Disposable Pipette Extraction

NOT !
another “me too” SPE consumable

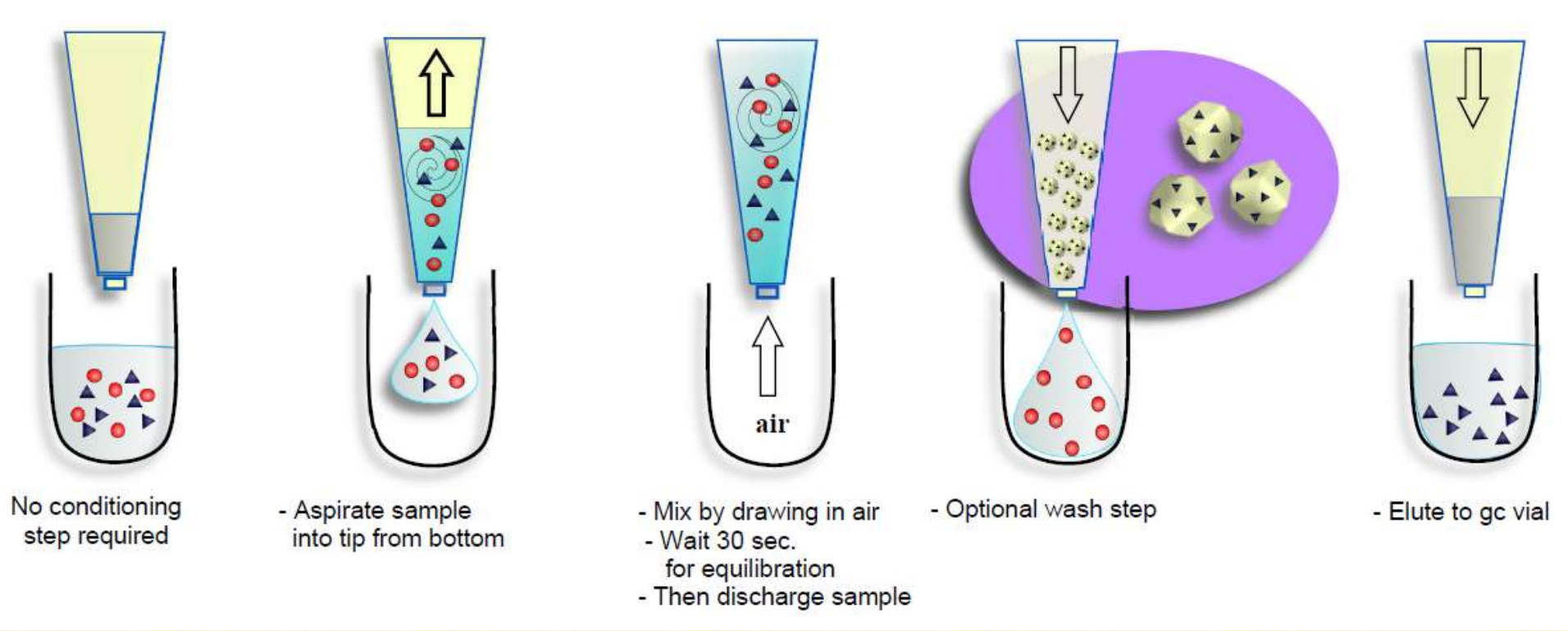
DPX TIP

- Pipette Tip
- Barrier
- Loose Sorbent
- Metal Screen

Extractions is Seconds!

- DPX - is a novel solid-phase extraction technique that enables rapid extraction of analytes from liquid solutions, combining minimal use of solvent with high recovery.
- DPX is based on loosely contained sorbent placed inside a pipette tip. Sample is drawn into the pipette tip where it gains direct contact to the solid phase. The phases are very efficiently mixed by allowing air to be drawn through the tip. Air bubble mixing is extremely efficient, enabling fast extractions for improved productivity and throughput

Manual Extraction Process:



No conditioning step required

- Aspirate sample into tip from bottom

- Mix by drawing in air
- Wait 30 sec. for equilibration
- Then discharge sample

- Optional wash step

- Elute to gc vial

GREEN CHEMISTRY

Saving the world 1 tip at a time!

