# FAST SEPARATION of

CARBOHYDRATES
OLIGOSACCHARIDES
FOOD SUPPLEMENTS
ORGANIC ACIDS
CONTAMINANTS
VITAMINS

## benefits

- Fast analysis
- High efficiency
- Low back pressure
- Column-to-column reproducibility

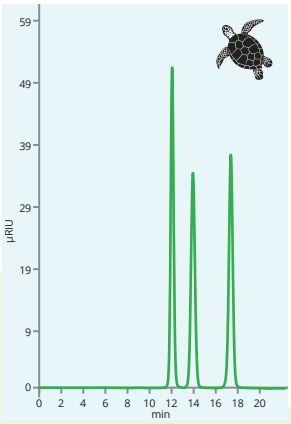
CHROMSERVIS

www.chromservis.eu

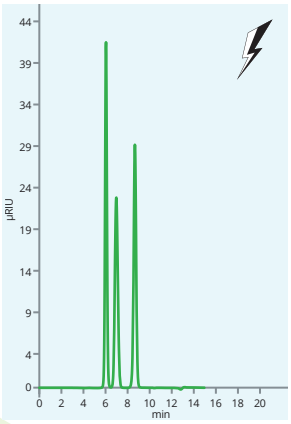
# Introduction

Sugar analysis is a vital process in both the food and beverage industries as well as in scientific research, enabling the identification and quantification of sugar compounds in various samples. This analysis is crucial for quality control, nutritional labeling, product development, and ensuring compliance with regulatory standards. A common method used in sugar analysis includes chromatography, which allows for precise measurements of simple sugars, such as glucose and fructose, as well as complex carbohydrates. Understanding sugar profiles not only informs consumers about dietary choices but also aids manufacturers in formulating products to meet consumer demands for taste, texture, and health considerations.

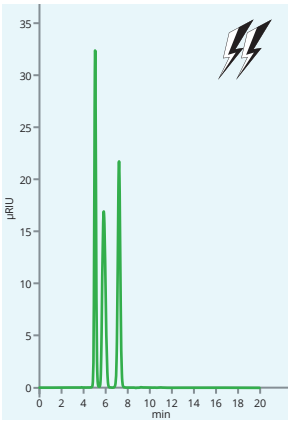
## SPEED UP YOUR ANALYSIS



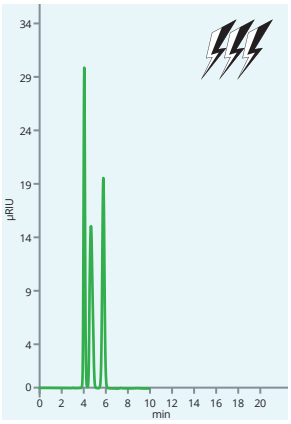

*17.4 min; 0.5 mL/min*




*8.7 min; 1.0 mL/min*




*7.2 min; 1.2 mL/min*

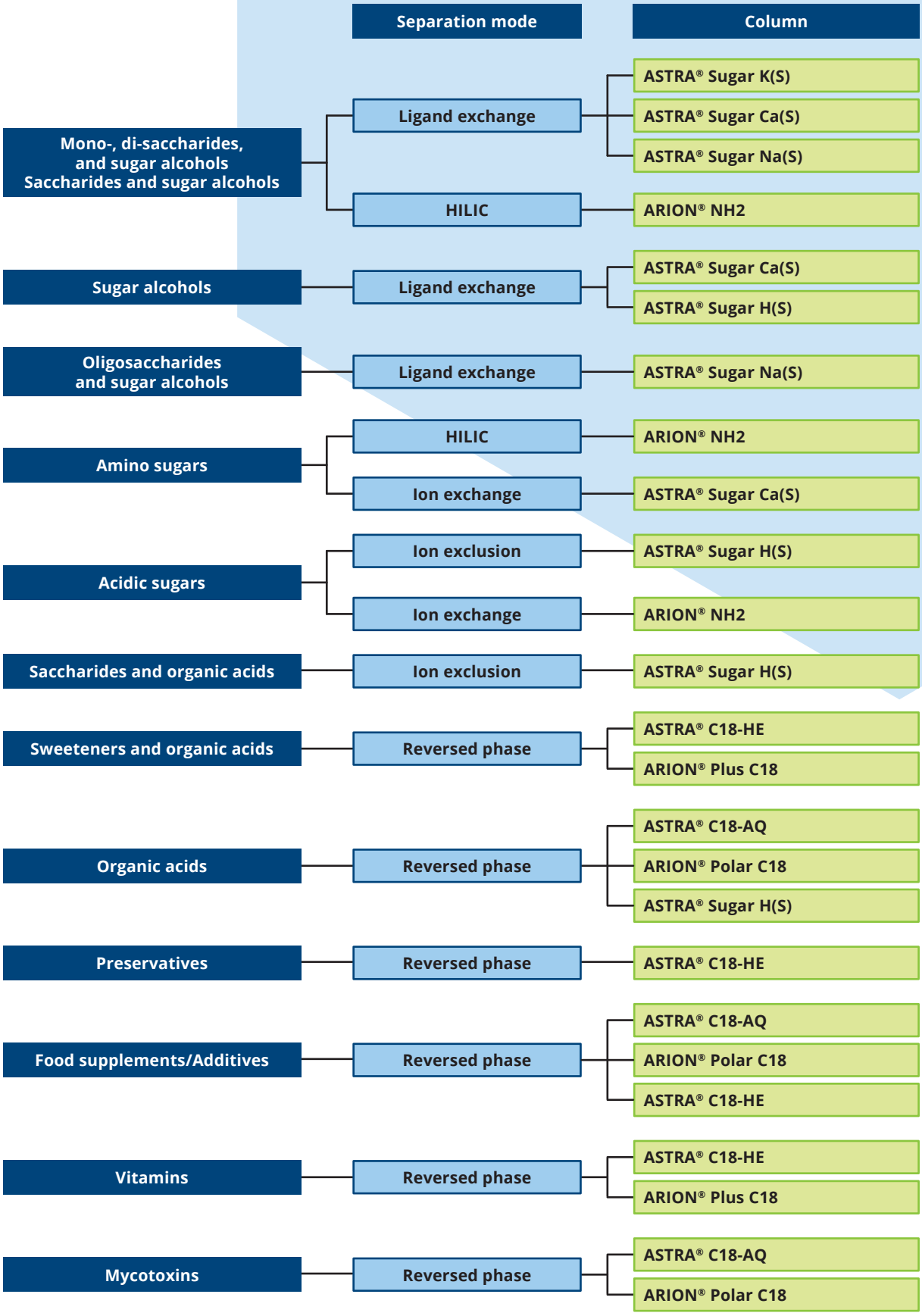



*5.8 min; 1.5 mL/min*

*"We are pleased to share our experience of using the Chromservis Astra Sugar column in our laboratory. This column has significantly enhanced our ability to separate and analyse key components in our samples, including sucrose, glucose, fructose, and sorbitol.*
*One of the standout features of the Astra Sugar column is its impressive separation efficiency. The results we've achieved are not only reliable but also remarkably precise, allowing us to obtain accurate quantitative data for each sugar component."*

*Associate Professor Vladimír Štefuca, Slovak University of Technology in Bratislava*

# Column selection guide



# Retention times for some saccharides, sugar alcohols and organic acids

| 1.0 mL/min | Retention Time [min] | | | |
|---|---|---|---|---|
| **Counter Ion** | **$Ca^{2+}$** | **$H^+$** | **$Na^+$** | **$K^+$** |
| Erythritol | 9.98 | n/a | n/a | n/a |
| Ethanol | 10.84 | 14.41 | 10.30 | 10.00 |
| Fructose | 8.52 | 6.58 | 7.37 | 7.78 |
| Galactose | 7.71 | 6.47 | 7.23 | 7.68 |
| Glucose | 7.10 | 6.18 | 6.86 | 7.24 |
| Glycerol | 10.05 | 8.59 | 8.18 | 8.01 |
| Isopropanol | 12.40 | 16.74 | n/a | n/a |
| Lactose | 6.38 | 5.43 | 5.76 | 6.01 |
| Lactulosa | 7.03 | n/a | n/a | n/a |
| Maltitol | 7.74 | 5.60 | 5.81 | 5.82 |
| Maltose | 6.26 | 5.33 | 5.74 | 5.98 |
| Mannitol | 10.20 | 6.84 | 6.88 | 6.86 |
| Mannose | 8.09 | 6.48 | 7.30 | 7.92 |
| Melezitose | 5.76 | n/a | 5.13 | 5.18 |
| Methanol | 10.66 | 12.19 | n/a | n/a |
| Sorbitol | 12.18 | 7.00 | 7.15 | 7.17 |
| Sucrose | 6.17 | n/a | 5.67 | 5.76 |
| Xylitol | 12.22 | 7.50 | 7.59 | 7.56 |
| Xylose | 7.67 | 6.54 | 7.40 | 7.84 |
| Acetic acid | n/a | 9.49 | n/a | n/a |
| Citric acid | n/a | 5.64 | n/a | n/a |
| Formic acid | n/a | 8.74 | n/a | n/a |
| Lactic acid | n/a | 8.39 | n/a | n/a |
| Malic acid | n/a | n/a | n/a | n/a |
| Shikimic acid | n/a | n/a | n/a | n/a |
| Succinic acid | n/a | n/a | n/a | n/a |
| Tartaric acid | n/a | 5.95 | n/a | n/a |

**Conditions**

| | |
|---|---|
| **Dimensions** | 300 mm × 8 mm |
| **Mobile phase** | UPW (0.1% $H_2SO_4$ for $H^+$ form) |
| **Flow rate** | 1.0 mL/min |
| **Temperature** | 80 °C (70 °C for $Ca^{2+}$) |
| **Detection** | RID @ 55 °C |

