Multiplelabs
Turnkey Laboratories Solutions

Analytical®
Technologies Limited

Flash Chromatography System

EPCC / PRODUCTS / APPLICATION / SOFTWARE / ACCESSORIES / CONSUMABLES / SERVICES

Analytical Technologies Limited

An ISO 9001 Certified Company

www.analyticalgroup.net

- Smart column holder for easy operation
- Binary/Quaternary solvent elution
- Real-time monitoring of solvent level
- Wireless operation through mobile devices
- Emergency stop button for extra safety and protection
- Auxiliary column holder

- 200 - 800 nm UV/Vis detector
- Built-in feature of separation method recommendation
- Built-in automatic fraction collector
- Maximum pressure up to 500 psi (34.5 bar) with builtin pressure alert module
- On-line full wavelength scanning
- Built-in air pump to purge the residual solvents

Features of machine

- Wireless Operation Through Mobile Devices

The flexible wireless control method is especially suitable for separation experiments that need to be protected from light or placed in an isolator .

- Power Failure Recovery

The built-in power-off recovery function in the software minimizes the loss caused by accidental power failure.

- Smart Column Holder

Column holder with touchpad could achieve automatic fixing of the flash column

• Separation Method Recommendation

The software has a built-in separation method database that automatically recommends the most appropriate separation method based on the key information entered by the user, thereby improving work efficiency.

• Fraction Collector

Tube racks with LCD display enable users to easily track the tubes containing collected fractions.

Built-in fume hood enclose for fraction collection. Fraction tracking facility with peak to tube graphical interface. and included rack of different size with minimum 100 fraction or above

• Local Network Data Sharing

Multiple instruments could form a local area network to facilitate internal data sharing and resource optimization in the laboratory.

• RFID Technology

Automatic identification of current flash column information based on RFID technology, facilitating the use and maintenance of the columns.**

Solvent level sensor, waste level sensor & vapor sensor have available in system

• 21-CFR Part 11 Compliance

The control software complies with FDA requirements for system safety (21-CFR Part 11), making the instrument more suitable for pharmaceutical R&D companies and laboratories.

3-USB port & 1 L an port shall be integrated with the system

Smart purification system makes the purification easier

The smart flash chromatography system machine launched by ATL Technologies has the built-in feature of separation method recommendation. Even the beginners or non-professional chromatography operators could easily complete the purification task.

Smart purification system with “Tough & Go” simplicity

Machine is operated through mobile device, with iconized UI, it is simple enough for the beginner and non-professional to complete routine separation, but also sophisticated enough for the professional or guru to complete or optimized a complex separation.

Built-In Method Database Knowledge Retained

Researchers around the world spent numerous resources to develop methods of separating and purifying compound mixtures, whether it’s synthesized mixtures, or extracts from natural products, these valuable methods are usually stored in single location, isolated, disconnected, and become “information island” over the time. Unlike traditional flash instrument, machine employs database and distributed computing technology to retain and share these methods across secured organizational network:

Machine has built-in relational database to store separation methods, researchers can query existing or update new separation method simply using compound name, structure or project code.

Machine is network ready, multiple instruments within an organization can form a private channel, so that separation methods can be shared across the entire organization, authorized researchers can access and run these methods directly without having to re-develop the methods.

Machine can discover and connect to peer instrument automatically, once multiple instruments are connected, data is automatically synced, researchers can access their methods in any connected instrument from any location.

Three steps to a appproach the

•Step 1: Join the machine to local area network (LAN) with or without internet access, multiple instruments will be auto-connected and automatically synchronized with data;

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•Step 3: Fill in compound information before separation, including key starting materials if the compound is synthesized.

Advantage

Every single method and related data which researchers spent resources on developing is retained in the database and searchable across the entire authorized network, these methods and related data become valuable assets of the organization, including information of all the compounds synthesized and purified over the year

Simply input compound information, such as name, CAS # or structure, previous matched or similar methods will pop up and you can follow the method to finish a separation, or to start a new one so that other researchwes can benifit from it.