DPX is promoting greener chemistry by reducing the amount of solvent waste generated by labs in daily sample prep analysis.

This is an extremely marketable advantage that DPX has in today's environmentally conscious world.

Throughout this presentation you will see the logo to the left, showing where using DPX results in greener chemistry

The mixing advantage

(Over standard SPE cartridges)

No conditioning steps are necessary

Saving labs time and Money by using less solvent

High extraction efficiencies

Loosely contained sorbent allows for maximum surface area contact with analyte when solution is mixed with air.

Rapid extraction times (< 5min/sample)

No Conditioning step, No vacuum Manifold & ability to readily automate greatly cut down on sample time.

Minimal elution solvent volumes

Saving money by requiring less solvents for every sample processed

No solvent evaporation step

Use GERSTEL CIS-4 to concentrate analyte directly in the GC injection port. No need to evaporate large volumes of solvent into the atmosphere, causing air pollution and increasing analysis time.

Increased throughput

GERSTEL automation permits DPX extraction during the chromatographic analysis of the previous sample. This is referred to as "ready for analysis sample preparation". Ex. as Sample 2 is being extracted Sample 1 is being analyzed..

Also, semi-automation, which processes 20 samples simultaneously, can be coupled directly to the GERSTEL MPS-2 by utilizing a MPS tray for the DPX elution step.

Study done by the S.C. Dept of Agriculture Comparing DPX to the LL Luke method

" The results have been excellent and the cost saving will be great per sample. We are now running DPX and a very modified Micro Luke Method we developed in our Chemical Residue Lab. The DPX / Micro Luke Extraction method is the best. It is not only half as expensive to run as the Old Luke Method but also faster and more sensitive. We will be able to do twice as many samples for half the cost and detect more Chemical Residues at lower levels.

Example: Old Luke Extraction took 2.83 hours and cost $14.53 per sample.
DPX / Micro Luke Extraction takes 1.42 hours and cost $7.37 per sample.
Our Estimated savings in Cost and Chemist Time for 1536 samples per year.
Old Luke method would take-------- 4,347 hours of Chemist Time and Cost $22,318.00.
New DPX / Micro Luke would take- 2,181 hours of Chemist Time and Cost $11,320.00.

Saving Per Year 2,166 hours of Chemist Time and $10,998.00. "

In this example by Sherry Garris of the S.C. Dept of Agriculture,
using DPX over the Luke Liquid Liquid method
saved almost :

- **50% off Cost per Sample**
- **50% off labor costs as well**

COST COMPARISON STUDY

LUKE COST FOR 6 SAMPLES

PRODUCT	AMOUNT	COST
Hexane	990 mL @ 0.0091 / mL	$9.00
Sodium Chloride	60 gm @ 0.00714 /gm	$0.43
Methanol (Wash)	1000 mL @ 0.0036 / mL	$3.60
Methylene Chloride	1200 mL @ 0.008 / mL	$9.60
Sodium Sulfate	1500 gms @ 0.0109 /gm	$16.35
Pet Ether	300 mL @ 0.0142 /mL	$4.26
Acetone for Blending	1260 mL @ 0.0092 /mL	$11.59
Ethyl Ehter	810 mL @ 0.0225 /mL	$18.22
GC Vials	24 Vials @ 0.16 / Vial	$3.84
GC Caps	24 Caps @ 0.18 / Cap	$4.32
Filter Paper	6 filters @ 0.1961 / paper	$1.18
Printer Paper	96 Sheets @ 0.00654 / Sheet	$0.63
Ziplock Sample Bags	6 Bags @ 0.5638 / Bag	$3.39
DisposableTransfer Pipets	24 Pipets @ 0.0307 / Pipet	$0.74
	TOTAL FOR 6 SAMPLES	**$87.15**

