Proven OPLC Technology from the Pioneer, OPLC-NIT, Ltd., Hungary

Personal OPLC Separation Unit – POSU 50

for Semi-preparative and High Throughput Screening Applications

Acquiring the proven OPLC technology from OPLC-NIT, Ltd., JC Scientific Co. Ltd. has transferred the manufacturing of OPLC equipment from Hungary to Hong Kong in Year 2013.

Personal OSU 50 chromatograph is designed for on-line and off-line separation and isolation of compounds in complex matrix. Efficient and economical open adsorbent layer avoids the necessary and tedious steps in sample preparation in HPLC. All compounds retained on the layer can be visuallized.

Fig. 1 On-line Personal OSU50 Isocratic OPLC Chromatograph with ECOM ECP2010 Pump, ECD 2600 UV-VIS Detector and DataApex Clarity Chromatography Software

Fig. 2 POSU50 OPLC Separation Unit

The Personal OSU 50 Chromatograph Advantages:

- **High chromatographic efficiency**
- **High throughput parallel separation**
- **Fast semi-preparative scale-up using the same eluent composition as in analytical separation**
- **Visualize compounds retained on the stationary phase, no loss of information**
- **Ideal chromatographic technique for bioassay-guided isolation of active natural and synthetic compounds in the innovative BioArena System**
- **Low operating cost. Inexpensive, disposable and re-usable OPLC layers, low solvent consumption (up to 100x less than other LC techniques) with no or minimum sample preparation make this technique particularly economical.**
- **Work with any HPLC Systems (Fig. 1) in your laboratory. Save on capital investment.**

JC Scientific

What is OPLC?

Over**p**ressured-**L**ayer **C**hromatography (OPLC) is a powerful separation technique that uses a solvent pump (optional item) to deliver eluent into a pressurized ultramicro chamber containing an analytical or preparative planar adsorbent bed to separate the components of a mixture (Fig.5). The eluent is forced to flow through the adsorbent layer at an optimum, constant linear velocity. The openable planar adsorbent bed (*OPLC layer*) and the forced flow allows OPLC to combine the benefits of HPLC (High Performance Liquid Chromatography) and TLC (Thin-Layer Chromatography) to provide rapid, efficient separations using a variety of stationary phases.