Non-interrupted separation. If the machine was interrupted or replaced, you could continue the run in another machine, just install the interrupted flash column and test-tube rack in any connected the machine nearby, log in and continue from where you left-off.

TLC-to-Gradient

Now, with the new feature of TLC-to-Gradient built in the control software of the machine, the whole sample preparation procedure is greatly accelerated. The user only needs to input the TLC information and the loading amount of the sample, the software will automatically recommend the proper flash column for the separation. Also the optimized elution gradient will be generated. As a result, the work efficiency can be significantly improved.

HPLC-to-Gradient

For reversed-phase separation, the control software of machine can also help the user with smart recommendations. Input the analytical HPLC information, including the retention time of the sample, the percentage of Solvent B when specific component is eluet out, the peak area of the target product and the primary impurities, the elution gradient will be automatically generated.

User Interface

• Streamlined operation

The simple parameter setting as well as the clear interface enables the user to easily understand and operate.

• Collection methods

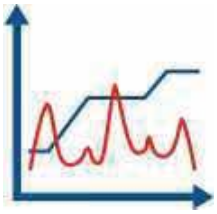
These collection methods are supported: all, threshold, slope, time, waste.

• Real-time parameters modificationdurring running

During separation running, the separation parameters could be modified at any time, including flow rate, gradient, collection volumn, threshold value for collection, etc.

• Gradient hold

The elution gradient could be hold during the separation procedure to improve the resolution of the components.



• Flash column recommendation

The most proper flash column could be recommended according to the key sample information.

• History records

The history records of the current user's experiments could be reviewed at any time.

Detectors

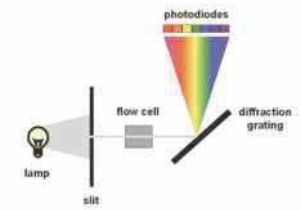
• Variable Dual Wavelength Diode Array Detector (DAD)

•Suitable for detecting the compounds with UV or visible light absorption

•Built-in feature of full wavelength scanning for the easy determination of the maximum absorption wavelength of the sample, contributing to higher detection sensitivity as well as lower sample loss

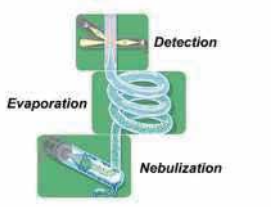
•Review of full wavelength scanning data in the history records could help the user evaluate the purity of the product, making the separation results more reliable

• Lamp: Halogen/Deuterium



Evaporative Light Scattering Detector (ELSD)

Universal detector with high sensitivity, commonly used for analysis of compounds where UV detection might be a restriction and therefore compounds do not efficiently absorb UV radiation, such as sugars, lipids, polymers, fatty acids, amino acid etc.