Staff: Sherry Garris & Chanin Craft

Prep & Extraction Time:	**7.0 Hours**
Time to run samples overnight on GC:	**6.0 Hours**
Time to ID, Quantify, Record Results, & Report:	**4.0 Hours**
Total Time:	**17.0 Hours**

DPX COST FOR 6 SAMPLES

PRODUCT	AMOUNT	COST
Hexane	3 mL @ 0.0091 /ml	$0.03
Sodium Chloride	30 gms @ 0.00714 /gm	$0.22
Methanol (Wash)	500 mL @ 0.0036 /mL	$1.80
Methylene Chloride	45 mL @ 0.008 /mL	$0.36
Sodium Sulfate	87 gms @ 0.0109 /gm	$0.95
Pet Ether	15 mls @ 0.0142 /mL	$0.21
Acetone for Blending	1200 mL @ 0.0092 /mL	$11.04
Ethyl Acetate	3 mL @ 0.0062 /mL	$0.02
GC Vials	12 Vials @ 0.16 / Vial	$1.92
GC Caps	12 Caps @ 0.18 / Cap	$2.16
Filter Paper	6 Filters @ 0.1961 / filter	$1.18
Printer Paper	36 Sheets @ 0.00654 / Sheet	$0.24
Ziplock Sample Bags	6 Bags @ 0.5638 / Bag	$3.39
Pasteur Pipets	18 Pipets @ 0.20 / Pipet	$3.60
Glass Vial Inserts	6 Inserts @ 0.16 / Insert	$0.96
Disposable Culture Tubes	12 tubes @ 0.09716 / Tube	$1.17
DPX Tips	6 Tips @ $3.00 / Tip	$18.00
	TOTAL FOR 6 SAMPLES	**$47.25**

Staff: Sherry Garris & Chanin Craft

Prep & Extraction Time:	**2.0 Hours**
Time to run samples overnight on GC:	**2.5 Hours**
Time to ID, Quantify, Record Results, & Report:	**4.0 Hours**
Total Time:	**8.5 Hours**

Contents of Tips

Sizes of Tips

- 1mL DPX Tip contains
  - 30mg of sorbent
- 5mL DPX Tip Contains
  - 60mg of sorbent

Particle Size

- RP - 90 um particle size
- CX - 10-20 um
- WAX - 10-20 um

DPX TIP FORMATS

- CX, Cation Exchange
- RP, Reverse Phase
  - sdvb material not C-18
- Q, QuEChERS
- Qg, QuEChERS w/ Graphitized Carbon
- WAX, Weak Anion Exchange

DPX-CX (Cation Exchange) 1ml & 5ml

Tips contain a sulfonated polymeric material. Analytes containing an amine group will bind with great efficiency. High recoveries of greater than 90% are typically achieved due to strong ionic binding with protonated amine groups.

DPX-CX also contains RP characteristics via mixed mode. Hence, acidic/neutral and basic drugs can all be analyzed with high recoveries (most greater than 90%) with this single product.

Cocaine and Benzoylecgonine - Morphine - 6MAM - Codeine - Oxycodone - Amphetamine - Methamphedamine - MDMA - PCP - Methadone - Meperidine - Methaqualone - Benzodiazepines

MELAMINE

DPX-RP (Reverse Phase) 1ml & 5ml

This is a non-polar (sdvb) material used to extract analytes from polar solutions such as water.

This mechanism also provides high recoveries of acidic compounds from acidic sample solutions.

Organochlorine
Organophosphate
Pesticides
Pyrethroids

THC and COOH-THC
- from whole blood and urine

Barbiturates from urine

DPX-WAX (Weak Anion Exchange) 1ml & 5ml

Tips contain a poly-amino sorbent that selectively binds compounds containing COOH. This product is ideal for removing fatty acids, which are the major sample matrix interferences found in grain products (food safety) and tissue specimens (toxicology and food safety). In this manner, the tips are used for "clean up" and are referred to as CU-Tips! The extractions take about 30 to 60 seconds to perform because there are no wash or elution steps involved, just simply mix the solution and dispense into the GC (or HPLC) vial.