# Retention times for some saccharides, sugar alcohols and organic acids

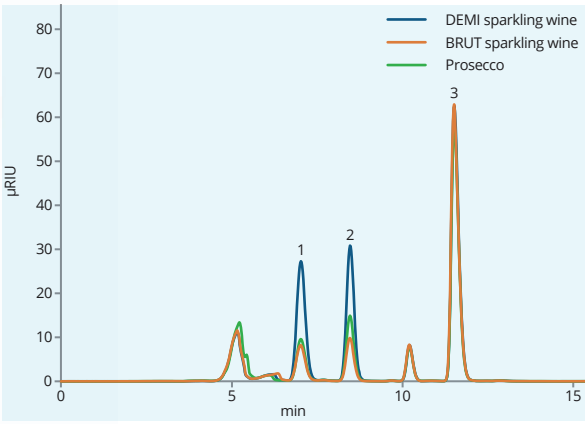
| 0.5 mL/min | Retention Time [min] | | | |
|---|---|---|---|---|
| **Counter Ion** | **$Ca^{2+}$** | **$H^+$** | **$Na^+$** | **$K^+$** |
| Erythritol | 19.77 | n/a | n/a | n/a |
| Ethanol | 21.66 | 28.84 | 20.57 | 20 |
| Fructose | 16.68 | 13.10 | 14.72 | 15.58 |
| Galactose | 15.19 | 12.88 | 14.43 | 15.37 |
| Glucose | 13.99 | 12.28 | 13.68 | 14.48 |
| Glycerol | 20.10 | 17.11 | 16.34 | 16.01 |
| Isopropanol | 24.79 | 33.60 | n/a | n/a |
| Lactose | 12.55 | 10.80 | 11.51 | 12.01 |
| Maltitol | 15.15 | 11.15 | 11.61 | 11.63 |
| Maltose | 12.34 | 10.62 | 11.46 | 11.95 |
| Mannitol | 19.80 | 13.61 | 13.75 | 13.71 |
| Mannose | 16.21 | 12.88 | 14.58 | 15.86 |
| Melezitose | 11.38 | 10.01 (30 °C) | 10.23 | 10.35 |
| Methanol | 21.30 | 24.33 | n/a | n/a |
| Sorbitol | 23.45 | 13.95 | 14.28 | 14.34 |
| Sucrose | 12.19 | 10.76 (30 °C) | 11.32 | 11.52 |
| Xylitol | 23.70 | 14.94 | 15.15 | 15.13 |
| Xylose | 15.15 | 13.00 | 14.77 | 15.67 |
| Acetic acid | n/a | 19.03 | n/a | n/a |
| Citric acid | n/a | 11.26 | n/a | n/a |
| Formic acid | n/a | 17.48 | n/a | n/a |
| Lactic acid | n/a | 16.78 | n/a | n/a |
| Malic acid | n/a | 12.84 | n/a | n/a |
| Shikimic acid | n/a | 14.93 | n/a | n/a |
| Succinic acid | n/a | 14.90 | n/a | n/a |
| Tartaric acid | n/a | 11.88 | n/a | n/a |

**Conditions**

| | |
|---|---|
| **Dimensions** | 300 mm × 8 mm |
| **Mobile phase** | UPW (0.1% $H_2SO_4$ for $H^+$ form) |
| **Flow rate** | 0.5 mL/min |
| **Temperature** | 80 °C (70 °C for $Ca^{2+}$) |
| **Detection** | RID @ 55 °C |

# SUGARS

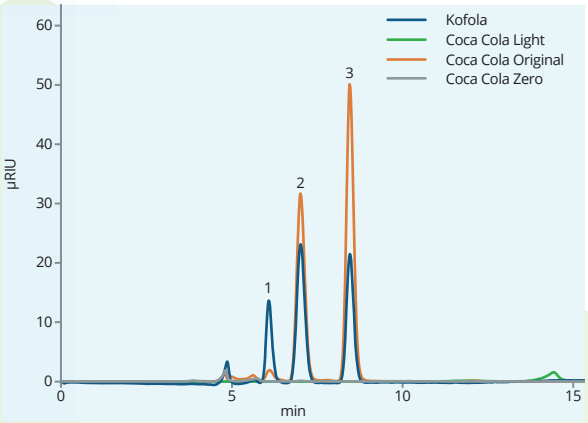
## Sugars in sparkling wines




*Sugars profile in sparkling wines on ASTRA® Sugar Ca column*

| | |
|---|---|
| **Column** | ASTRA® Sugar Ca(S), 10 µm |
| **Dimensions** | 300 mm × 8 mm |
| **Part number** | AST-5906-VN80 |
| **Mobile phase** | 100% $H_2O$ |
| **Flow rate** | 1.0 mL/min |
| **Temperature** | 80 °C |
| **Injection volume** | 3 µL |
| **Detection** | RID (55 °C) |
| **Analytes** | **1. Glucose**<br>**2. Fructose**<br>**3. Ethanol** |

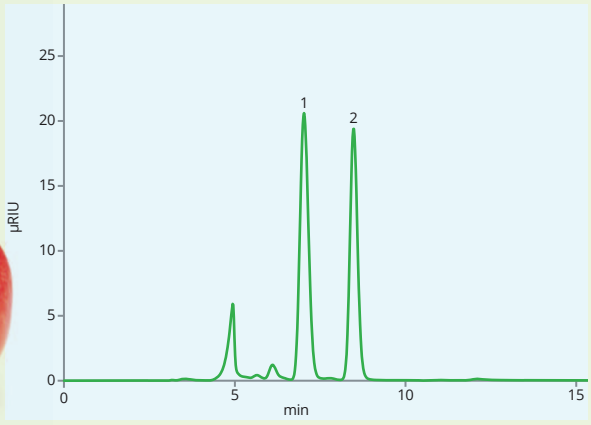
## Sugars in non-alcoholic beverages




*Coke-type drinks on ASTRA® Sugar Ca column*

| | |
|---|---|
| **Column** | ASTRA® Sugar Ca(S), 10 µm |
| **Dimensions** | 300 mm × 8 mm |
| **Part number** | AST-5906-VN80 |
| **Mobile phase** | 100% $H_2O$ |
| **Flow rate** | 1.0 mL/min |
| **Temperature** | 80 °C |
| **Injection volume** | 3 µL |
| **Detection** | RID (55 °C) |
| **Analytes** | **1. Sucrose**<br>**2. Glucose**<br>**3. Fructose** |

## Sugars in apple juice

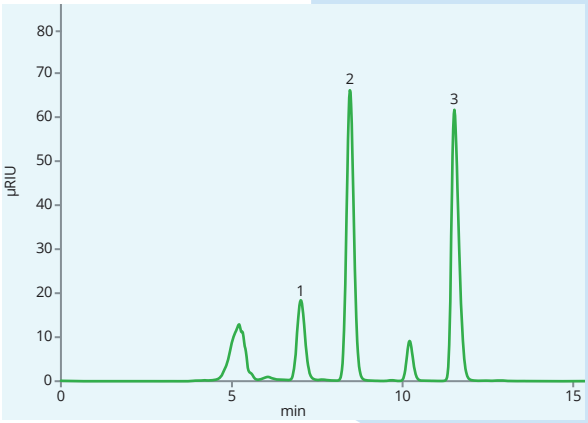



*Apple juice on ASTRA® Sugar Ca column*

| | |
|---|---|
| **Column** | ASTRA® Sugar Ca(S), 10 µm |
| **Dimensions** | 300 mm × 8 mm |
| **Part number** | AST-5906-VN80 |
| **Mobile phase** | 100% $H_2O$ |
| **Flow rate** | 1.0 mL/min |
| **Temperature** | 80 °C |
| **Injection volume** | 3 µL |
| **Detection** | RID (55 °C) |
| **Analytes** | **1. Glucose**<br>**2. Fructose** |

# SUGARS

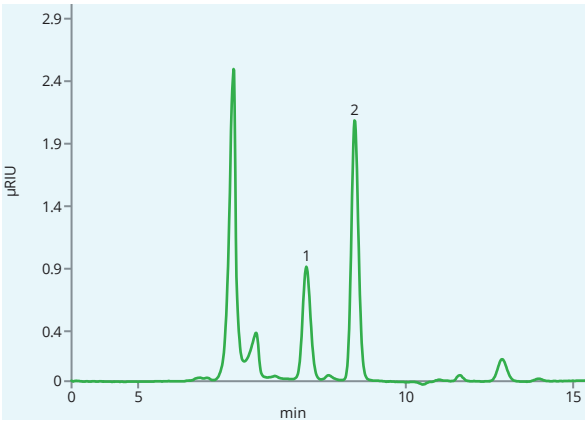
## Sugars in half-fermented wine




*Half-fermented wine profile on ASTRA® Sugar Ca column*

| | |
|---|---|
| **Column** | ASTRA® Sugar Ca(S), 10 µm |
| **Dimensions** | 300 mm × 8 mm |
| **Part number** | AST-5906-VN80 |
| **Mobile phase** | 100% $H_2O$ |
| **Flow rate** | 1.0 mL/min |
| **Temperature** | 80 °C |
| **Injection volume** | 3 µL |
| **Detection** | RID (55 °C) |
| **Analytes** | **1. Glucose**<br>**2. Fructose**<br>**3. Ethanol** |

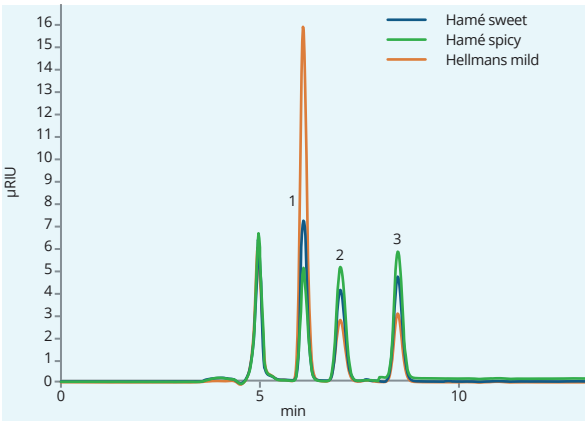
## Sugars analysis in tomatoes




*Sugars profile in small red tomatoes on ASTRA® Sugar Ca column*

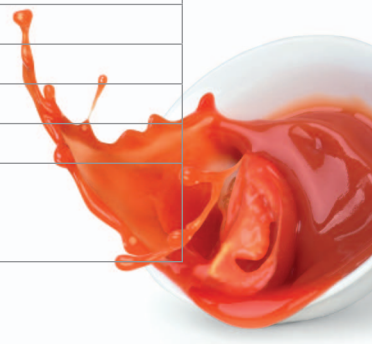
| | |
|---|---|
| **Column** | ASTRA® Sugar Ca(S), 10 µm |
| **Dimensions** | 300 mm × 8 mm |
| **Part number** | AST-5906-VN80 |
| **Mobile phase** | 100% $H_2O$ |
| **Flow rate** | 1.0 mL/min |
| **Temperature** | 80 °C |
| **Injection volume** | 3 µL |
| **Detection** | RID (55 °C) |
| **Analytes** | **1. Glucose**<br>**2. Fructose** |

