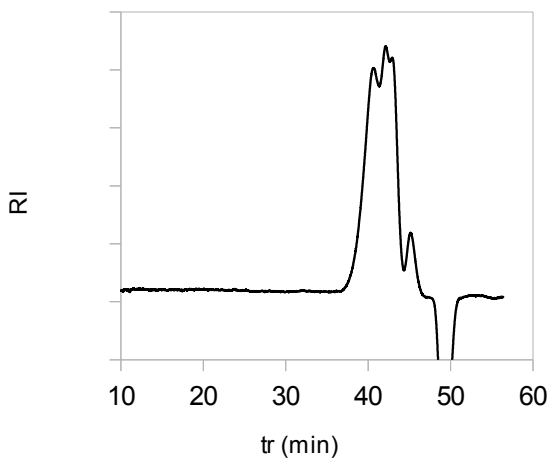
AppliChrom ABOA DMSO-Phil-P-Multipore GPC column  
3 x (300x8mm),  
0,4ml/min,  
DMSO  
70°C,  
UV270nm-detection & RI, Ve (ml) vs. UV (280nm)  
Calibration vs. Dextran, pullulan

Part.No.: 3 x SADPM3008

## GPC of Melamin in DMSO

### GPC of Melamin Resin

AppliChrom ABOA DMSO-Phil-P-100 & 350  
separation range 100-1.500.000Da

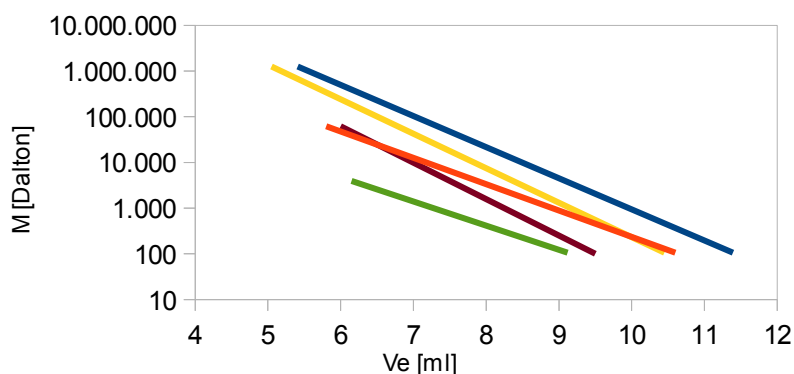


Analyte:  
Melamin GPC (range: 100-1.500.000Da)

AppliChrom ABOA DMSO-Phil-P-100 & AppliChrom ABOA DMSO-Phil-P-350 GPC column  
2 x (300x8mm),  
0,4ml/min,  
DMSO 0,075M NaNO<sub>3</sub>,  
60°C,  
UV280nm-detection, Ve (ml) vs. UV (280nm)  
Easy calibration vs. dextran or pullulan

Part.No.: SADP1003008 + SDAP3503008

Measuring range of selected **AppliChrom ABOA DMSO-Phil-P** GPC/SEC-columns, 300x8mm, poresizes 100, 200, 250, multipore (M), 350, 400  
**Part.No.: SADP1003008, SADP2003008, SADP2503008, SADP3503008 + SADP4003008**



Poresizes:  
**Poresizes for different ranges of molecular size are available:**

## Die AppliChrom® ABOA DMSO-Phil-P GPC-Series for your advantages

- ✓ optimized for DMSO-GPC applications
- ✓ interactionfree GPC/SEC-applications for a variety of analytes that are soluble in DMSO
- ✓ low column bleeding for low detector noise
- ✓ 12µ particle technology for low column backpressure
- ✓ large pore volume for high GPC/SEC resolution
- ✓ pressurestability 30-100bar (depending on poresizes)
- ✓ temperatur range typical for use 30-85°C, in special cases up to 140°C
- ✓ individual poresizes for individual molecular weight measuring ranges
- ✓ multi-pore technology for broad molecular weight range available
- ✓ increased livetime by combination oft optimized proprietary particle- and packingtechnology
- ✓ service-applicationcenter for methodscreening in Oranienburg (Germany/Europe) available
- ✓ developed and produced in Germany, Quality - „Made in Germany“

### Ordering informations:

SADP1003008	GPC-Column <i>AppliChrom ABOA DMSO-Phil-P-100</i> , 100-2500 Da, 300mm x 8mm	Price on request
SADP2003008	GPC-Column <i>AppliChrom ABOA DMSO-Phil-P-200</i> , 100Da-20.000 Da, 300mmx8mm	Price on request
SADP2503008	GPC-Column <i>AppliChrom ABOA DMSO-Phil-P-250</i> , 100Da-70.000 Da, 300mmx8mm	Price on request
SADP3003008	GPC-Column <i>AppliChrom ABOA DMSO-Phil-P-300</i> , 1-500 kDa, 300mmx8mm	Price on request
SADP3503008	GPC-Column <i>AppliChrom ABOA DMSO-Phil-P-350</i> , 5-1.500 kDa, 300mmx8mm	Price on request
SADP4003008	GPC-Column <i>AppliChrom ABOA DMSO-Phil-P-400</i> , 10- >10.000 kDa, 300mmx8mm	Price on request
SADPM3008	GPC-Column <i>AppliChrom ABOA DMSO-Phil-P-Multipore</i> , 100Da-1Mio Da, 300mmx8mm	Price on request
VADP508	Precolumn - <i>AppliChrom ABOA DMSO-Phil-200 (50x8mm)</i>	Price on request

a) larger or different poresizes on request.

