CLEAN SCREEN®
Solid Phase Extraction Columns

Copolymeric Phases for Drug Abuse Testing

- **Copolymeric Phases Offered:**
  - DAU - Acidic, Basic + Neutral Drugs
  - THC - Carboxy THC
  - GHB - Gamma Hydroxybutyrate
- **CLEAN-THRU® Tips**

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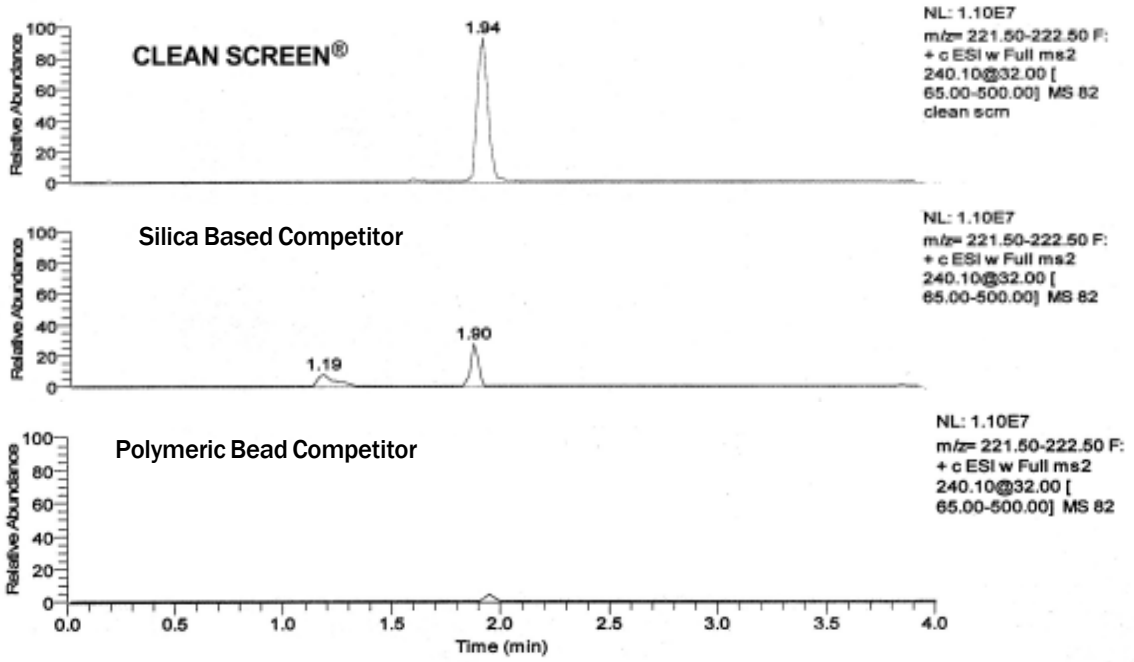
Applications Manual

Comparison of 3 solid phase extraction columns:

Silica Based vs. Polymeric Bead

Three different types of commercially available solid phase extraction columns were evaluated based on their cleanliness and recoveries. The comparisons were made via LCMS for the extraction of salbutamol.



The results are clear. Silica based CLEAN SCREEN® column outperformed the polymeric bead based column as well as the competitive silica based column.

CLEAN SCREEN® Column Advantages:

- No shrinking / swelling
- Cleaner chromatograms
- Silica backbone prevents leeching
- High exchange capacity
- Responds quicker to changes in pH

Copolymeric Bonded Phases for Drug Abuse Testing

Analytical demand for more efficient, robust and clean extraction of drugs from biological matrices led to the development of United Chemical Technologies CLEAN SCREEN® sorbents. Since 1986, CLEAN SCREEN® has led the industry with dependable and reproducible solid phase extraction products and applications. CLEAN SCREEN® phases are true copolymeric sorbents that contain hydrophobic and ion exchange functional groups uniquely polymerized to a silica substrate. The design and quality of CLEAN SCREEN® provides superior sample clean up, recovery and reproducibility.

Mixed mode separations allow maximum selectivity for extraction of acids, neutrals and bases. This selectivity makes CLEAN SCREEN® ideal for both screening and confirmation analysis for virtually all drug categories. CLEAN SCREEN® DAU and THC columns are used extensively by forensic and clinical chemists including:

- Post mortem Investigations
- Criminal Investigations
- Urine Drug Testing
- Athletic Drug Testing
- Racing Laboratories
- Therapeutic Drug Monitoring
- Medical Drug Screening

Note:
If performing extractions out of viscous matrices such as tissue or horse urine, turn to our XtrackT® section where high-flow/gravity flow columns are found. The DAU CLEAN SCREEN® sorbent is available in this larger particle size.