These tips could also be used to directly analyze compounds containing COOH groups, such as fatty acids and drugs such as COOH-THC.

Comprehensive Pesticides in grain and other foods (as CU-Tips)

Fatty Acids **COOH-THC**

Comprehensive Drugs in tissue specimens (as CU-Tips)

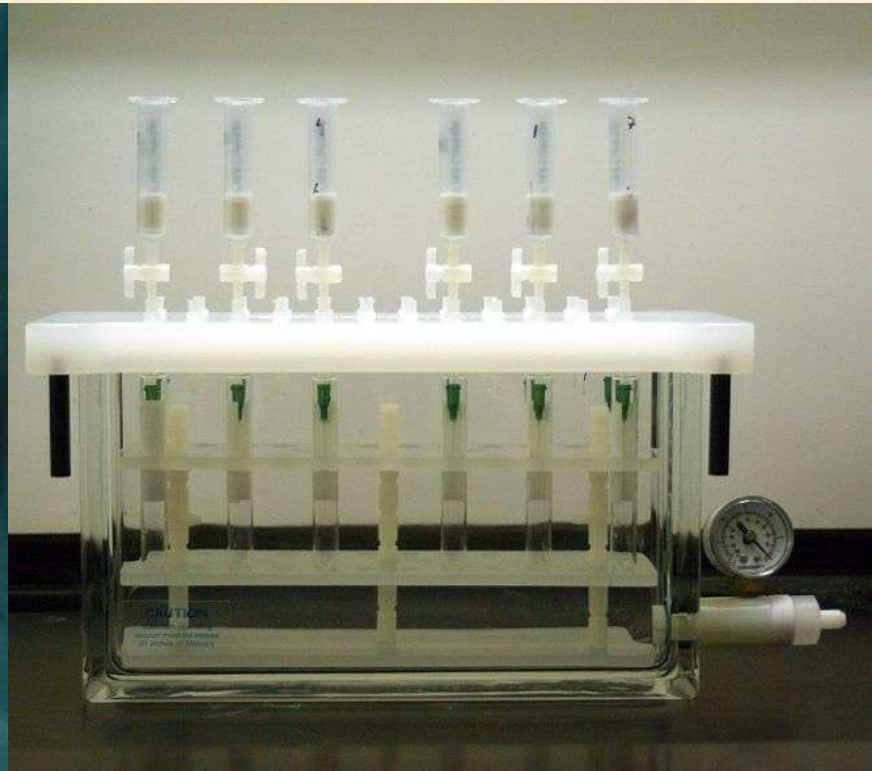
DPX Tips vs Standard SPE Cartridges

DPX Lever Press Extractor

You control the flow rate!