## Sugar control in ketchups



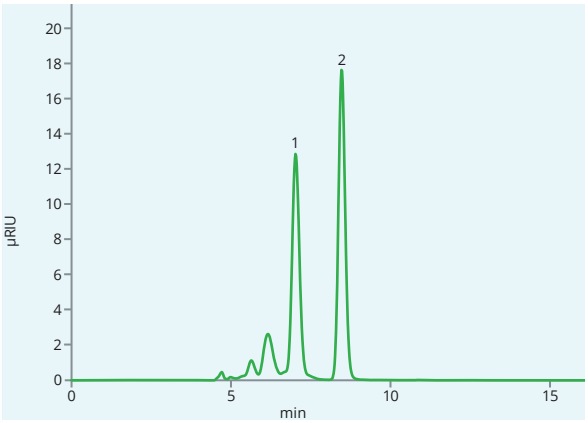

*Ketchup analysis on ASTRA® Sugar Ca column*

| | |
|---|---|
| **Column** | ASTRA® Sugar Ca(S), 10 µm |
| **Dimensions** | 300 mm × 8 mm |
| **Part number** | AST-5906-VN80 |
| **Mobile phase** | 100% $H_2O$ |
| **Flow rate** | 1.0 mL/min |
| **Temperature** | 80 °C |
| **Detection** | RID (55 °C) |
| **Injection volume** | 3 µL |
| **Analytes** | **1. Sucrose**<br>**2. Glucose**<br>**3. Fructose** |



# SUGARS AND ORGANIC ACIDS

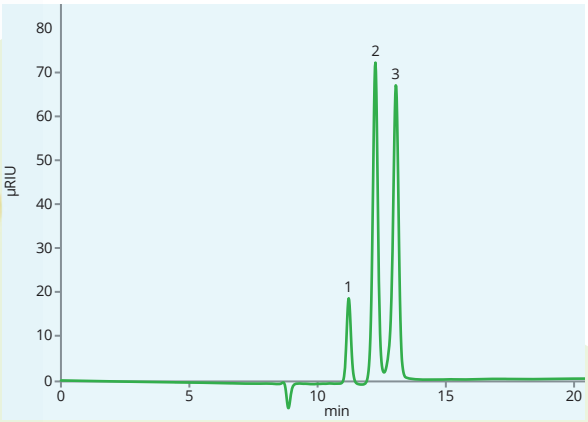
## Sugars in honey




*Honey profile on ASTRA® Sugar Ca column*

| | |
|---|---|
| **Column** | ASTRA® Sugar Ca(S), 10 µm |
| **Dimensions** | 300 mm × 8 mm |
| **Part number** | AST-5906-VN80 |
| **Mobile phase** | 100% $H_2O$ |
| **Flow rate** | 1.0 mL/min |
| **Temperature** | 80 °C |
| **Injection volume** | 3 µL |
| **Detection** | RID (55 °C) |
| **Analytes** | **1. Glucose**<br>**2. Fructose** |

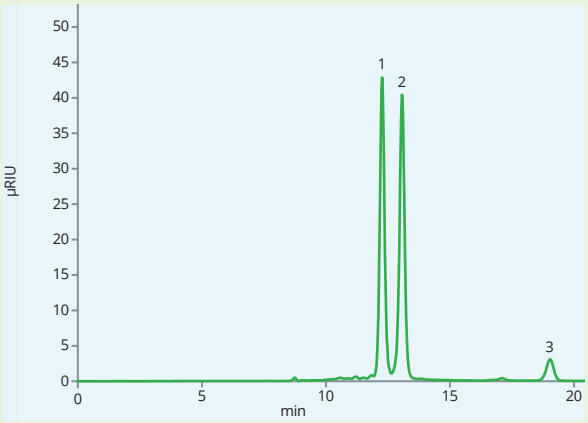
## Sugars and citric acid in grapefruit juice




*Grapefruit analysis on ASTRA® Sugar H column*

| | |
|---|---|
| **Column** | ASTRA® Sugar H(S), 10 µm |
| **Dimensions** | 300 mm × 8 mm |
| **Part number** | AST-5927-VN80 |
| **Mobile phase** | 0.1% $H_2SO_4$ |
| **Flow rate** | 0.5 mL/min |
| **Temperature** | 80 °C |
| **Injection volume** | 3 µL |
| **Detection** | RID (55 °C) |
| **Analytes** | **1. Citric acid**<br>**2. Glucose**<br>**3. Fructose** |

## Sugars and acetic acid in balsamic vinegar

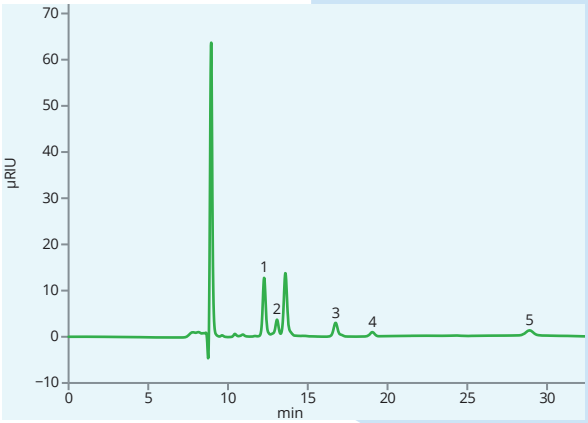



*Balsamic vinegar on ASTRA® Sugar H column*

| | |
|---|---|
| **Column** | ASTRA® Sugar H(S), 10 µm |
| **Dimensions** | 300 mm × 8 mm |
| **Part number** | AST-5927-VN80 |
| **Mobile phase** | 0.1% $H_2SO_4$ |
| **Flow rate** | 0.5 mL/min |
| **Temperature** | 80 °C |
| **Injection volume** | 3 µL |
| **Detection** | RID (55 °C) |
| **Analytes** | **1. Glucose**<br>**2. Fructose**<br>**3. Acetic acid** |

# SUGARS AND ORGANIC ACIDS

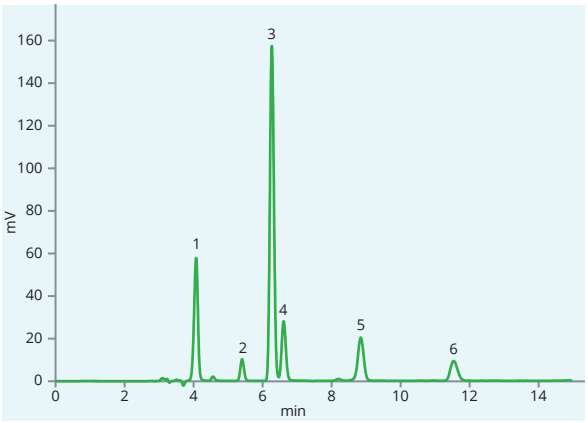
## Cabbage juice




*Cabbage juice profile on ASTRA® Sugar H column*

| | |
|---|---|
| **Column** | ASTRA® Sugar H(S), 10 µm |
| **Dimensions** | 300 mm × 8 mm |
| **Part number** | AST-5927-VN80 |
| **Mobile phase** | 0.1% $H_2SO_4$ |
| **Flow rate** | 0.5 mL/min |
| **Temperature** | 80 °C |
| **Injection volume** | 3 µL |
| **Detection** | RID (55 °C) |
| **Analytes** | **1. Glucose**<br>**2. Fructose**<br>**3. Lactic acid**<br>**4. Acetic acid**<br>**5. Ethanol** |

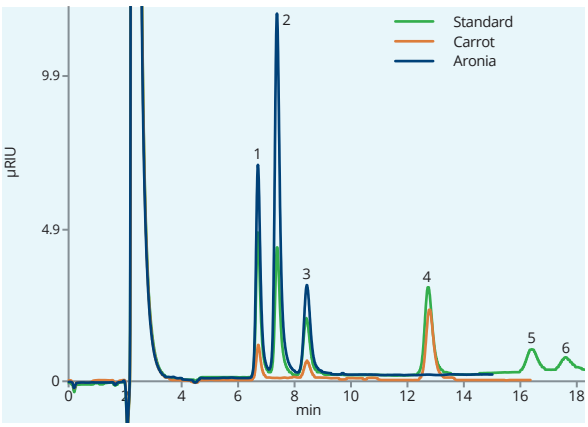
## Organic acids




*Test solution on ASTRA® C18-AQ column*

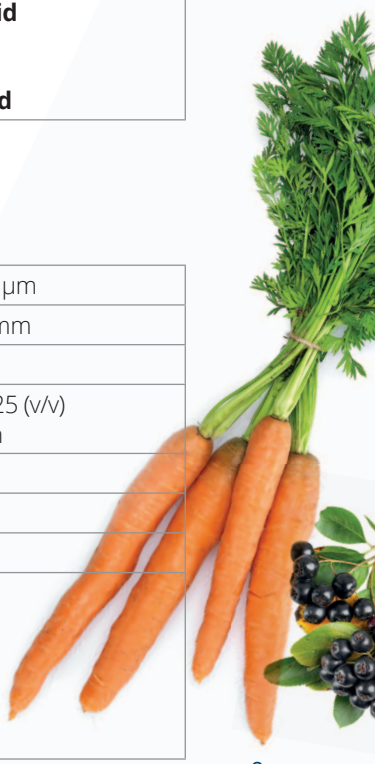
| | |
|---|---|
| **Column** | ASTRA® C18-AQ, 3 µm |
| **Dimensions** | 150 mm × 4.6 mm |
| **Part number** | AST-5832-IK46 |
| **Mobile phase** | 25mM $KH_2PO_4$ (pH = 2.71)<br>Isocratic elution |
| **Flow rate** | 1.0 mL/min |
| **Temperature** | 30 °C |
| **Detection** | DAD at 204 nm |
| **Injection volume** | 10 µL |
| **Analytes** | **1. Tartaric acid**<br>**2. Malic acid**<br>**3. Shikimic acid**<br>**4. Lactic acid**<br>**5. Citric acid**<br>**6. Succinic acid** |