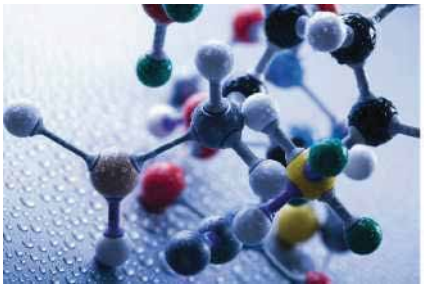


Model	Machine U	Machine T	Machine	Machine 2
				
Description	Entry level model with all the features of control software. Meet the demands of daily separation and purification, including normal phase and reversed phase separation.	Cost effective model with all features of controlsoftware. Binary gradient with any combinations of two solvents. Optional ELSD to cover more types of samples.	Standard version. Binary gradient with four solventlines, high pressure mixing. Optional ELSD to cover more types of samples.	Medium pressure model which could perfectly match with spin-welded columns Four solvent suction line and waste sensor for waste line solvent as modifier, able to run complex separation conditions.Optional ELSD to cover more types of samples.
Flow Range	1 - 100 mL/min (U100) 1 - 200 mL/min (U200)	1 - 200 mL/min	1 - 200 mL/min	0-220mL/min
Maximum Pressure	100 psi (6.9 bar, U100) 200 psi (13.8 bar, U200)	200 psi (13.8 bar)	200 psi (13.8 bar)	500 psi (34.5 bar)
Pumping System	Highly accurate, maintenance free ceramic pump	Highly accurate, maintenance free ceramic pump	Highly accurate, maintenance free ceramic pump	Highly accurate, maintenance free ceramic pump
Gradients	Two solvents, binary	Four solvents binary with anycombinations of two solvents	Four solvents binary, highpressure mixing	Four solvent suction line and waste sensor for waste line
Detector	Fixed wavelength (254 nm, optional other wavelength) or DAD variable UV (200 - 400 nm) or DAD vairable UV (200 - 400 nm) + Vis (400 - 800 nm)	Fixed wavelength (254 nm, optional other wavelength) or DAD variable UV (200 - 400 nm) or DAD vairable UV (200 - 400 nm) + Vis (400 - 800 nm)	Fixed wavelength (254 nm, optional other wavelength) or DAD variable UV (200 - 400 nm) or DAD vairable UV (200 - 400 nm) + Vis (400 - 800 nm)	Fixed wavelength (254 nm, optional other wavelength) or DAD variable UV (200 - 400 nm) or DAD vairable UV (200 - 400 nm) + Vis (400 - 800 nm)
Sample Loading Capacity	10 mg - 33 g	10 mg - 33 g	10 mg - 33 g	10 mg - 33 g
Column Sizes	4 g - 330 g, up to 3 kg with adapters	4 g - 330 g, up to 3 kg with adapters	4 g - 330 g, up to 3 kg with adapters	4 g - 330 g, up to 3 kg with adapters

Other Specifications	• Gradient types: isocratic, linear, step • Flowcell optical path length: 0.3 mm (default); 2.4 mm (optional) • Spectral display: single/dual/all-wavelengths* • Sample loading method: manual load • Fraction collection method: all, waste, threshold, slope, time • Fraction collector: Standard: tubes (13 mm, 15 mm, 18 mm, 25 mm); Optional: French square bottle (250 mL, 500 mL) or large collection bottle; Customizable collection container • Control device: wireless operation through mobile devices**

Applications

The application of C18AQ column in the purification of strong polar peptides



During the purification procedure for these strong polar peptide samples by reversed-phase chromatography, a phenomenon called hydrophobic phase collapse will occur.

Compared with the regular C18AQ columns, the improved C18AQ columns are most suitable for the purification of strong polar or hydrophilic samples. In this application, a strong polar peptide was utilized as the sample and purified by a C18AQ column. As a result, the target product meeting the requirements was obtained and could be used in the following research and development.

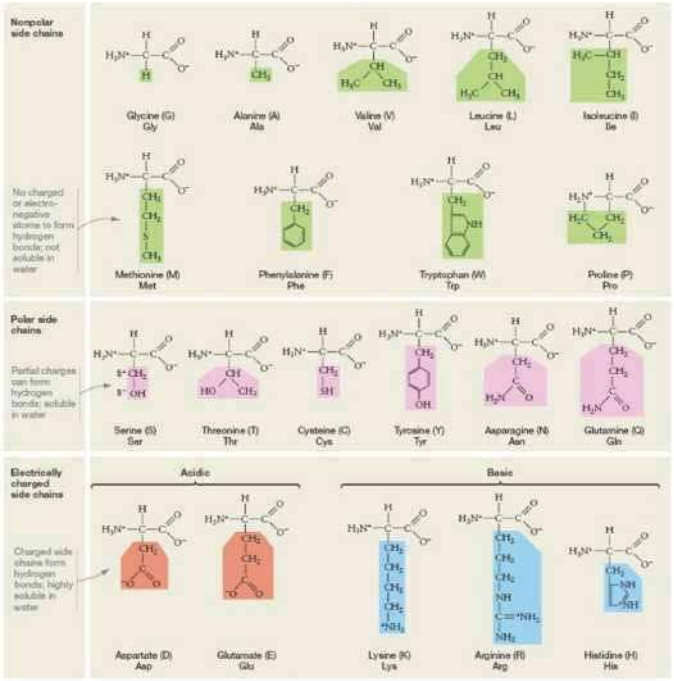
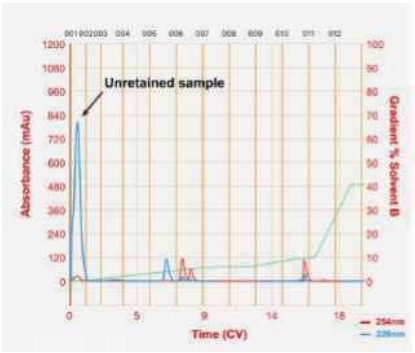