Vacuum manifold

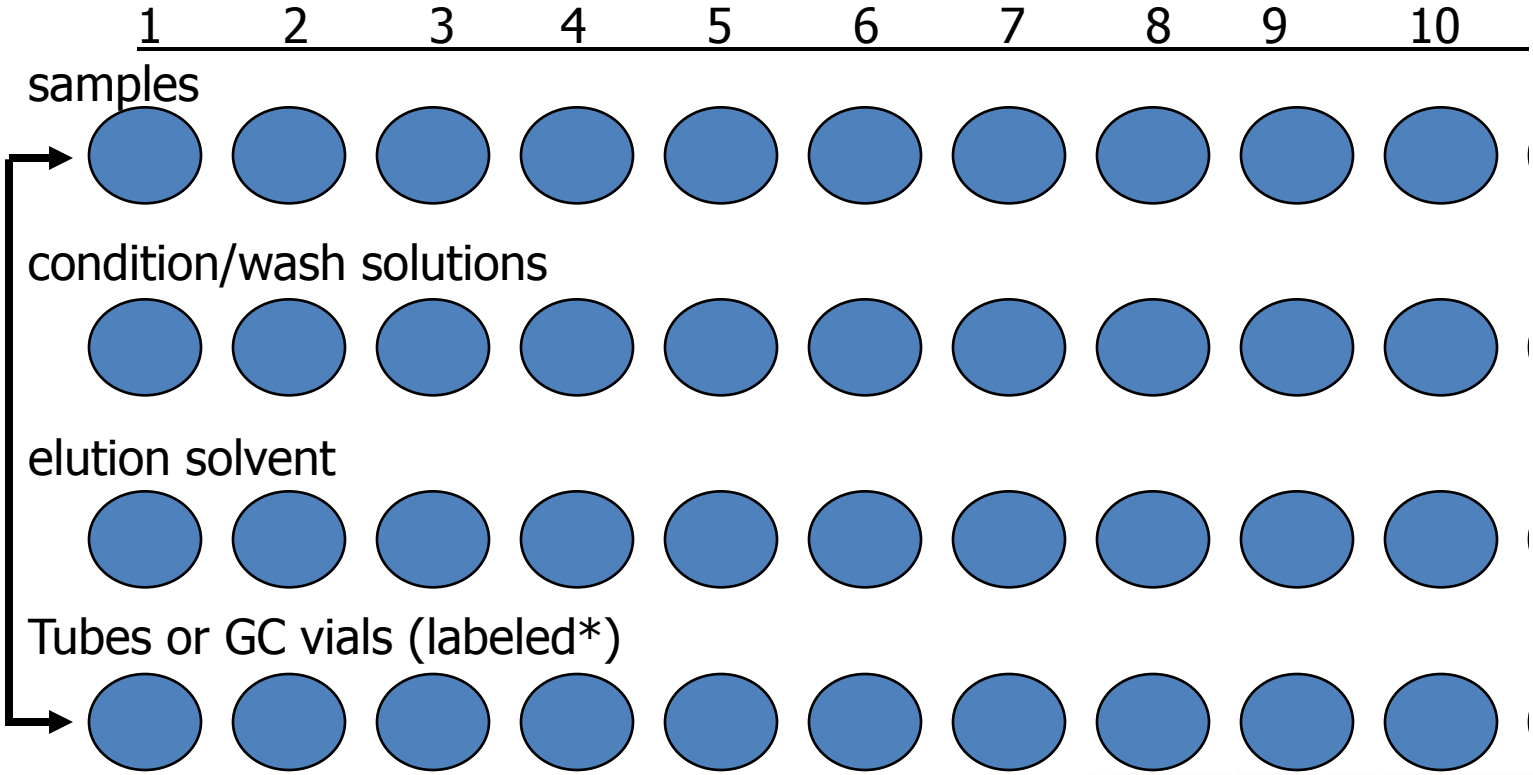
Flow rate controls YOU!

