hero twipes Benzopyrene Study

PART 1: HERO WIPE'S EFFECTIVENESS OF REMOVING POLYCYCLIC AROMATIC HYDROCARBON (BENZOPYRENE): WIPE SAMPLE LOT NO. M1704250023

A. PURPOSE:

Preliminary study on Hero Wipes to establish baseline data using Hero Wipe samples spiked with a Benzopyrene solution. The experimental conditions are controlled where the volume and analyte concentration are known and the analyte is directly added to the surface of the Hero Wipes and determined by HPLC.

B. DATA

Blank

Benzopyrene	Blank % Benzopyrene		
1	0 % interference		
2	0 % interference		
3	0 % interference		
Average	0% interference		

Benzopyrene spiked into Hero Wipes

Benzopyrene	Removal of Benzopyrene from wipe	% Recovery
1	1.19%	79.28%
2	1.28%	85.61%
3	1.29%	85.92%
Average	1.25%	83.60%

C. OBSERVATIONS AND CONCLUSION:

- 1. On ideal controlled conditions, the Hero Wipe meet the recovery study, where:
 - An average of 84% is recovered from the Benzopyrene spiked wipe.
- 2. The Hero Wipe did not show any interference on HPLC analysis
- 3. The results of the wipes' performance under controlled conditions, meets the desired effectiveness.
- 4. The actual efficacy of the wipe to remove contaminants off of a substrate simulating the human skin will be tested using similar method.

D. ATTACHMENT

■ HPLC

Data File W:\2017\MA...2\DATA\BENZO-BASELINE\BENZO-BASELINE 2017-05-16 15-12-14\001-0401.D Sample Name: wipe blank M1704150023 4 13 1717//7

Acq. Operator : Teena S Seq. Line : 4

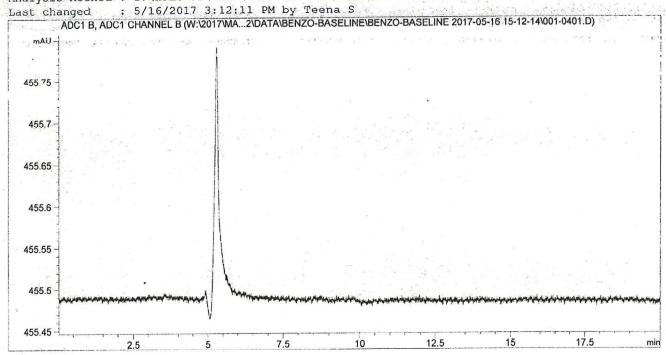
Acq. Instrument : HPLC-P2 6.16 I0753 Location : Injection Date : 5/16/2017 8:15:34 PM Inj : 1

Acq, Method : Z:\HPLC-P2\DATA\BENZO-BASELINE\BENZO-BASELINE 2017-05-16 15-12-14\BENZO-

BASELINE.M

Last changed : 5/16/2017 3:12:11 PM by Teena S

Analysis Method : Z:\HPLC-P2\DATA\BENZO-BASELINE\BENZO-BASELINE.M



Area Percent Report

Sorted By : Signal

Multiplier: : 1.0000
Dilution: : 1.0000
Use Multiplier & Dilution Factor with ISTDs

No peaks found

*** End of Report ***

191111

Data File W:\2017\MA...2\DATA\BENZO-BASELINE\BENZO-BASELINE 2017-05-16 15-12-14\002-0103.D Sample Name: std_

 Acq. Operator
 : Teena S
 Seq. Line : 1

 Acq. Instrument
 : HPLC-P2 6.16 I0753
 Location :

 Injection Date
 : 5/16/2017 4:00:58 PM
 Inj : 3

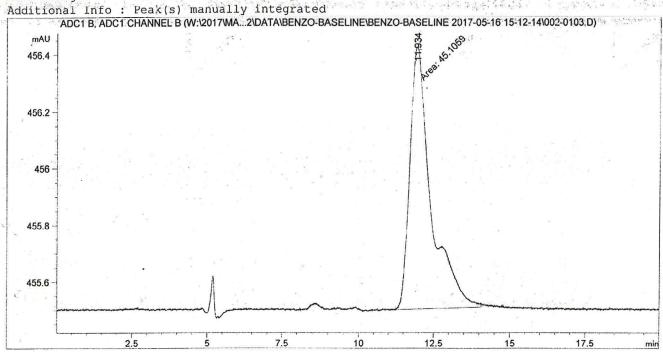
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BASELINE.M