## Mono- and disaccharides and sugar alcohol



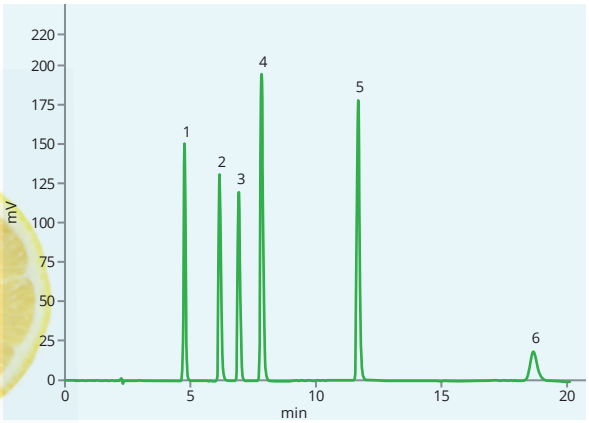

*Analysis on ARION® NH2 column*

| | |
|---|---|
| **Column** | ARION® NH2, 5 µm |
| **Dimensions** | 250 mm × 4.6 mm |
| **Part number** | ARI-5736-LM46 |
| **Mobile phase** | ACN/water 75/25 (v/v)<br>Isocratic elution |
| **Flow rate** | 1.5 mL/min |
| **Temperature** | 35 °C |
| **Detection** | RID |
| **Analytes** | **1. Fructose**<br>**2. Sorbitol**<br>**3. Glucose**<br>**4. Sucrose**<br>**5. Maltose**<br>**6. Lactose** |



# SWEETENERS AND ORGANIC ACIDS

## Sweeteners & organic acids



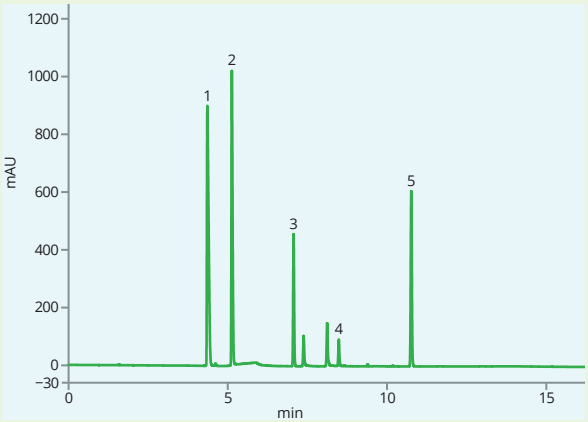

*Standard mixture on ARION® Plus C18 column*

| | |
|---|---|
| **Column** | ARION® Plus C18, 5 µm |
| **Dimensions** | 150 mm × 4.6 mm |
| **Part number** | ARI-5720-LK46 |
| **Mobile phase** | Acetonitrile : methanol : 17.5mM $KH_2PO_4$ 0.1 mol/L NaOH > pH = 6.0 Gradient *according table below |
| **Flow rate** | 1.3 to 1.5 mL/min |
| **Temperature** | Ambient |
| **Detection** | UV @214 & 230 nm |
| **Sample** | Supelco 37 FAME mix in DCM (dilution 1:10) |
| **Analytes** | **1. Acesulfame-K**<br>**2. Benzoic acid**<br>**3. Saccharin**<br>**4. Sorbic acid**<br>**5. Caffeine**<br>**6. Aspartame** |

* Gradient program

| Time (min) | Flow rate (mL/min) | Wavelength (nm) | A (%) (Water) | B (%) 17.5mM $KH_2PO_4$ | C (%) Acetonitrile | D (%) Methanol |
|---|---|---|---|---|---|---|
| 0 | 1.3 | 230 | 0 | 90 | 2 | 8 |
| 7 | 1.5 | 214 | 0 | 80 | 8 | 12 |
| 14 | 1.5 | 214 | 0 | 80 | 8 | 12 |
| 15 | 1.3 | 214 | 0 | 90 | 2 | 8 |
| 17 | 1.3 | 214 | 0 | 90 | 2 | 8 |

## Sweeteners

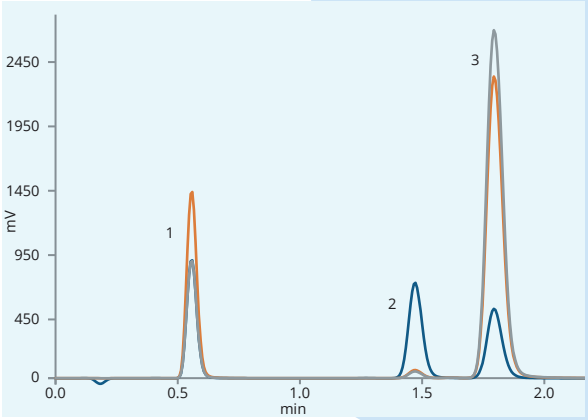



*Standard on ASTRA® C18-HE column*

| | |
|---|---|
| **Column** | ASTRA® C18-HE, 3 µm |
| **Dimensions** | 150 mm × 4.6 mm |
| **Part number** | AST-5732-IK46 |
| **Mobile phase** | 12.5mM $KH_2PO_4$ pH 3.5 / ACN, grad. ACN: 5% 0 min, 60% 12 min. |
| **Flow rate** | 1.0 mL/min |
| **Temperature** | 30 °C |
| **Injection volume** | 3 µL |
| **Detection** | UV @214 nm |
| **Analytes** | **1. Acesulfame-K**<br>**2. Saccharin**<br>**3. Aspartame**<br>**4. Neohesperidin DC**<br>**5. Neotame** |

# FOOD SUPPLEMENTS AND PRESERVATIVES

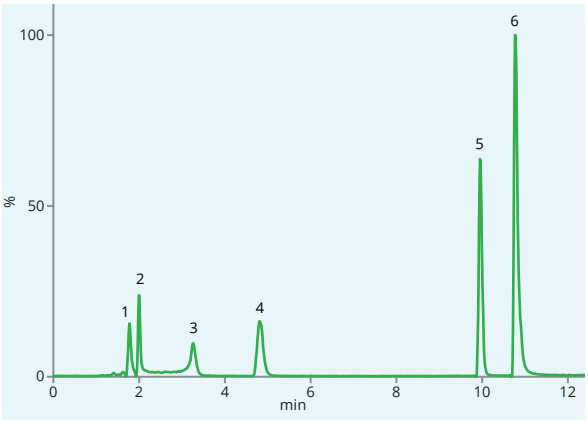
## Preservatives in caffeinated beverages




*Standard on ASTRA® C18-HE HPLC column*

| | |
|---|---|
| **Column** | ASTRA® C18-HE, 3 µm |
| **Dimensions** | 50 mm × 2.1 mm |
| **Part number** | AST-5732-IG21 |
| **Mobile phase** | 51.4mM Sodium acetate trihydrate (pH 3.8) / ACN 90/10 (v/v)<br>Isocratic elution |
| **Flow rate** | 1.3 mL/min |
| **Temperature** | 50 °C |
| **Detection** | UV @226 nm (Sodium benzoate), 272 nm (Caffeine), 259 nm (Potassium sorbate) |
| **Sample** | Supelco 37 FAME mix in DCM (dilution 1:10) |
| **Analytes** | **1. Caffeine**<br>**2. Sodium benzoate**<br>**3. Potassium sorbate** |

## Food supplements

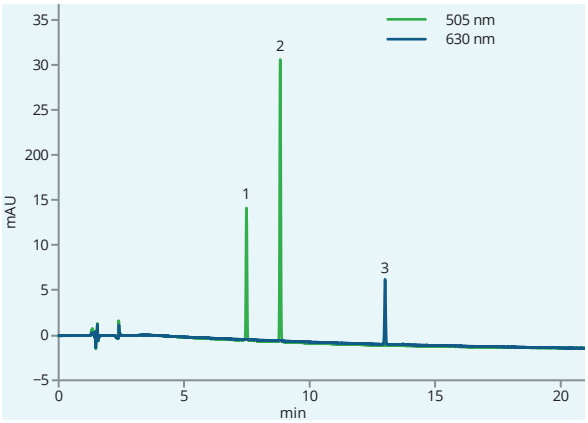



*Analysis of standard solution on ARION® Polar C18 column*

| | | | |
|---|---|---|---|
| **Column** | ARION® Polar C18, 5 µm | | |
| **Dimensions** | 250 mm × 4.6 mm | | |
| **Part number** | ARI-5721-LM46 | | |
| **Mobile phase** | A: ACN<br>B: 5mM formic acid | | |
| **Gradient elution** | **Time (min)**<br>0<br>5<br>12<br>17 | **%A**<br>5<br>5<br>35<br>70 | **%B**<br>95<br>95<br>65<br>30 |
| **Flow rate** | 0.25 mL/min | | |
| **Temperature** | 30 °C | | |
| **Detection** | TOF MS | | |
| **Injection volume** | 3 µL | | |
| **Analytes** | **1. Malic acid**<br>**2. Citric acid**<br>**3. cAMP**<br>**4. L-phenylalanine**<br>**5. L-tryptophan**<br>**6. Flavin adenine dinucleotide** | | |