Mechanism of CLEAN SCREEN®

Sample Application

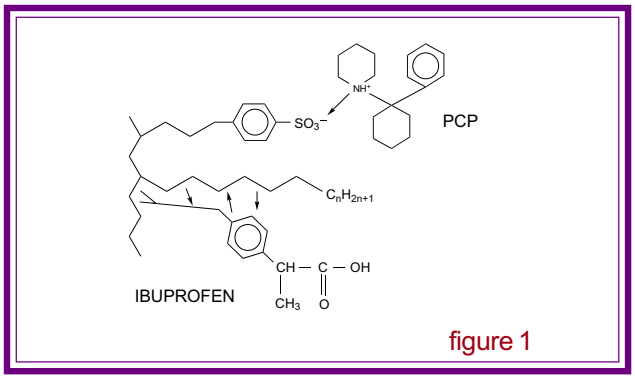


figure 1

When a sample is loaded onto the column at pH 6, many carboxylic acid functionalities present in the sample are ionized. This creates a repulsion between the column and many sample borne interferences, thereby reducing the likelihood of their adsorbing onto the column. At this pH, ibuprofen & barbiturates are not ionized and are hydrophobically adsorbed onto the column (figure 1). At the same time, drugs with amine functionalities such as cocaine and phencyclidine adsorb onto the column via both hydrophobic and ionic attraction (figure 1).

Elution 1

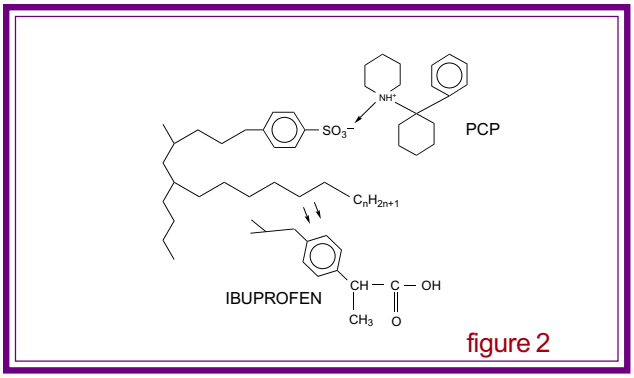


figure 2

The column can then be washed with water or weak aqueous buffers at or below pH 6 without risking loss of the analytes. After drying the column, it is possible to elute the hydrophobically bound analytes using solvents of minimal polarity such as methylene chloride or a hexane/ethyl acetate mixture (figure 2). Cationic analytes will remain bound to the column. Many compounds of intermediate polarity and potential interferences will also remain on the column. The majority of these potential interferences can be removed by using a methanol wash.

Dry Column

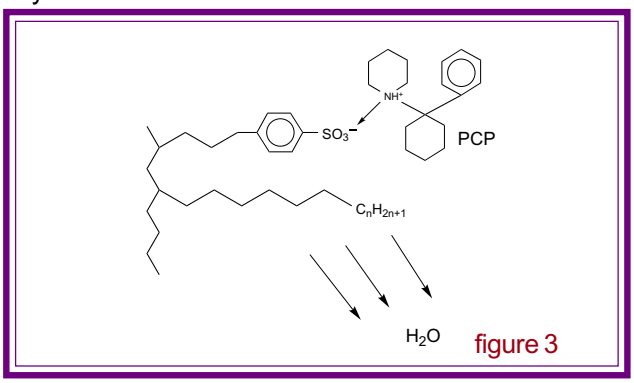


figure 3

Cationic analytes bound to the column can be eluted after another drying step. The drying steps are necessary to remove water which would have prevented the water-immiscible elution solvents from optimally interacting with the analytes (Figure 3).