Last changed : 5/16/2017 3:12:11 PM by Teena S

Analysis Method : Z:\HPLC-P2\DATA\BENZO-BASELINE\BENZO-BASELINE.M

Last changed : 5/16/2017 3:12:11 PM by Teena S



Area Percent Report

Sorted By : Signal

Multiplier: : 1.0000
Dilution: : 1.0000
Use Multiplier & Dilution Factor with ISTDs

Signal 1: ADC1 B, ADC1 CHANNEL B

 Peak RetTime Type
 Width
 Area
 Height
 Area

 # [min]
 [mAU*s]
 [mAU]
 %

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 1
 11.934 MM
 0.8123
 45.10591
 9.25497e-1
 100.0000

Totals: 45.10591 9.25497e-1

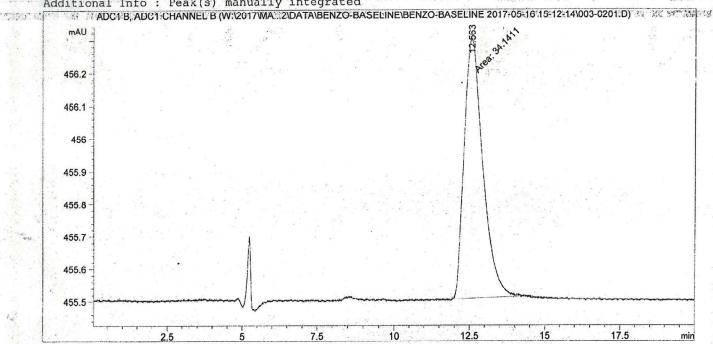
Data File W:\2017\MA...2\DATA\BENZO-BASELINE\BENZO-BASELINE 2017-05-16 15-12-14\003-0201.D Sample Name: sample spiked M170425002 x 3 15 5/17/17

Seq. Line : Acq. Operator : Teena S Location : Acq. Instrument: HPLC-P2 6.16 I0753 1 Injection Date : 5/16/2017 6:08:16 PM Inj :

Acq. Method : Z:\HPLC-P2\DATA\BENZO-BASELINE\BENZO-BASELINE 2017-05-16 15-12-14\BENZO-

Last changed : 5/16/2017 3:12:11 PM by Teena S Analysis Method : Z:\HPLC-P2\DATA\BENZO-BASELINE\BENZO-BASELINE.M

Last changed : 5/16/2017 3:12:11 PM by Teena S Additional Info : Peak(s) manually integrated



Area Percent Report

Sorted By Signal

Multiplier: . . : 1.0000 Dilution: Use Multiplier & Dilution Factor with ISTDs

Signal 1: ADC1 B, ADC1 CHANNEL B

Peak RetTime Type Width Height Area Area # [min] [mAU*s] ્રુ [mAU] ---|----|----|---|---|----|----|---1 12.563 MM 0.7171 34.14106 7.93485e-1 100.0000

34.14106 7.93485e-1 Totals :

PART 2. HERO WIPES' EFFECTIVENESS OF REMOVING POLYAROMATIC HYDROCARBON, BENZOPYRENE, FROM A SIMULATED SKIN SUBSTRATE

I. PURPOSE OF PART 2 BENZOPYRENE ON DIAMOND WIPE HERO WIPE STUDY

Hero Wipes will be evaluated for its effectiveness of removing benzopyrene. The study will consist of spiking a known volume and concentration of benzopyrene on a substrate simulating the porous surface of the skin and performing recovery studies using the wipes. The study will be performed once with substrate spiked with a low concentration of benzopyrene and a second time with substrate spiked with high concentration of benzopyrene.