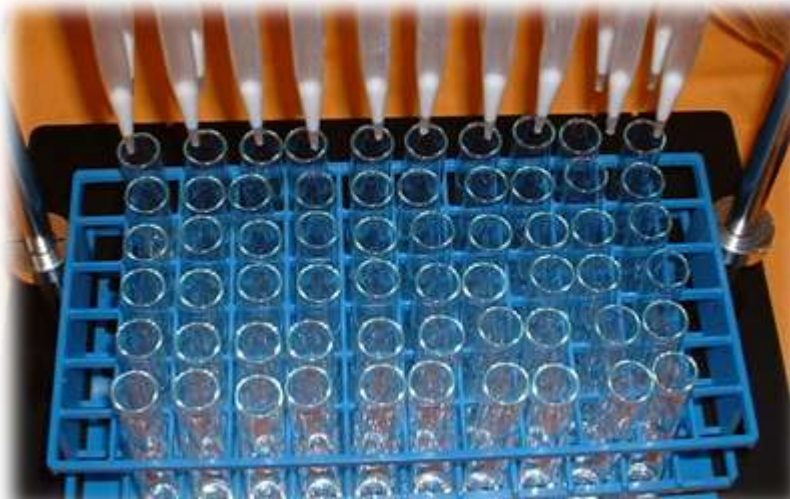


Load up to 20 DPX 5mL Tips

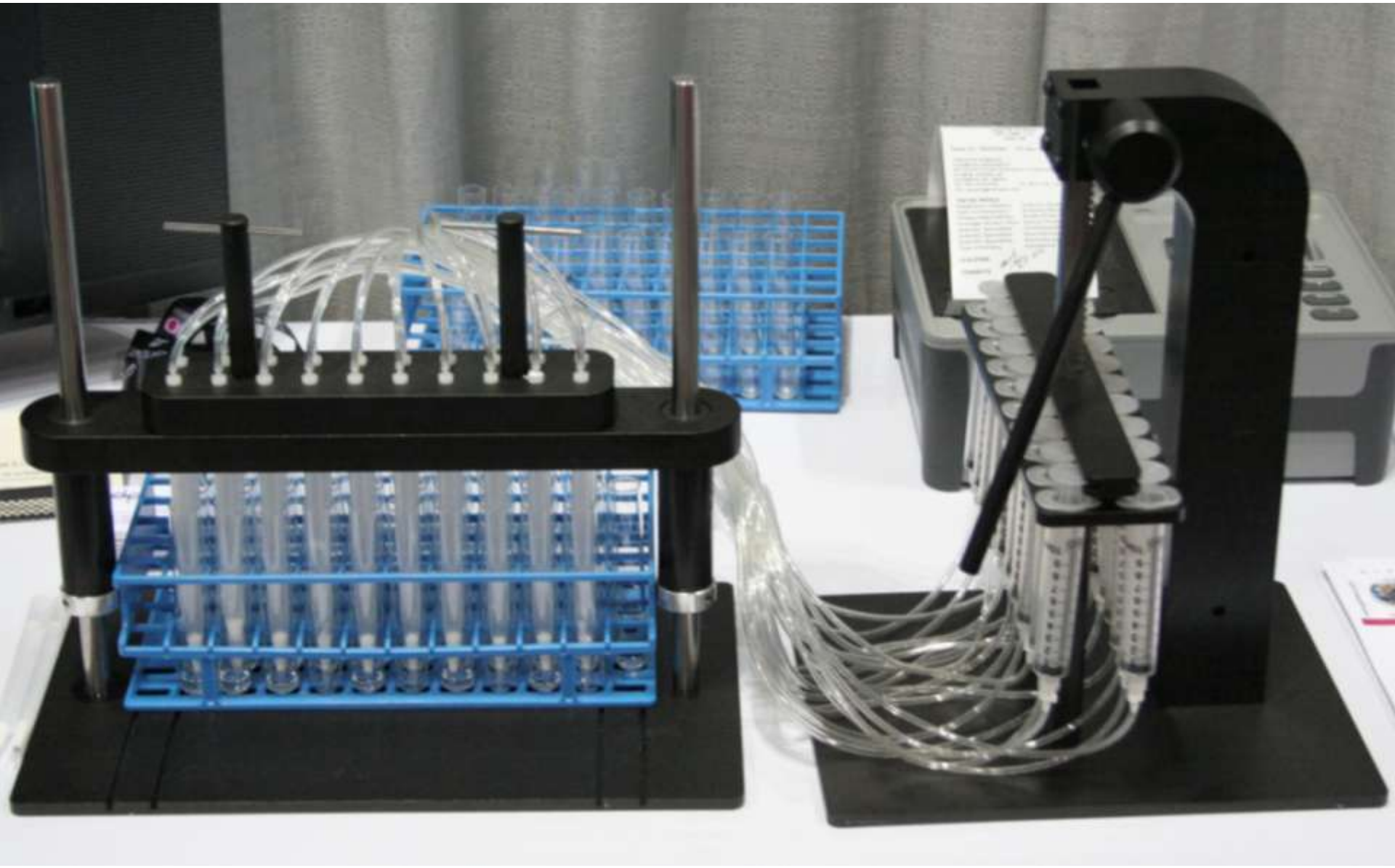
Load test tube rack with samples