# FOOD SUPPLEMENTS AND PRESERVATIVES

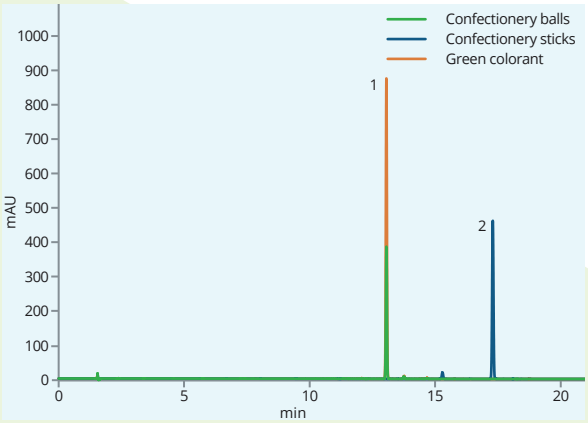
## Additives in energy drinks




*Energy drink sample on ASTRA® C18-HE HPLC column*

| | |
|---|---|
| **Column** | ASTRA® C18-HE, 3 µm |
| **Dimensions** | 150 mm × 4.6 mm |
| **Part number** | AST-5732-IK46 |
| **Mobile phase** | A: 50mM Ammonium Acetate<br>B: ACN<br>Gradient A:<br>0 min 95 %, 20 min 50 % |
| **Flow rate** | 1 mL/min |
| **Temperature** | 45 °C |
| **Detection** | 630 & 505 nm |
| **Sample** | Monster Ultra Strawberry Dreams drink |
| **Analytes** | **1. E110 Sunset Yellow FCF / Orange Yellow S**<br>**2. E129 Allura Red AC**<br>**3. E133 Brilliant Blue FCF** |

## Additives in confectionery for decorating

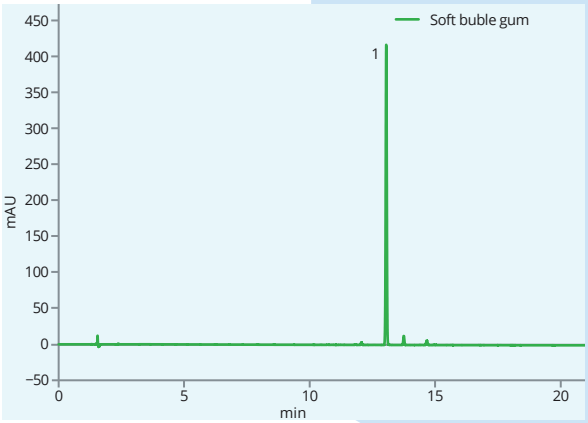



*Food samples on ASTRA® C18-HE column*

| | |
|---|---|
| **Column** | ASTRA® C18-HE, 3 µm |
| **Dimensions** | 150 mm × 4.6 mm |
| **Part number** | AST-5732-IK46 |
| **Mobile phase** | A: 50mM Ammonium Acetate<br>B: ACN<br>Gradient A:<br>0 min 95 %, 20 min 50 % |
| **Flow rate** | 1 mL/min |
| **Temperature** | 45 °C |
| **Detection** | 630 nm |
| **Sample** | Confectionery balls<br>Confectionery sticks<br>Green colorant |
| **Analytes** | **1. E133 Brilliant Blue FCF**<br>**2. E131 Patent blue V** |

# FOOD SUPPLEMENTS AND PRESERVATIVES

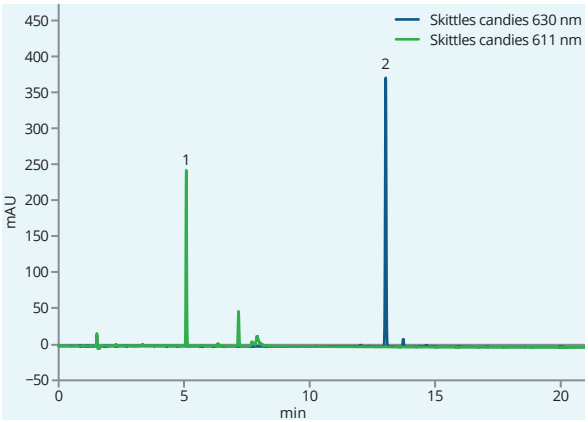
## Additives in bubble gum




*Real samples on ASTRA® C18-HE HPLC column*

| | |
|---|---|
| **Column** | ASTRA® C18-HE, 3 µm |
| **Dimensions** | 150 mm × 4.6 mm |
| **Part number** | AST-5732-IK46 |
| **Mobile phase** | A: 50mM Ammonium Acetate<br>B: ACN<br>Gradient A:<br>0 min 95 %, 20 min 50 % |
| **Flow rate** | 1 mL/min |
| **Temperature** | 45 °C |
| **Detection** | 630 nm |
| **Sample** | Soft bubble gum |
| **Analytes** | **1. E133 Brilliant Blue FCF** |

## Additives in candies

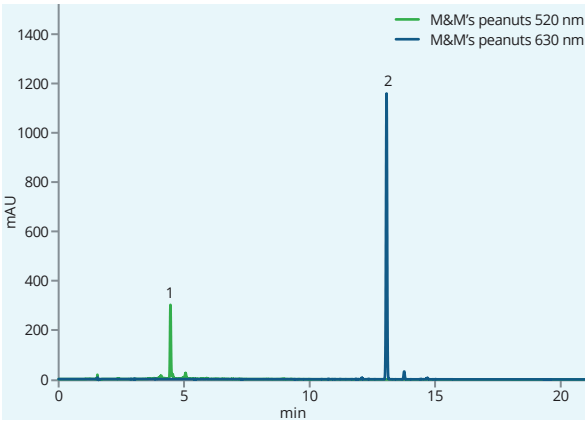



*Real samples on ASTRA® C18-HE HPLC column*

| | |
|---|---|
| **Column** | ASTRA® C18-HE, 3 µm |
| **Dimensions** | 150 mm × 4.6 mm |
| **Part number** | AST-5732-IK46 |
| **Mobile phase** | A: 50mM Ammonium Acetate<br>B: ACN<br>Gradient A:<br>0 min 95 %, 20 min 50 % |
| **Flow rate** | 1 mL/min |
| **Temperature** | 45 °C |
| **Detection** | 611 & 630 nm |
| **Sample** | Skittles candies |
| **Analytes** | **1. E132 Indigotine, Indigo carmine**<br>**2. E133 Brilliant Blue FCF** |

# FOOD SUPPLEMENTS AND PRESERVATIVES

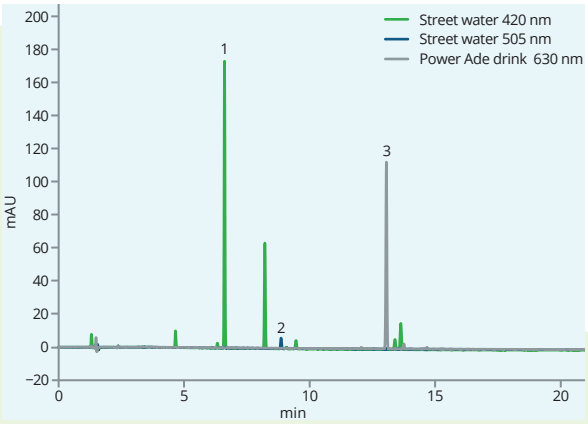
## Additives in M&M's peanuts




*Real samples on ASTRA® C18-HE HPLC column*

| | |
|---|---|
| **Column** | ASTRA® C18-HE, 3 µm |
| **Dimensions** | 150 mm × 4.6 mm |
| **Part number** | AST-5732-IK46 |
| **Mobile phase** | A: 50mM Ammonium Acetate<br>B: ACN<br>Gradient A:<br>0 min 95 %, 20 min 50 % |
| **Flow rate** | 1 mL/min |
| **Temperature** | 45 °C |
| **Detection** | 520 & 630 nm |
| **Sample** | M&M's peanuts |
| **Analytes** | **1. E120 Carminic acid / Carmines**<br>**2. E133 Brilliant Blue FCF** |

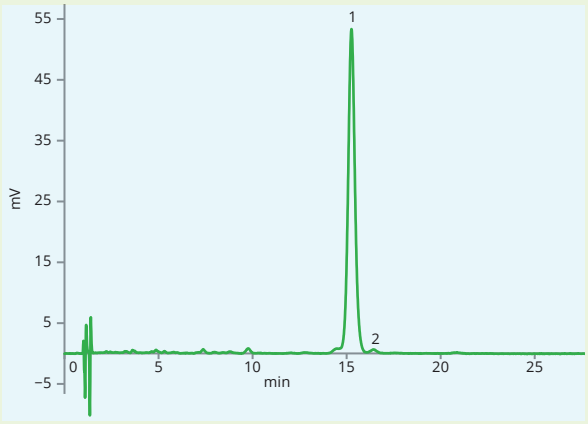
## Additives in drinks




*Various drinks on ASTRA® C18-HE column*

| | |
|---|---|
| **Column** | ASTRA® C18-HE, 3 µm |
| **Dimensions** | 150 mm × 4.6 mm |
| **Part number** | AST-5732-IK46 |
| **Mobile phase** | A: 50mM Ammonium Acetate<br>B: ACN<br>Gradient A:<br>0 min 95 %, 20 min 50 % |
| **Flow rate** | 1 mL/min |
| **Temperature** | 45 °C |
| **Detection** | 420, 505 & 630 nm |
| **Sample** | Street water<br>Power Ade drink |
| **Analytes** | **1. E104 Quinoline Yellow**<br>**2. E129 Allura Red AC**<br>**3. E133 Brilliant Blue FCF** |

## Lutein in food supplements




*Lutein standard on ASTRA® HPLC C18-HE column*

| | |
|---|---|
| **Column** | ASTRA® C18-HE, 5 µm |
| **Dimensions** | 150 mm × 4.6 mm |
| **Part number** | AST-5732-LK46 |
| **Mobile phase** | ACN / Milli-Q water 90 / 10 (v/v)<br>Isocratic elution |
| **Flow rate** | 1.0 mL/min |
| **Temperature** | 30 °C |
| **Injection volume** | 10 µL |
| **Detection** | UV @450 nm |
| **Analytes** | **1. Lutein**<br>**2. Zeaxanthin** |