b) Further column dimensions can be prepared – do not hesitate contacting us at [info@applichrom.de](mailto:info@applichrom.de)

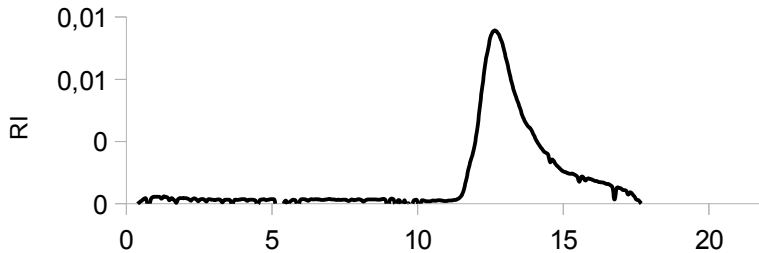
## Please ask for your special offer!

### Related AppliChrom-products:

#### AppliChrom ABOA CatPhil-P Series:

For aqueous GPC/SEC-analysis, especially useful for polycations.

Groups of analytes: e.g. **Poly-aminosugars/chitosans, polyethylenimins (PEI),...**



GPC-analysis of highly molecular weight chitosan (polyglucosam, polyglucosamin, CAS 9012-76-4),  
**AppliChrom ABOA CatPhil-P-100, 300x8mm + AppliChrom ABOA CatPhil-P-350, 300x8mm**, 1ml/min 0.1M NaNO<sub>3</sub> + 0,2% Formic acid in water, 100µl sample, RI-detection. Part.No.: **SACP1003008 + SACP3503008**

#### AppliChrom ABOA SuperOH-P Series:

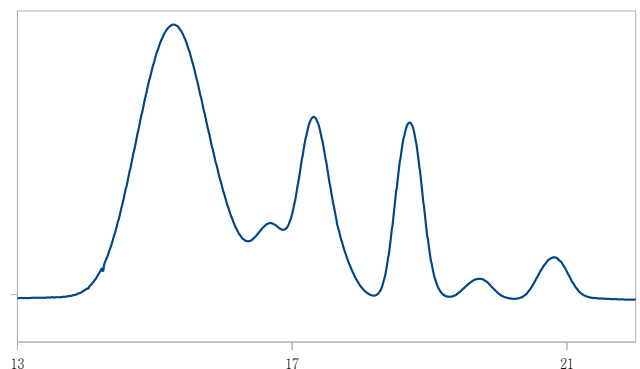
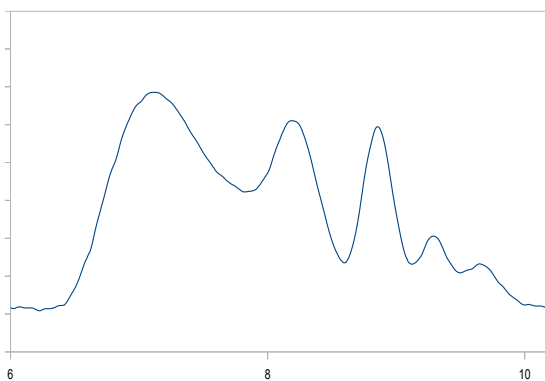
For aqueous GPC/SEC-analysis.

Groups of analytes:

**Starch degradation products, pectins, hydroxyethyl cellulose, water soluble methyl celluloses, dextran, pullulan, carboxymethylcellulose, heparins, water soluble humic acid fractions, water soluble lignin fractions, ligninsulfonic acids,...**

Methodoptimisation in high resolution aqueous GPC/SEC

Starting method => optimized method

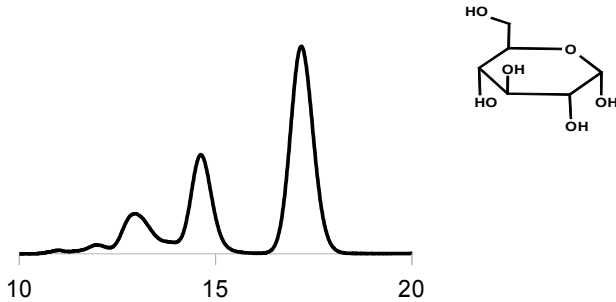


**AppliChrom ABOA SuperOH-P-100** for high resolution oligosaccharid-analysis: 1 x AppliChrom ABOA SuperOH-P-100 (300x8mm), 1ml/min H<sub>2</sub>O, 20°C, 20µl sample, detection: RI.