Test tube rack with test tube solutions for DPX

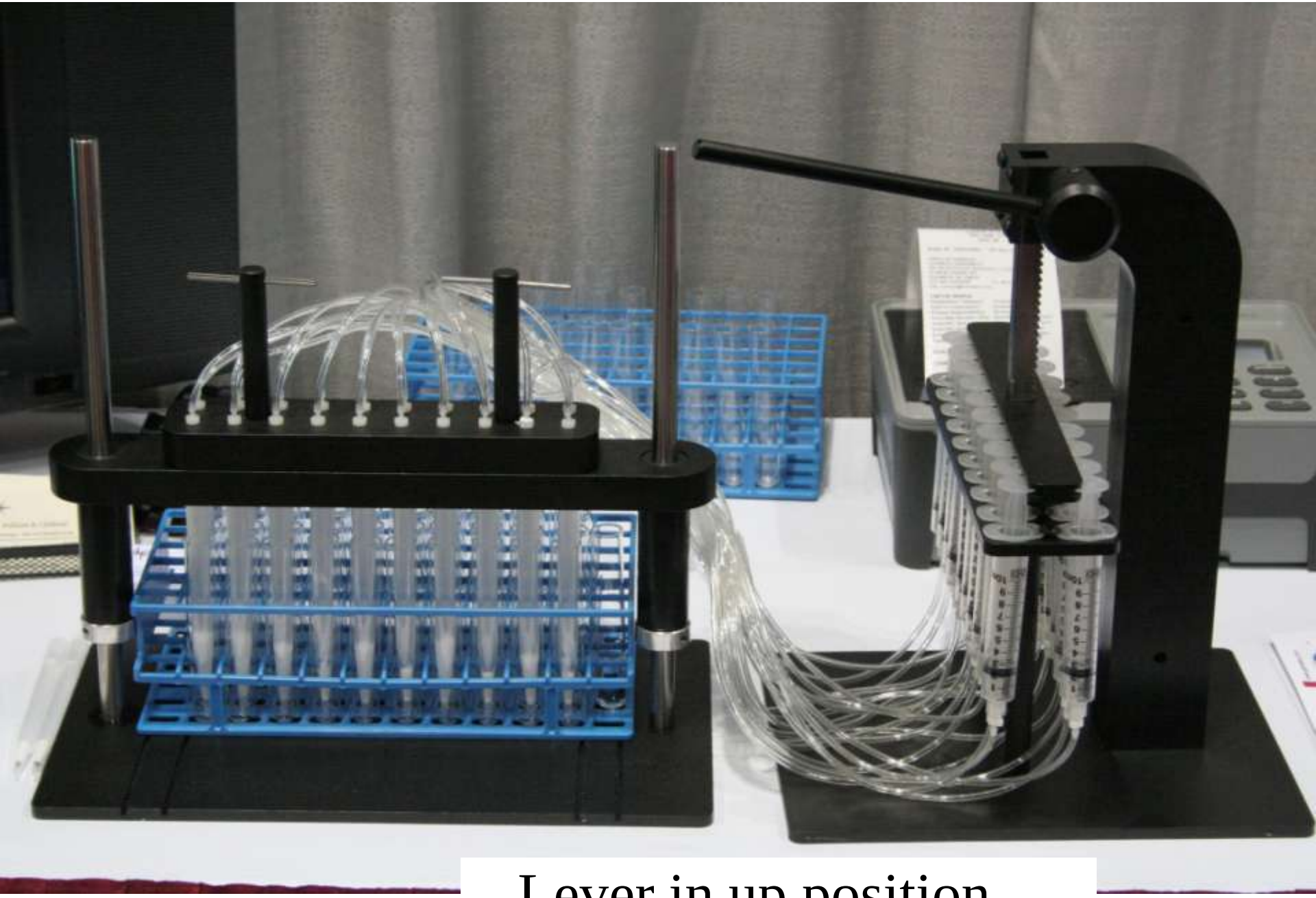




Push tips down into Sample and Press up on lever to draw sample into tips