II. STUDY INFORMATION:

- a. A third-party laboratory was contracted to conduct the investigation into the Hero Wipes' effectiveness of removing benzopyrene. The laboratory determined the percent recovery of the benzopyrene contaminant using a Hero Wipe to remove and clean the benzopyrene contaminant off of the simulated substrate and measuring the amount of benzopyrene removed from the wipes. The investigation utilizes:
 - Control samples: A known volume and concentration of benzopyrene is pipetted equally onto 3 individual pieces of Hero Wipes [Refer to Part 1 of the report].
 - Test samples: A low concentration of benzopyrene is spiked onto the simulated substrate, dried and wiped off using an individual Hero Wipe. This is repeated three times, each time the wipe is collected into a 500-mL amber bottle. This is repeated again using high concentration of benzopyrene.
- b. The material used for the simulated skin substrate was a 6" x 10" textured board that closely models the ridges and lines seen on the surface of the skin.
- c. The benzopyrene solution was transferred onto different the simulated substrate. The substrate was left to air-dry for at least 30 minutes. One Hero Wipe is used to wipe the surface of each simulated substrate. Each wipe is reverse-folded at each turn of the wipe where the contaminated surface of the wipe is folded onto itself to avoid the contaminant returning to board.
- d. The spiking and drying of the board following wiping is repeated three separate times for each benzopyrene concentration. The efficacy target for the removal of benzopyrene by the wipe is >60% recovery.
- e. The percent recovery of benzopyrene will be analyzed using HPLC.

III. DATA AND RESULT:

BLANK WIPE	LOT A-1	LOT A-1	LOT A-1
Peak area (% at benzopyrene retention time)	0	0	0
Interference to Benzopyrene	None (pass)	None (pass)	None (pass)

PART 2-1 LOW CONCENRATION BENZOPYRENE SURFACE WIPE-OFF

RESULT	LOT # M1705030022	LOT # M1705030023	LOT # M1705030024
% Recovery [>60%]	64.68% (pass)	70.41% (pass)	78.00% (pass)
RSD triplicate [<5%]	2.413%	3.281%	2.255%

PART 2-2 HIGH CONCENTRATION BENZOPYRENE SURFACE WIPE-OFF

Lot #	LOT # M1705030025	LOT # M1705030026	LOT #M1705030027	
% Recovery [>60%]	90.93% (pass)	81.14% (pass)	76.19% (pass)	
RSD triplicate [<5%]	2.911%	2.657%	0.727%	

IV. CONCLUSION AND OBSERVATION

- a. The removal of polycyclic aromatic hydrocarbon, benzopyrene, using Hero Wipe passed the efficacy target >60% removal from the simulated skin substrate.
- b. The wiping of the simulated substrate followed an arbitrary pattern, the cleaning and wiping off contaminants from the skin in the actual use is uncontrolled and random. The data gathered showed a more realistic evaluation of its use as compared to controlled conditions in Part 1.
- c. Based on the Part 1 controlled condition, the baseline study showed more than 84% recovery of high concentration benzopyrene.
- d. In conclusion, Hero Wipes can remove greater than 84% benzopyrene in a controlled condition and up to 82.75% from the simulated skin substrate for the high concentration benzopyrene.
- e. In conclusion, the Hero Wipe can remove 71.03% low concentration benzopyrene from the simulated surface.
- f. Benzpyrene is a polyaromatic hydrocarbon. Over time at diluted conditions, it may begin to form isomeric compounds.

V. ATTACHMENT

HPLC

Sample Name: Sample Blank H1705030028 TS 5/23/17

 Acq. Operator
 : Teena Samaranayake
 Seq. Line : 2

 Acq. Instrument
 : HPLC-P2 6.16 I0753
 Location :

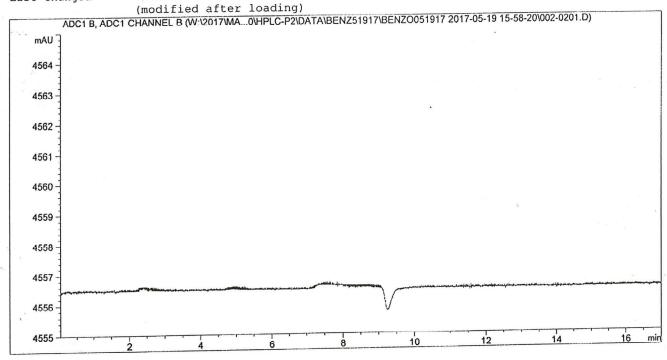
 Injection Date
 : 5/19/2017 6:10:37 PM
 Inj : 1