Fig. 3 OPLC 20x20cm cassette

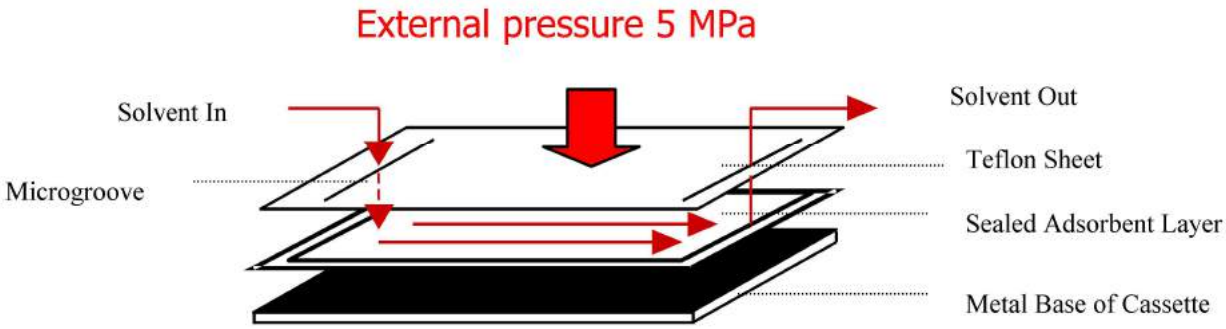

Fig. 4 Flat Column Concept

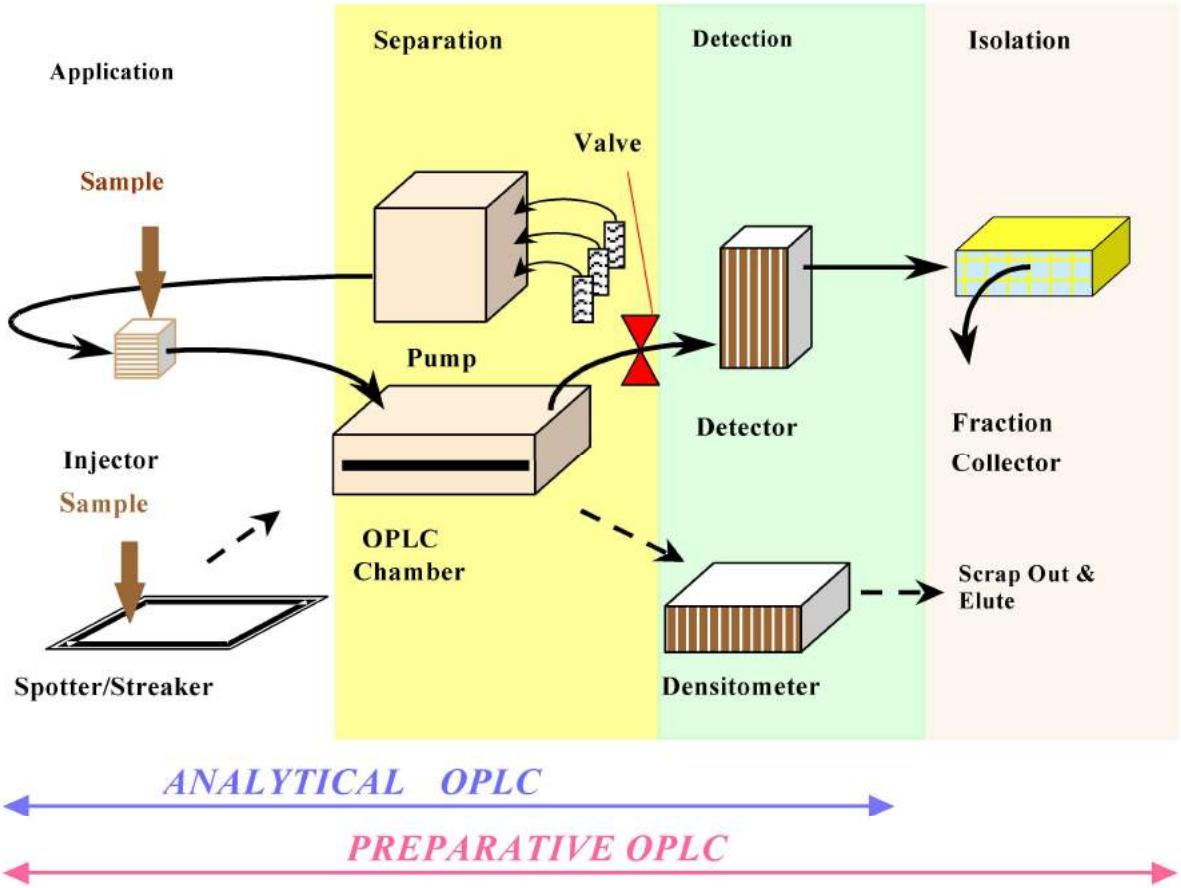

Fig. 5 Scheme of OPLC process

High Chromatographic Efficiency

Inside POSU 50, a pressure of 50 bar is applied over the layer to reduce the interstitial void between silica particles. This results in more compact and more uniform packing and substantially improves the separation efficiency and reproducibility (Fig. 6.). Typical number of theoretical plates at optimum linear velocity (N) for 5 µm particle and 17 cm migration distance is around 12000.

POSU 50 works with a HPLC pump to force mobile phase flow through layer at optimum and constant linear velocity, results in fast separation with low diffusion of chromatographic spots (Fig. 7 and Fig. 8). Chromatographer can run to the full length of 5µm layer with little loss of column efficiency.

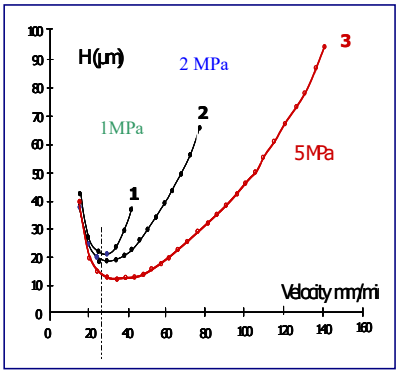

Fig. 6 As external pressure increases, efficency improves

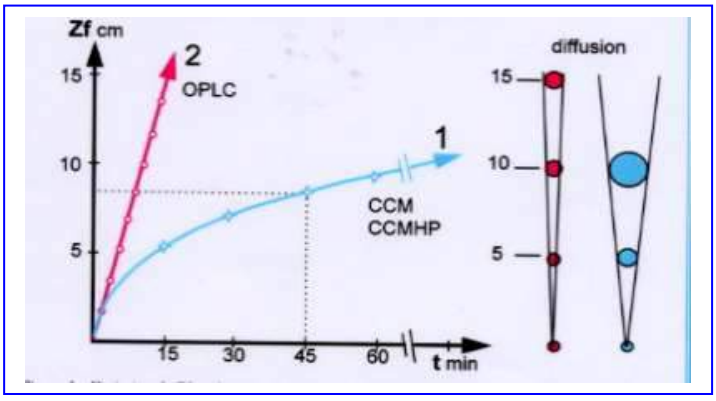

Fig. 7 The distance of solvent front (Zf) vaires linearly with time in OPLC (forced flow by pump) but non-linearly in TLC (flow by capillary action).