Figure 1. The chemical structure of 20 common amino acids.



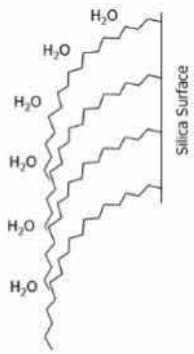
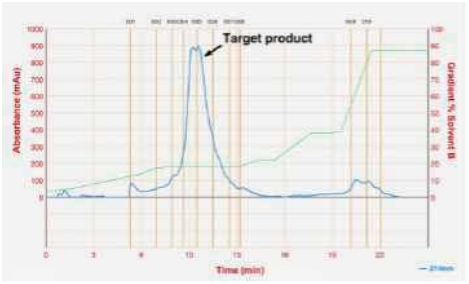


Figure 2. The flash chromatogram of the sample on a regular C18 cartridge.



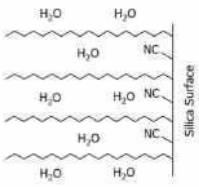
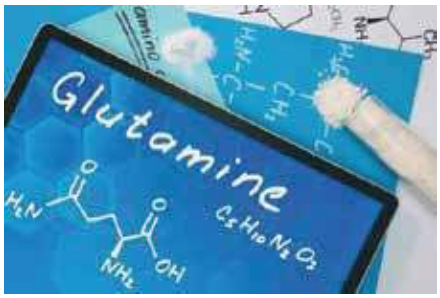


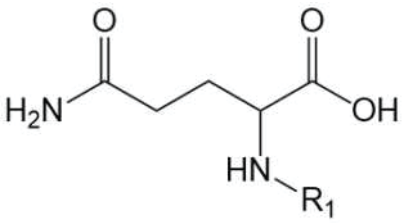
Figure 3. The flash chromatogram of the sample on a regular C18 cartridge.

Instrument	Machine 2			
Flash Cartridge	C18 RP flash cartridge (spherical silica, 20 – 45 μm, 100 Å)		C18 RP flash cartridge (spherical silica, 20 – 45 μm, 100 Å)	
Wavelength	254 nm, 220 nm		214 nm	
Mobile phase	Solvent A: Water Solvent B: Acetonitrile			
Flow rate	15 mL/min		20 mL/min	
Sample loading	30 mg			
Gradient	Time (CV)	Time (CV)	Time (CV)	Time (CV)
	0	0	0	4
	1.0	0	1.0	4
	10.0	6	7.5	18
	12.5	6	13.0	18
	16.5	10	14.0	22
	19.0	41	15.5	22
	21.0	41	18.0	38
			20.0	38
	/	/	22.0	87
			29.0	87

C18AQ Cartridge and its application in the purification of glutamine derivatives

In this application, the sample used was a highly polar glutamine derivative which cannot be dissolved in regular organic solvents such as n-hexane, ethyl acetate, etc. The sample can barely retain on regular reversed phase C18 cartridge. Considering the specific sample properties, the application engineers from ATL Technologies utilized a hydrophilic C18AQ cartridge combining with a flash chromatography system machine for the sample purification. As a result, the target product meeting the purity requirement was obtained, suggesting a feasible solution for the fast purification of highly polar glutamine derivative samples.