# ADDITIVES

## Food additives list

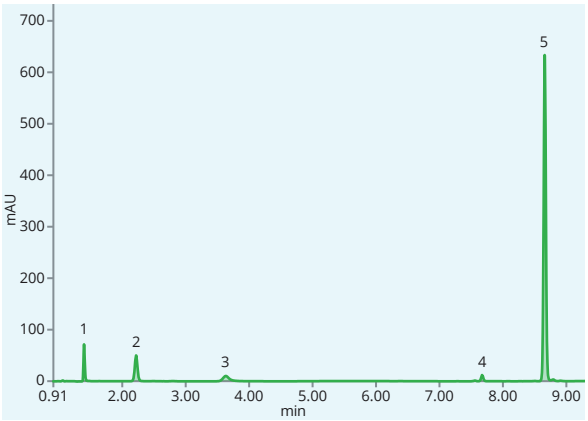
| Additive Code | Name | CAS | Ret. Time [min] | Wavelength [nm] |
|---|---|---|---|---|
| E102 | Tartrazine | 1934-21-0 | 3.75 | 420 |
| E104 | Quinoline Yellow | 8004-92-0 | more peakes detected | 420 |
| E110 | Sunset Yellow FCF / Orange Yellow S | 2783-94-0 | 7.52 | 505 |
| E120 | Carminic acid | 1260-17-9 | more peakes detected | 520 |
| E122 | Azorubine, Carmoisine | 3567-69-9 | 11.79 | 520 |
| E123 | Amaranth | 915-67-3 | 4.71 | 520 |
| E124 | Ponceau 4R, Cochineal Red A | 2611-82-7 | 6.92 | 505 |
| E127 | Erythrosine | 16423-68-0 | 15.21 | 520 |
| E128 | RED 2G | 3734-67-6 | 9.82 | 520 |
| E129 | Allura Red AC | 25956-17-6 | 8.81 | 505 |
| E131 | Patent blue V | 3536-49-0 | 17.29 | 630 |
| E132 | Indigotine, Indigo carmine | 860-22-0 | 5.06 | 611 |
| E133 | Brilliant Blue FCF | 3844-45-9 | 13.13 | 630 |
| E142 | Green S | 3087-16-9 | 12.46 | 630 |
| E151 | Brilliant Black PN | 2519-30-4 | 7.04 | 570 |
| E161b | Lutein | 127-40-2 | 2.49* | 450 |

| | |
|---|---|
| **Column** | ASTRA® C18-HE, 3 µm |
| **Dimensions** | 150 mm × 4.6 mm |
| **Part number** | AST-5732-IK46 |
| **Mobile phase** | A: 50mM Ammonium Acetate<br>B: ACN<br>Gradient A:<br>0 min 95 %, 20 min 50 % |
| **Flow rate** | 1 mL/min |
| **Temperature** | 45 °C |
| **Detection** | See the list of additives |

*Note: * Lutein method – see the application on page 14.*

# VITAMINS

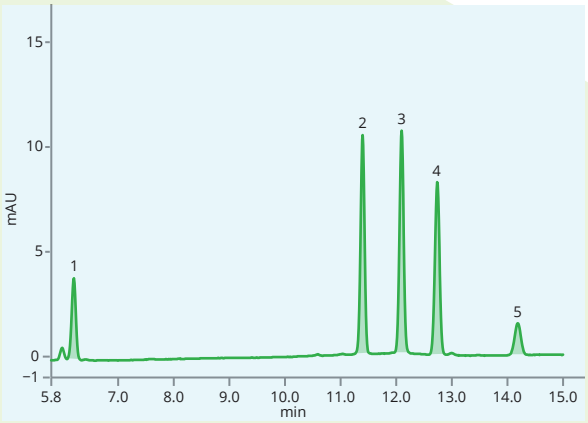
## Vitamins B




*Standard on ARION® Plus C18 column*

| | |
|---|---|
| **Column** | ARION® Plus C18, 3 µm |
| **Dimensions** | 100 mm × 4.6 mm |
| **Part number** | ARI-5720-II46 |
| **Mobile phase** | A: 0.0125M phosphate buffer (pH 3.5), B: Methanol |
| **Gradient elution** | **Time** **A (%)** **B (%)**<br>0 95 5<br>3 95 5<br>10 30 70<br>10.5 30 70 |
| **Flow rate** | 1.0 mL/min |
| **Temperature** | 40 °C |
| **Injection volume** | 5.0 µL |
| **Detection** | UV @280 nm |
| **Analytes** | **1. Thiamine (Vitamin B1)**<br>**2. Pyridoxine (Vitamin B6)**<br>**3. Nicotinamide (Vitamin B3, Niacinamide, NAM)**<br>**4. Cyanocobolamin (Vitamin B12)**<br>**5. Riboflavin (Vitamin B2)** |

## Vitamins A and E

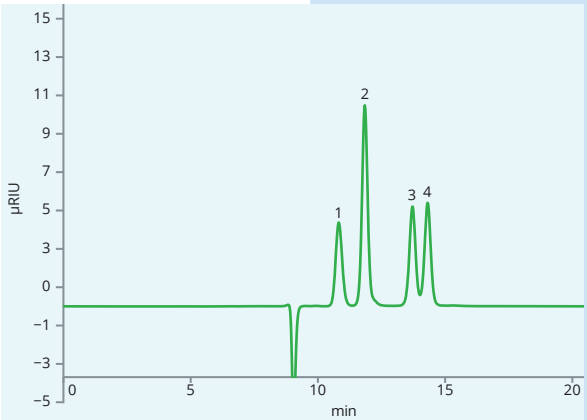



*Standard on ARION® Plus C18 column*

| | |
|---|---|
| **Column** | ARION® Plus C18, 3 µm |
| **Dimensions** | 100 mm × 4.6 mm |
| **Part number** | ARI-5720-II46 |
| **Mobile phase** | A: Water<br>B: Methanol |
| **Gradient elution** | **Time** **A (%)** **B (%)**<br>0 15 85<br>10 0 100<br>18 0 100 |
| **Flow rate** | 1.0 mL/min |
| **Temperature** | 40 °C |
| **Injection volume** | 5.0 µL |
| **Detection** | UV @284 nm |
| **Analytes** | **1. Retinol (Vitamin A)**<br>**2. Delta-tocopherol (D-Vitamin E)**<br>**3. Gamma-tocopherol (Vitamin E γ)**<br>**4. Alfa-tocopherol (Vitamin E α)**<br>**5. Alpha-Tocopheryl acetate (Vitamin E acetate)** |

# VITAMINS

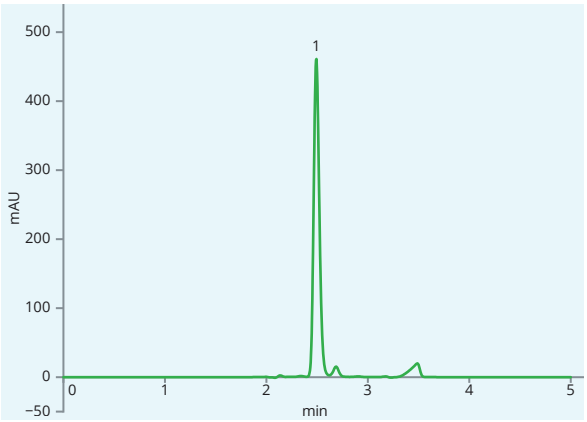
## Celaskon tablets




*Celaskon sample on ASTRA® Sugar H(S) column*

| | |
|---|---|
| **Column** | ASTRA® Sugar H(S), 10 µm |
| **Dimensions** | 300 mm × 8 mm |
| **Part number** | AST-5927-VN80 |
| **Mobile phase** | 0.1% $H_2SO_4$ |
| **Flow rate** | 0.5 mL/min |
| **Temperature** | 30 °C |
| **Injection volume** | 3 µL |
| **Detection** | RID 35°C |
| **Analytes** | **1. Lactose**<br>**2. Citric acid**<br>**3. Vitamin C**<br>**4. Sorbitol** |

## Vitamin C in syrup




*Syrup sample on ASTRA® C18-HE column*

| | |
|---|---|
| **Column** | ASTRA® C18-HE, 3 µm |
| **Dimensions** | 150 mm × 4.6 mm |
| **Part number** | AST-5732-IK46 |
| **Mobile phase** | 25mM phosphate buffer (pH 2.5) / acetonitrile (90/10) |
| **Flow rate** | 0.7 mL/min |
| **Temperature** | 25 °C |
| **Injection volume** | 10 µL |
| **Detection** | 245 nm |
| **Analytes** | **1. Vitamin C** |

## References

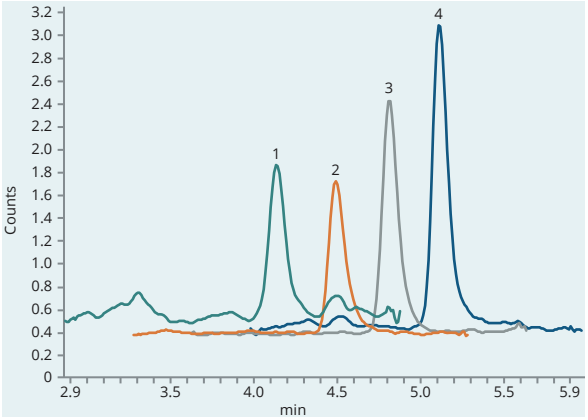

(1) Regulation (EC) No 1333/2008 of the European Parliament and of the Council of 16 December 2008 on food additives

(2) Directive 2002/46/EC of the European Parliament and of the Council of 10 June 2002 on the approximation of the laws of the Member States relating to food supplements

(3) Vitamin and Mineral Supplement Fact Sheets (NIH Office of Dietary Supplements)