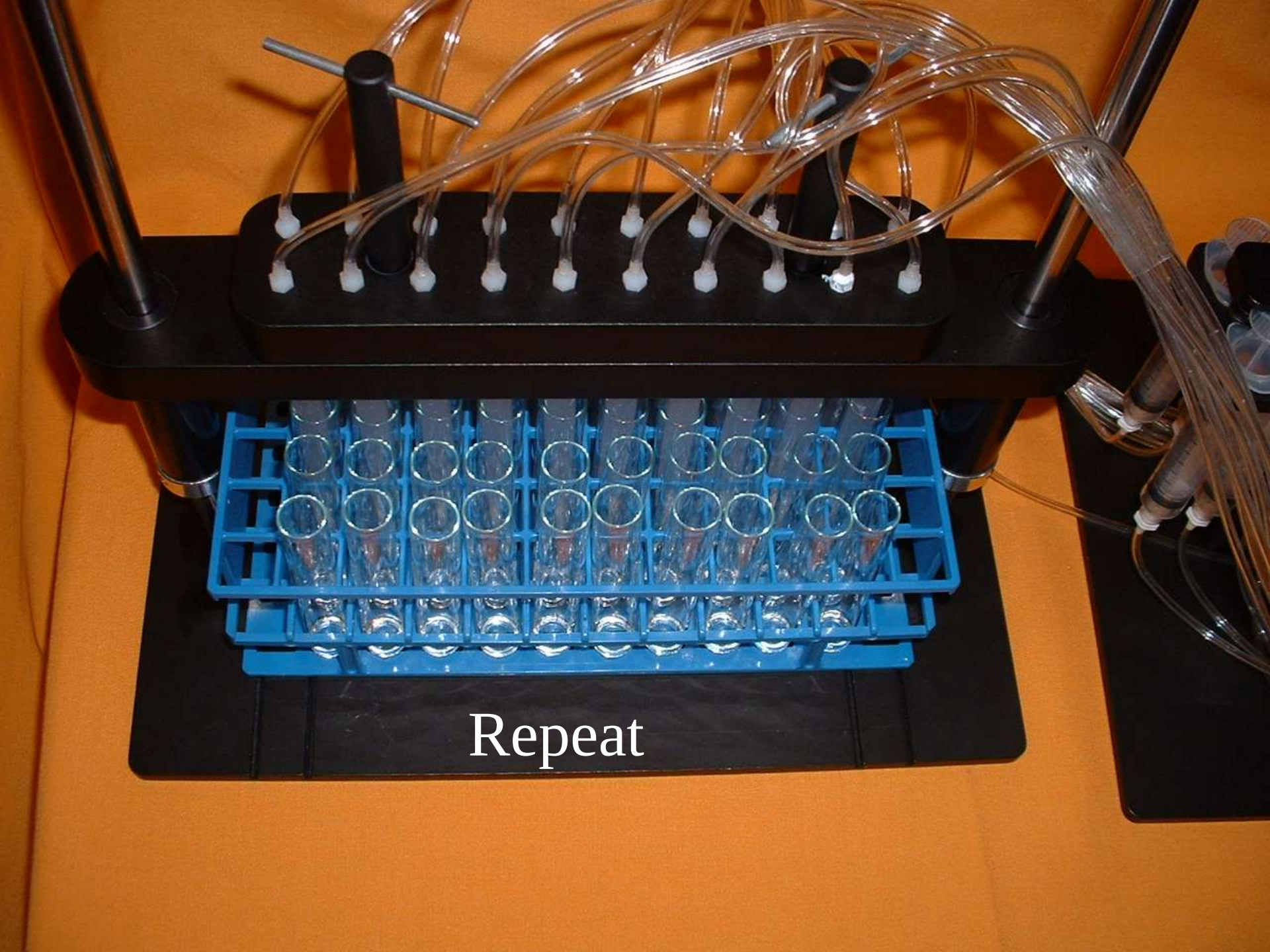


Lever in down position



Lever in up position


Pull tray forward


Repeat

GERSTEL

Automation