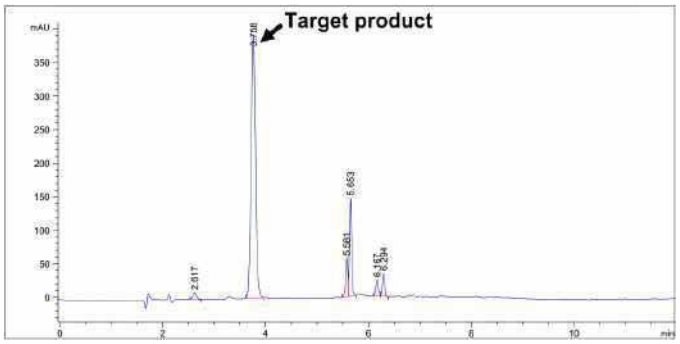


Figure 5. The chromatogram of the raw sample.

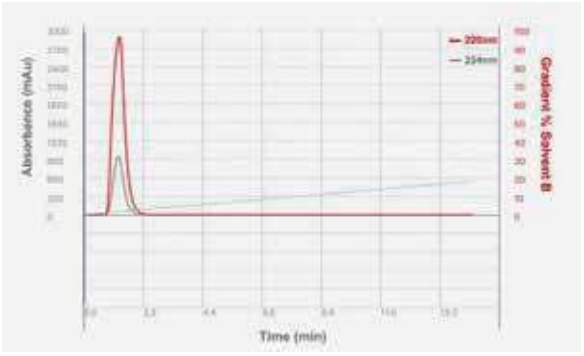


Figure 6. The flash chromatography of the sample by a regular C18 cartridge.

Figure 7. The flash chromatography of the sample by a regular C18 cartridge.

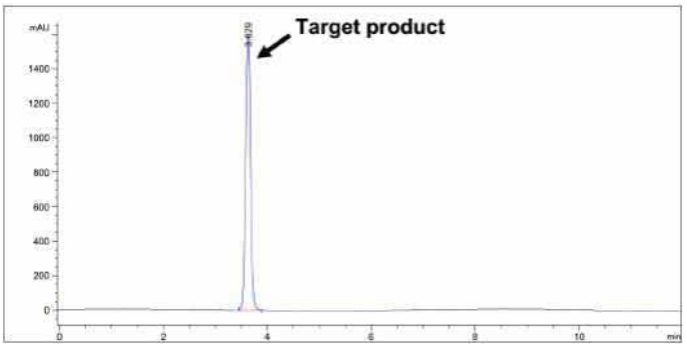


Figure 8. The HPLC chromatogram of the purified target product.

Instrument	Machine T			
Flash Cartridge	12 g Bonded Series C18 cartridge (spherical silica, 20 - 45 µm, 100 Å)		120 g Series C18AQ cartridge (spherical silica, 20 - 45 µm, 100 Å)	
Wavelength	220 nm, 254 nm			
Mobile phase	Solvent A: Water Solvent B: Acetonitrile			
Flow rate	25 mL/min		40 mL/min	
Sample loading	300 mg		1.2 g	
Gradient	Time (min)	Time (min)	Time (min)	Time (min)
	0	0	0	0
	15	20	10.0	0
			12.0	2.0
	/	/	16.0	2.0
			17.5	95
			30.0	95

The application of HILIC ARG cartridge for the purification of strong polar thiazide compound

In this application, the sample molecule contained a thiazide parent structure which led to poor separation by normal phase silica cartridge or regular C18 reversed phase cartridge. With the research and development by application engineers from ATL Technologies, a HILIC ARG cartridge combined with the preparative flash chromatography system machine were successfully applied for the separation and purification of the sample.