# CONTAMINANTS

## Aflatoxins by LC/MS



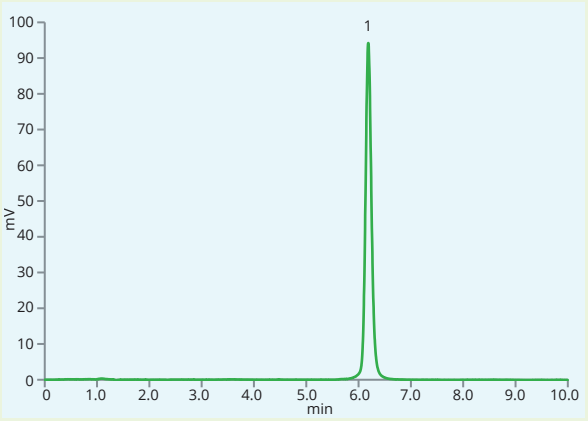

*Stress test – test mixture on ARION® Plus C18 column*

| | |
|---|---|
| **Column** | ARION® Plus C18, 2.2 µm |
| **Dimensions** | 100 mm × 2.1 mm |
| **Part number** | ARI-5720-EI21 |
| **Mobile phase** | A: 5mM ammonium formate / 0.2% formic acid<br>B: Methanol / 0.2% formic acid |
| **Gradient elution** | **Time** **A (%)**<br>0.0 70<br>0.5 70<br>8.0 0<br>10.5 0<br>10.6 70 |
| **Flow rate** | 0.35 mL/min |
| **Temperature** | 40 °C |
| **Analytes** | **1. Aflatoxin B1**<br>**2. Aflatoxin B2**<br>**3. Aflatoxin G1**<br>**4. Aflatoxin G2** |

**MS method:**

| Compound name | Precursor Ion | Product Ion | Collision energy |
|---|---|---|---|
| Aflatoxin B1 | 313.07 | 284.9 | 25 |
| Aflatoxin B1 | 313.07 | 240.9 | 45 |
| Aflatoxin B2 | 315.09 | 286.9 | 33 |
| Aflatoxin B2 | 315.09 | 259 | 33 |
| Aflatoxin G1 | 329.07 | 310.9 | 25 |
| Aflatoxin G1 | 329.07 | 198.9 | 57 |
| Aflatoxin G2 | 331.08 | 312.9 | 25 |
| Aflatoxin G2 | 331.08 | 189.1 | 49 |

## HMF in syrup

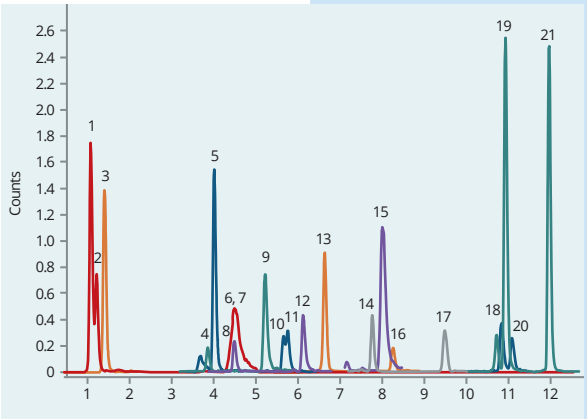



*Standard mixture on ARION® Plus C18 column*

| | |
|---|---|
| **Column** | ARION® Plus C18, 5 µm |
| **Dimensions** | 250 mm × 4.6 mm |
| **Part number** | ARI-5720-LM46 |
| **Mobile phase** | Methanol/water 10/90 (v/v)<br>Isocratic elution |
| **Flow rate** | 1.5 mL/min |
| **Temperature** | 30 °C |
| **Injection volume** | 5.0 µL |
| **Detection** | UV @285 nm |
| **Analytes** | **1. Hydroxymethylfurfural** |

# CONTAMINANTS

## Pyrrolizidine alkaloids in herbal tea

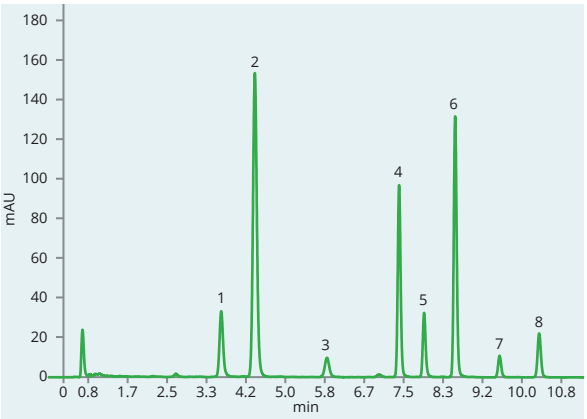



*Test mixture on ARION® Plus C18 column*

| | |
|---|---|
| **Column** | ARION® Plus C18, 2.2 µm |
| **Dimensions** | 100 mm × 2.1 mm |
| **Part number** | ARI-5720-EI21 |
| **Mobile phase** | 10mM ammonium carbonate in water/ACN (LC-MS grade) (v/v) Isocratic elution |
| **Flow rate** | 0.4 mL/min |
| **Temperature** | 40 °C |
| **Detection** | LC-MS/MS |

| | | | |
|---|---|---|---|
| **Analytes** | **1. Lycopsamine N-oxide**<br>**2. Intermedine N-oxide**<br>**3. Europine N-oxide**<br>**4. Retrorsine N-oxide (Isatidine)**<br>**5. Heliotrine N-oxide**<br>**6. Lycopsamine**<br>**7. Intermedine (Indicine)** | **8. Seneciphylline N-oxide**<br>**9. Europine**<br>**10. Senecivernine N-oxide**<br>**11. Senecionine N-oxide**<br>**12. Senkirkine (Renardine)**<br>**13. Echimidine N-oxide**<br>**14. Lasiocarpine N-oxide** | **15. Heliotrine**<br>**16. Retrosine**<br>**17. Seneciphylline**<br>**18. Senecivernine**<br>**19. Echimidine**<br>**20. Senecionine (Aureine)**<br>**21. Lasiocarpine** |

## Ergot alkaloids




*Test solution on ASTRA® C18-HE column*

| | |
|---|---|
| **Column** | ASTRA® C18-HE, 3 µm |
| **Dimensions** | 100 mm × 3 mm |
| **Part number** | AST-5732-II30 |
| **Mobile phase** | A: 10mM Buffer (pH = 7.0)<br>B: ACN |
| **Gradient elution** | **Time** **A (%)** **B (%)**<br>0.0 59 41<br>4.0 55 45<br>6.0 40 60<br>15.0 15 85 |
| **Flow rate** | 0.75 mL/min |
| **Temperature** | 30 °C |
| **Detection** | UV at 310 nm |
| **Injection volume** | 3 µL |
| **Analytes** | **1. Ergosine**<br>**2. Ergotamine**<br>**3. Ergosinine**<br>**4. Ergocristine**<br>**5. Ergostine**<br>**6. Ergotaminine**<br>**7. Ergostinine**<br>**8. Ergocristinine** |

# ASTRA® Sugar technical guide

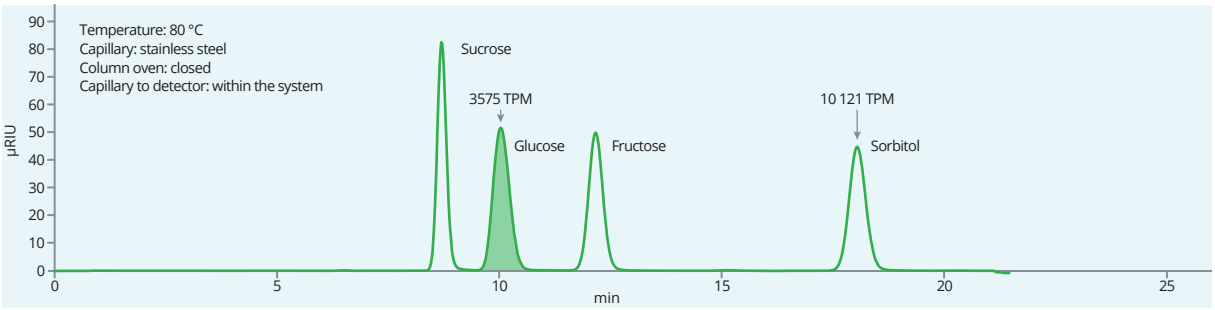
## Work with right temperature

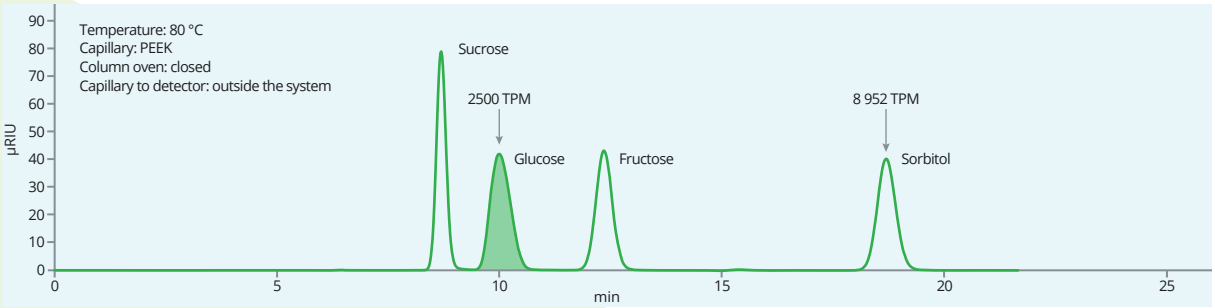
**Working with Ca(2+), Na(+) and K(+) ionic form**

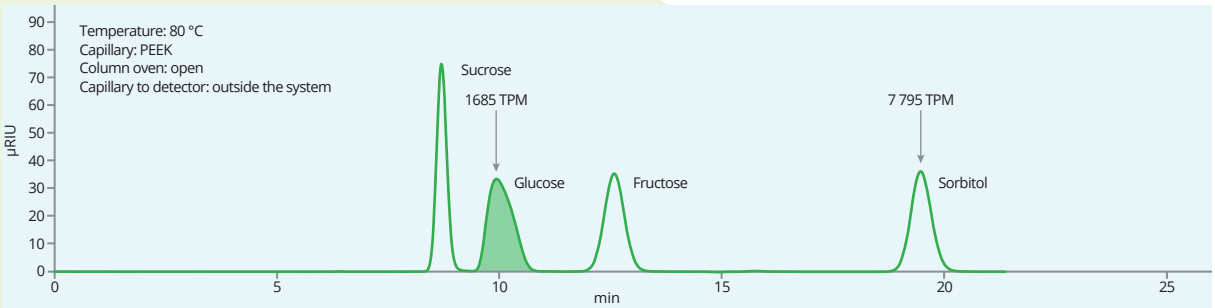
It is necessary to keep all critical parts (column, pre-column and capillaries) at an elevated temperature. If you have cold spots, the efficiency will decrease. The most significant effect is in glucose peak, where it can even appear to be a split peak.