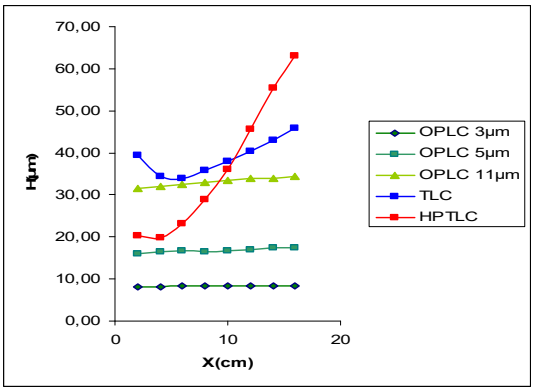

Fig. 8 Variation of HETP (H) as a function of migration distance, in TLC and OPLC

Ideal chromatographic technique for bioassay-guided isolation of active natural and synthetic compounds in the innovative BioArena System

The HPLC column cannot be used for biological detection and interaction as living cells do not grow in such a closed environment. Contrary, living cells can grow well on open silica layer, and biological detection and interactions of separated substances in situ in the adsobent layers will be a crucial and indispensable methodological solution for isolation, identification and characterization of new anitmicrobials, antineoplastics, biopesticides as well as for studying fundamental biochemical reactions and mechanisms [E. Tyihák, et al., J. Chromatogr. A(2011), doi:10.1016/j.chroma.2011.11.049].

BioArena system is a further development of direct bioautography to exploit the potential of biological detection on open silica layer using aimed series of endogenous and/or exogenous molecules (co-factors). Interaction of microbial indicator cells, the separated components and different co-factors in situ in the spots of the absorbent layer leads to new possibilities in bioassay-guided detection, fractionation and isolation. Fig. 9 shows detection of resveratrol with Pseudomonas sp. following OPLC separation.

OPLC, with its high efficiency and on-line fraction collection capability, is an ideal chromatographic technique used in the BioArena System.

5 MPa external pressure,
fine particle (5 µm) silica gel 60 layers (200x200x 0.2 mm).

Eluent flow rate, 400 µl/min,
Chloroform-methanol, 91:9, v/v.

Rapid eluent admission, 350 µl; development volume, 8000 µl; development time, 1209 sec.

Pseudomonas sp., 2 hrs incubation, staining with MTT reagent, incubation time, 18 hrs.

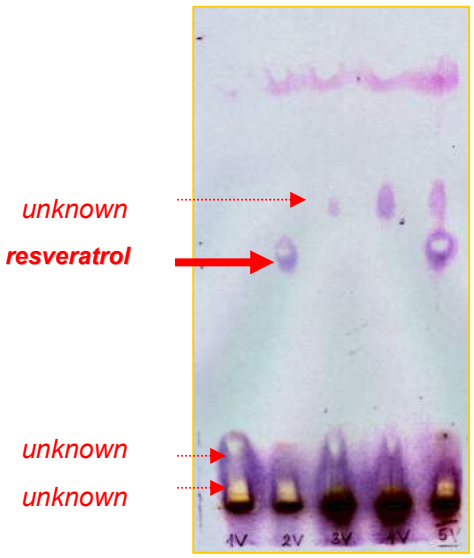

Fig. 9 Detection of resveratrol in different red wines of Villány by Pseudomonas sp. after fully off-line OPLC separation

Other Typical Applications :

QC of pharmaceutical products: Cleaning validations of manufacturing vessels, determination of impurities in drugs and reaction mixtures
Natural products: Extraction of pharmacologically active compounds
Drug metalolism: Metabolites isolation in biological fluids
Oligomers and synthetic polymers: Natural oligomers (e.g. peptides) and synthetic polymers (e.g. polystyrene) separation
Toxicology: Determination of toxins in foodstuffs (e.g. aflatoxins)

Specifications:

OPLC Layer Accommodated: 5 x 20 cm, 10 x 20 cm and 20 x 20 cm,
External Pressure: 5.0 MPa (50bar), Eluent Pressure Limit: 40 bar
Dimension (W x D x H): 296 x 390 x 135mm (12 x 15.5 x 5.3 inches), Weight: 19kg (42lb)
Operating Conditions: 5-40°C, Max. Relative Humidity 80%, Power: 110V/ 60 Hz or 220V/ 50Hz, 160VA

All specifications are subject to change.

Ordering Information:

P/N	Description
200001	POSU 50 Separation Unit supplied with R-rinsing Cassette, A5 and A20 cassettes, including SK003 starter kit. 110 V/60 Hz or 220 V/50 Hz, 160VA

A board range of OPLC layers are available, including Silica for normal Phase separations, C18 for Reverse Phase separations and others. Stationary Phase are available in 5, 8 and 11µm. **Please contact JC Scientific Co. Ltd. or your local representative for ordering information of layers and accessories.**

JC Scientific

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