Instrument	Machine T			
Flash Cartridge	12 g Bonded Series C18 cartridge (spherical silica, 20 - 45 µm, 100Å)		120 g HILIC ARG Cartridge (spherical silica, 20 - 45 µm, 100Å)	
Wavelength	220 nm, 254 nm			
Mobile phase	Solvent A: water (0.1%TFA) Solvent B: acetonitrile (0.1%TFA)			
Flow rate	15 mL/min		50 mL/min	
Sample loading	100 mg		500 mg	
Gradient	Time (min)	Solvent B (%)	Time (min)	Solvent B (%)
	0	10	0	70
	10.0	90	35.0	0

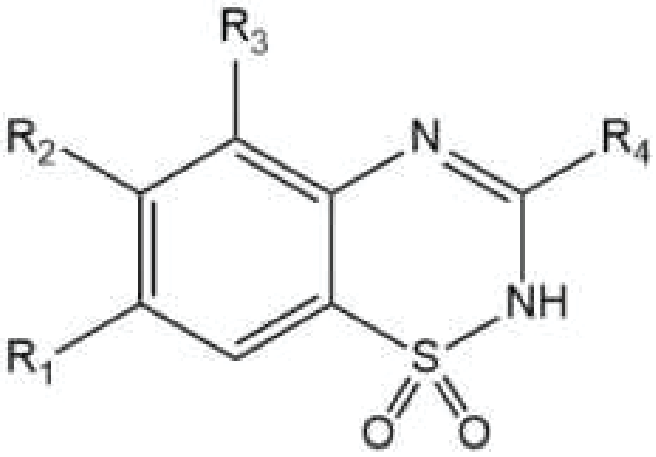


Figure 9. The chemical structure of the sample molecule.

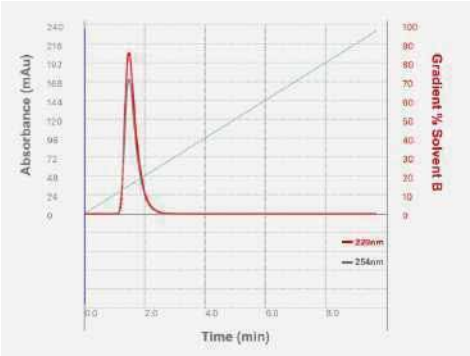


Figure 10. The flash chromatography of the sample by a regular C18 reversed phase cartridge.

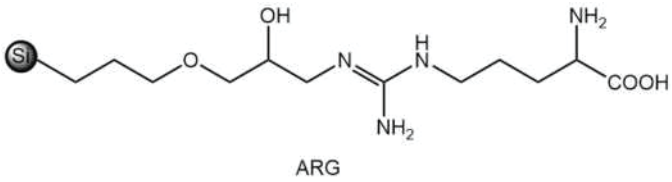


Figure 11. The schematic diagram of the stationary phase bonded to the surface of ARG separation media.

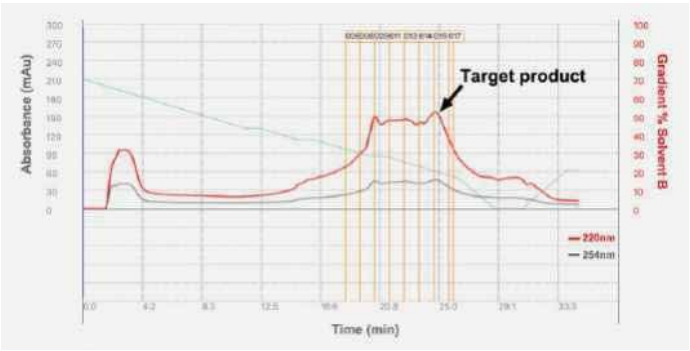


Figure 12. The flash chromatogram of the sample by a HILIC ARG cartridge.

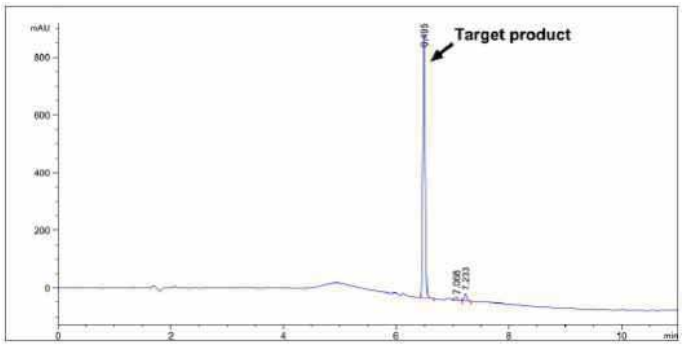


Figure 13. The HPLC chromatogram of the purified product.