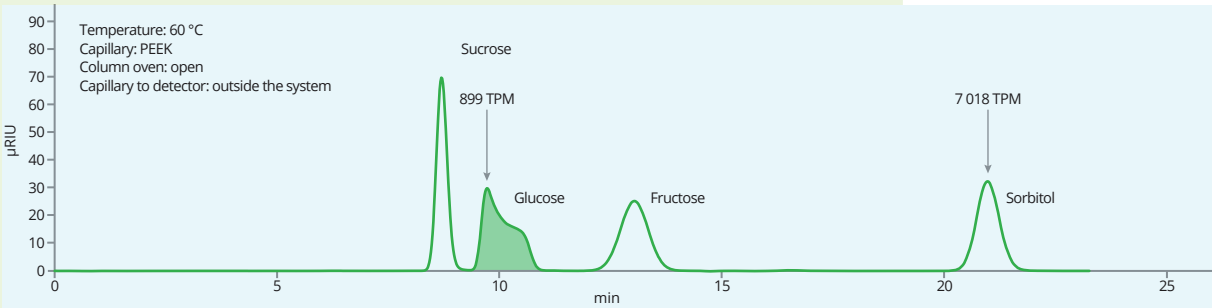
**Working with H(+) ionic form**

Sucrose will decompose at higher temperatures to glucose and fructose under acidic conditions.



# HPLC AND LC-MS/MS SUPPORT

## ASTRA® Sugar technical guide

### Use of organic solvents

ASTRA® Sugar columns are intended to be used in the 100% aqueous mobile phase. Using the organic solvent may lead to polymer swelling. In rare cases, acetonitrile can be used up to a maximum of 10% (v/v).

### Correct plug tightening

When putting your column in a refrigerator for long-term storage, check the column plugs after 1 to 4 hours. It may be necessary to tighten the plugs due to thermal expansion.

### Column regeneration

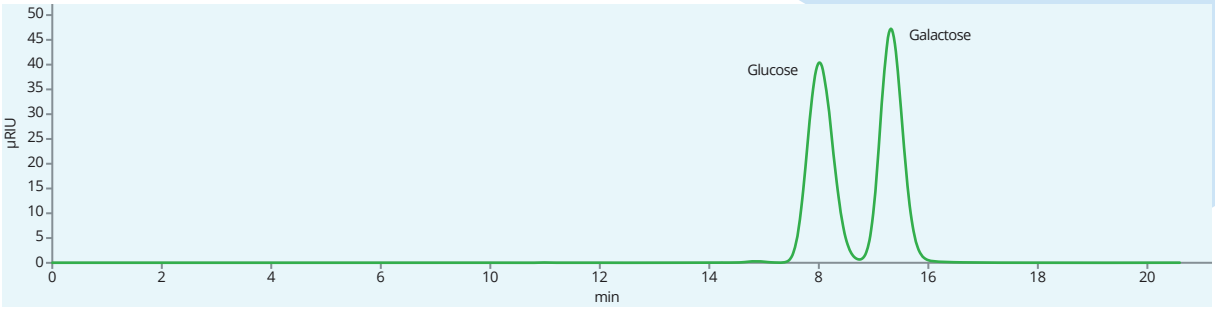
Regeneration of **Calcium form** can be done by using

- 0.05M $CaCl_2$ or $Ca(NO_3)_2$ solution in water
- With flow rate of 0.15 mL/min approx. 6 h
- Followed by rinsing with 0.3 mL/min of pure water for a further 6–8 h

The success of the regeneration may be checked by comparing it with the initial selectivity.

### Do you have a glucose and galactose separation issue?

ASTRA® Sugar Ca(S) solves the separation at flow rate of 0.5 mL/min with a resolution of 1.56.



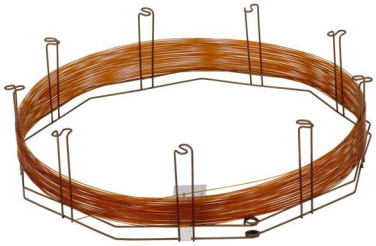

*Glucose and galactose separation on ASTRA® Sugar Ca(S) column*

The laboratory offers HPLC, UHPLC and LC-MS/MS analyses.

# OTHER PRODUCTS

## GC columns

The family of LION™ GC column has grown by two stages. LN-624 Sil MS brings with it a higher temperature limit of 300/320 °C, lower background and longer lifetime. New LN-FAME HT is a highly polar bonded phase with an increased temperature limit up to 280 °C, with the application being focused on the analysis of FAME and their cis/trans isomers.
LION™ GC columns are available in standard dimensions. We also offer atypical dimensions on request.



## MSPE columns

MSPE columns enable the quick and effective pretreatment of a sample using different types of membranes with 0.22 micrometer porosity and a suitable sorbent. They are a suitable replacement for 1–3 mL SPE columns, tips filled with sorbent and LL type extraction. With MSPE columns you will save time, use a minimum amount of solvents and perform more sample analyses than with conventional SPE columns.

## SPE columns

SpeExtra™ is a new range of SPE columns for your sample preparation. Florisil® and HLB columns are suitable for use in the environmental and toxicology area. The SpeExtra™ HLB SPE column is based on a modified polymer of 100Å pore size. It offers a high surface area of >825 $m^2/g$. The working pH range is from pH 1 to pH 13. The loading capacity is 20 %. It has been developed to clean a broad range of hydrophobic/hydrophilic compounds across various matrixes (plasma, urine, oil, water etc.).


## Chromatography vials

In the world of analytical chemistry, precision and reliability are key to successful sample analysis. Our chromatography vial offer provides top-quality 2mL and headspace vials designed to meet the stringent needs of laboratory professionals across various applications.

Headspace vials

2mL screw robotic vials

# OTHER PRODUCTS

## MetAmino® kit


MetAmino® kits offer an easy sample preparation method for your LC/MS or GC/MS analysis. MetAmino® kits include derivatization reagents and all clean-up accessories to prepare your sample for injection.
They eliminate time consuming sample preparation procedures. The new clean-up procedure uses a special material as the end-step. The other advantage is that the derivatization procedure enables the extension of the analyte list. Contact us for further details.

- 76 amino acids, polyamines, biogen amines and coenzymes in 25 minutes (sample preparation and analysis time).
- Easy sample preparation.
- Unique clean-up step.
- LC/MS and GC/MS kit.
- NIST library for GC/MS available.
- Possible extension to other analytes on request.

## Laboratory sensors

Chromservis s.r.o. manufactures laboratory and process sensors for pH, dissolved oxygen and conductivity measurement as well as for ORP measurement. The sensor offer includes sensors with various electrical connections (S7, S8, VP6, VP8, K8) and fixed cable option with free end, BNC, Lemo and DIN connectors.

# ORDERING INFORMATION

## Ligand exchange columns

| Description | Ionic form | Size (mm) | USP code | Part No. |
|---|---|---|---|---|
| ASTRA® Sugar Ca(S) HPLC column, 10 µm | Calcium | 300 × 8 | L19 | AST-5906-VN80 |
| ASTRA® Sugar H(S) HPLC column, 10 µm | Hydrogen | 300 × 8 | L17 | AST-5927-VN80 |
| ASTRA® Sugar K(S) HPLC column, 10 µm | Potassium | 300 × 8 | – | On request |
| ASTRA® Sugar Na(S) HPLC column, 10 µm | Sodium | 300 × 8 | L58 | On request |

## Silica based columns

| Description | Separation mode | Size (mm) | USP code | Part No. |
|---|---|---|---|---|
| ASTRA® C18 HE, 3 µm | RP | 50 × 2.1 | L1 | AST-5732-IG21 |
| ASTRA® C18 HE, 3 µm | RP | 100 × 3 | L1 | AST-5732-II30 |
| ASTRA® C18-HE, 3 µm | RP | 150 × 4.6 | L1 | AST-5732-IK46 |
| ASTRA® C18-HE, 5 µm | RP | 150 × 4.6 | L1 | AST-5732-LK46 |
| ARION® C18-AQ, 3 µm | RP | 150 × 4.6 | L1 | AST-5832-IK46 |
| ARION® Polar C18, 5 µm | RP | 250 × 4.6 | L1 | ARI-5721-LM46 |
| ARION® Plus C18, 2.2 µm | RP | 100 × 2.1 | L1 | ARI-5720-EI21 |
| ARION® Plus C18, 3 µm | RP | 100 × 4.6 | L1 | ARI-5720-II46 |
| ARION® Plus C18, 5 µm | RP | 150 × 4.6 | L1 | ARI-5720-LK46 |
| ARION® Plus C18, 5 µm | RP | 250 × 4.6 | L1 | ARI-5720-LM46 |
| ARION® NH2, 5 µm | RP | 250 × 4.6 | L8 | ARI-5736-LM46 |

*Note: The table includes HPLC columns, which are listed in the applications. If you need other dimensions/selectivities of ASTRA® or ARION® column, please, contact us. ASTRA® Sugar Ca(S) is available with 9µm particle size.*

**Have you ever heard about Micro-Solid-Phase-Extraction?**
**Visit our website for more information.**

Distributor

*MSPE columns*


Ver. 25.3

CHROMSERVIS

www.chromservis.eu