Elution 2

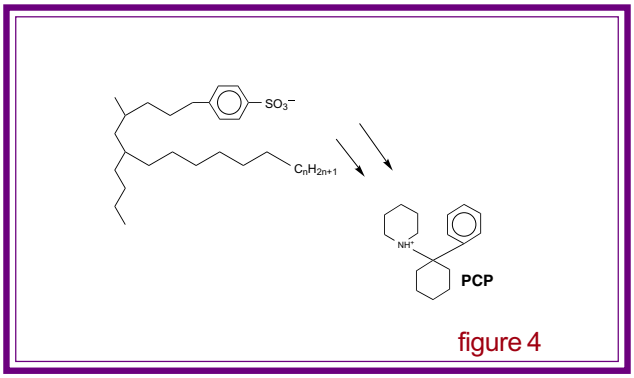


figure 4

To elute the cationic analytes, an organic solution with a high pH (between 11 & 12) should be used. A methylene chloride-isopropanol-ammonium hydroxide mixture will simultaneously disrupt these ionic interactions and successfully elute the desired compound (Figure 4).

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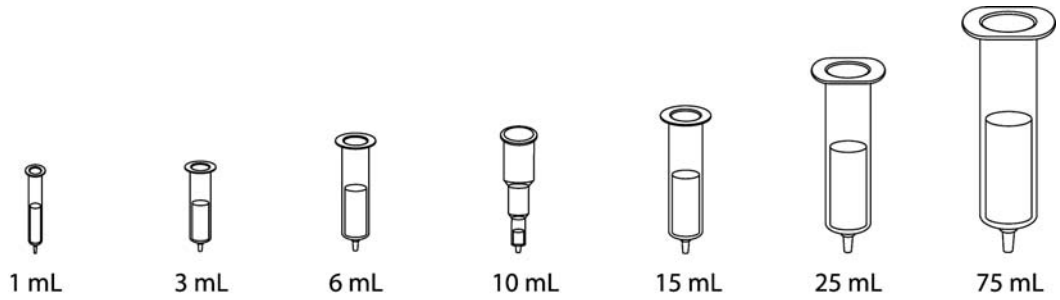
Copolymeric Bonded Phases for Drug Abuse Testing



Chemistries are offered on these particle sizes.

Small Particle (5-20 µm)

Intermediate Particle (25-40 µm)

Standard Particle (40-60 µm)

Large Particle (125-210 µm)

DAU

Part Number without CLEAN-THRU® Tips	Part Number with CLEAN-THRU® Tips	Amount sorbent / Tube volume	Units per bag
CSDAU131	CCDAU131	130mg / 1mL	100
CSDAU133	CCDAU133	130mg / 3mL	50
CSDAU203	CCDAU203	200mg / 3mL	50
CSDAU303	CCDAU303	300mg / 3mL	50
CSDAU503	CCDAU503	500mg / 3mL	50
CSDAU206	CCDAU206	200mg / 6mL	50
CSDAU506	CCDAU506	500mg / 6mL	50
CSDAU1M6	CCDAU1M6	1g / 6mL	30
CSDAU020	CCDAU020	200mg / 10mL	50
CSDAU515	CCDAU515	500mg / 15mL	50
CSDAU1M25	CCDAU1M25	1g / 25mL	30
CSDAU1M25	CCDAU1M25	1g / 25mL	30
CSDAU110M75	CCDAU110M75	10g / 75mL	10

CLEAN SCREEN® DAU column is copolymerized on a rigid, purified silica gel support. The two functional Aminopropuyl groups include a reverse phase, and an ion exchanger, benzenesulfonic acid. This column is commonly used for analyzing a wide range of drugs of abuse, including acidic, basic & neutral drugs.

THC

Part Number without CLEAN-THRU® Tips	Part Number with CLEAN-THRU® Tips	Amount sorbent / Tube volume	Units per bag
CSTHC101	CCDAU131	130mg / 1mL	100
CSTHC203	CCTHC203	200mg / 3mL	50
CSTHC303	CCTHC303	300mg / 3mL	50
CSTHC503	CCTHC503	500mg / 3mL	50
CSTHC206	CCTHC206	200mg / 6mL	50
CSTHC1M6	CCTHC1M6	1g / 6mL	30
ZSTHC020	ZCTHC020	200mg / 10mL	50
CSTHC515	CCTHC515	500mg / 15mL	50
CSTHC1M25	CCTHC1M25	1g / 25mL	30
CSTHC110M75	CCTHC110M75	10g / 75mL	10

CLEAN SCREEN® THC column is copolymerized on a rigid, purified silica gel support. The two functional groups include a reverse phase, and an ion exchanger, quaternary amine This column is commonly used for analyzing THC and its metabolites.