The application of ELSD in the purification of Non-UV absorbing compounds

In chemical synthesis, many compounds are absent with UV absorption structure. For the purification of these compounds, commonly used UV detector cannot meet the requirement of real-time monitoring for the eluting procedure. In this application, a synthetic oligosaccharide molecule was used as the sample to show the application of ELSD in flash purification.

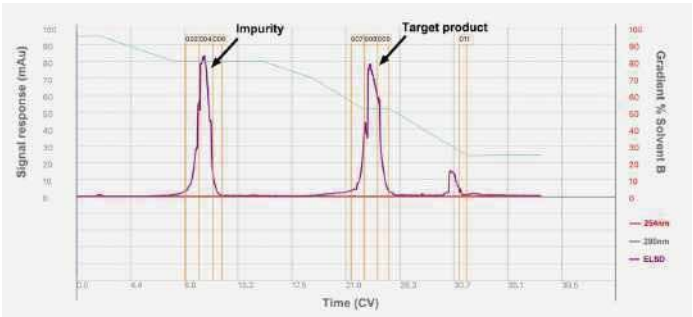


Figure 15. The flash chromatogram of the sample by a HILIC ARG cartridge.

Instrument	Machine T	
Flash Cartridge	12 g HILIC ARG cartridge (spherical silica, 20 - 45 µm, 100 Å)	
Wavelength	254 nm, 280 nm, ELSD	
Mobile phase	Solvent A: water Solvent B: acetonitrile	
Flow rate	30 mL/min	
Sample loading	30 mg	
Gradient	Time (CV)	Solvent B (%)
	0	95
	8	80
	15	80
	23	53
	25	53
	32	25
	37	25

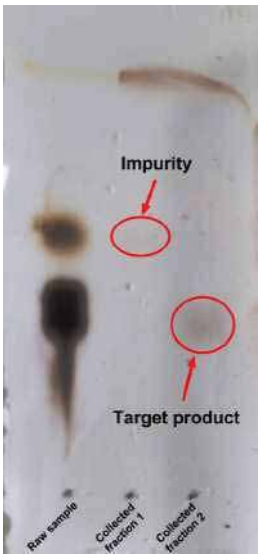


Figure 16. The TLC identification results of raw sample and collected fraction

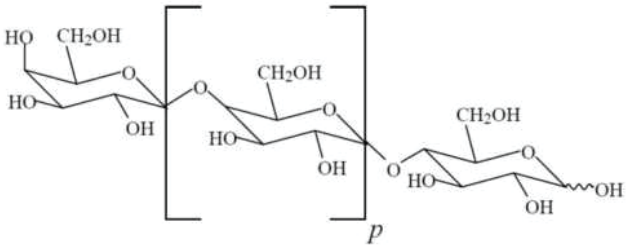
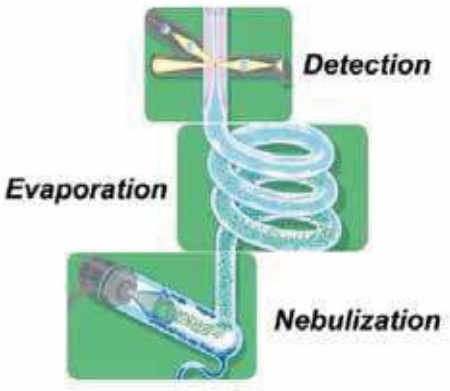


Figure 14. The chemical structure of an oligosaccharide sample.



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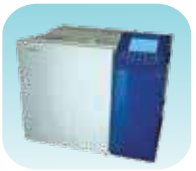

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Flash Chromatograph

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Liquid Partical Counter

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TOC Analyzer

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Water purification system

Regulatory compliances

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2. Improving quality of life by offering YOGA Training courses, Work shops/Seminars etc.

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