**AppliChrom ABOA SuperOH-P-100** for optimized high resolution oligosaccharid-analysis: 2 x AppliChrom ABOA SuperOH-P 100 (300x8mm), 0.5ml/min H<sub>2</sub>O, 40°C, 20µl sample, detection: RI.

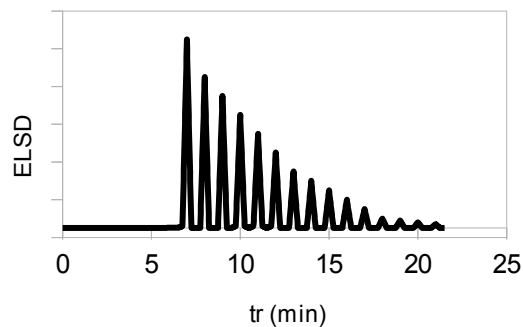
## AppliChrom ABOA SugarSep-Ca & -Pb

For aqueous HPLC-analysis using ion exchangers.  
Groups of analytes:  
**Sugars, sugaralcohols, alcohols.**



## AppliChrom OTU Amino 250x4.6mm

Gradient Separation Malto-Oligosaccharid



### Analysis of honey

Column: **AppliChrom® ABOASugarSep-Ca**, 300x8mm,  
Part.No.: SASCA103008,  
Eluent: water, 0,5ml/min, 80°C  
Detector: RI, alternativ ELSD  
Injectionvolume: 20µl  
Peaks in order of elution: Dp3, Dp2, glucose, fructose.,  $t_e$  [min]

### HPLC of an Oligosaccharid

Column: **AppliChrom® OTU Amino**, 250x4.6mm,  
Part.No.: xxxxx,  
Eluent A: ACN, B: H<sub>2</sub>O, 0min: 35% B, 15min: 50% B, 1ml/min  
Detector: ELSD  
Injectionvolume: 20µl,  
Peaks in order of elution: Dextrose, Maltose, Maltotriose, Maltopentanose, Maltohexanose,.... Maltopentadecanose,...,  
 $t_e$  [min]

## AppliChrom-Application & Chromatography products:

### AppliChrom ABOA SuperOH-P

Series for aqueous GPC/SEC-analysis (heparins, neutral and anionic polysaccharides)

### AppliChrom ABOA Cat-Phil-P

Series for GPC analysis of polar analytes in DMSO (starches, lignin, humic substances, UF/MUF-resin,...)

### AppliChrom ABOA ProteSep-S

Series for the analysis of proteins (BSA, immunoglobulin,...)

### AppliChrom ABOA SugarSep-H/Na/Ca

Series for the analysis of sugars, alcohols, acids

### AppliChrom OTU

Series (C<sub>8</sub>, C<sub>18</sub>, Phenyl, HILIC), for high resolution standard separations mostly of smaller molecules

### AppliChrom SPE-Säulen (C<sub>8</sub>, C<sub>18</sub>)

for samplepretreatment and enrichment

### AppliChrom SaloEx P, undSaloEx DNA

for removal of buffers, salt and low molecular substances in protein and DNA purification

**History aspects of chromatography & location of AppliChrom:** Do you know that the headquarter of **AppliChrom – Application & Chromatography** is in a historical place for chromatographers?

In 1850 Prof. F.F. Runge who was living and working in Oranienburg that time (\* 1794 in Hamburg-Billwerder; † 1867 in Oranienburg) published in 1850 his work "To colour chemistry, pattern pictures for friends of the beauty and for the use for draftsman, painter, verzierer and stuff printer 1<sup>st</sup> edition by Dr. F.F. Runge (Original title: *Zur Farbenchemie. Musterbilder für Freunde des Schönen und zum Gebrauch für Zeichner, Maler, Verzierer und Zeugdrucker, I.Lieferung. Dargestellt durch chemische Wechselwirkung von Dr. F.F. Runge*). In 1855 the book was published by Dr. FF.. Runge: "the creative impulse of the substances illustrated in self-grown pictures" (Original title: *Der Bildungstrieb der Stoffe, veranschaulicht in selbständig gewachsenen Bildern*). F.F. Runge describes in his works technologies technologies that are later assigned to paper chromatography.

Committed to the local history regarding inventions in chromatography **AppliChrom – Application & Chromatography** shifts today chromatography needs via inventions to chromatography media and columns. The aim is to supply market with German precision tools for your success. The development in recent years was characterized by constant growth through innovations and service to customers.

Become a part of the common success story – please ask what you are looking for at [info@applichrom.de](mailto:info@applichrom.de).

Version June 2013. As for R & D and laboratory, not tested for pharmaceuticals or medical diagnostics. The terms and conditions of AppliChrom are valid.