Acq. Method : Z:\HPLC-P2\DATA\BENZ51917\BENZ0051917 2017-05-19 15-58-20\BENZO-SPIKED.M

Last changed : 5/19/2017 3:58:00 PM by Teena Samaranayake

Analysis Method : C:\CHEM32\2\METHODS\BENZO-SPIKED.M

Last changed : 5/22/2017 3:39:59 PM by Teena Samaranayake



Area Percent Report

Sorted By : Signal

Calib. Data Modified : 5/22/2017 3:38:38 PM

Multiplier: : 1.0000
Dilution: : 1.0000
Use Multiplier & Dilution Factor with ISTDs

Signal 1: ADC1 B, ADC1 CHANNEL B

Totals: 0.00000

1 Warnings or Errors :

Warning : Calibrated compound(s) not found

3/23/17

Data file w: \ZUII\\mai\ZU\nfbc-fZ\DATA\DEMADISTI\DEMADOUSTSII ZUI: US IS IN N. SS\UUT UIUS.D Sample Name: std benzo

Acq. Operator : Teena Samaranayake Seq. Line : 1
Acq. Instrument : HPLC-P2 6.16 I0753 Location : Injection Date : 5/19/2017 3:41:03 PM Inj : 3

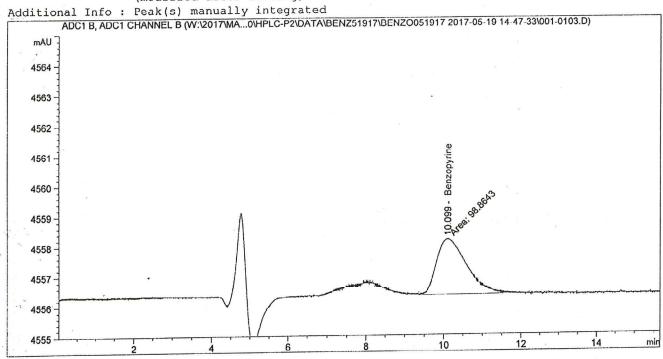
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Last changed : 5/19/2017 12:25:29 PM by Teena Samaranayake

Analysis Method : C:\CHEM32\2\METHODS\BENZO-SPIKED.M

Last changed : 5/22/2017 3:52:11 PM by Teena Samaranayake

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Area Percent Report

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Sorted By : Signal

Calib. Data Modified : 5/22/2017 3:52:53 PM

Multiplier: : 1.0000
Dilution: : 1.0000
Use Multiplier & Dilution Factor with ISTDs

Signal 1: ADC1 B, ADC1 CHANNEL B

 Peak RetTime Type
 Width
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 Area
 Name

 # [min]
 [min]
 [mAU*s]
 %

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 1
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Totals :

98.86430

Sample Name: M1705020022

B 15 5/23/17

Acq. Operator : Teena Samaranayake Seq. Line : 3
Acq. Instrument : HPLC-P2 6.16 I0753 Location : Injection Date : 5/19/2017 7:29:21 PM Inj : 1

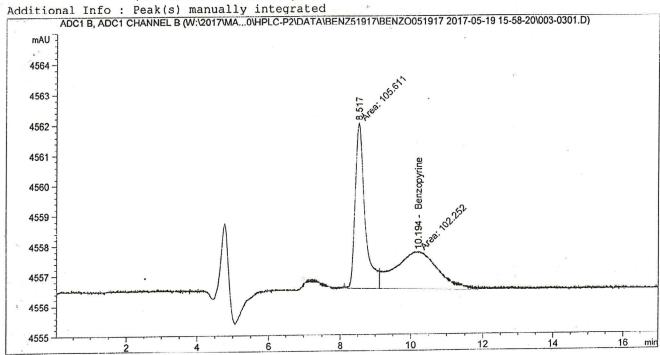
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Last changed : 5/19/2017 3:58:00 PM by Teena Samaranayake

Analysis Method: C:\CHEM32\2\METHODS\BENZO-SPIKED.M

Last changed : 5/23/2017 4:47:03 PM by Teena Samaranayake

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Area Percent Report

Sorted By : Signal

Calib. Data Modified : 5/23/2017 4:46:19 PM

Multiplier: : 1.0000
Dilution: : 1.0000
Use Multiplier & Dilution Factor with ISTDs

Signal 1: ADC1 B, ADC1 CHANNEL B

Peak #	RetTime [min]		Width [min]	Area [mAU*s]	Area %	Name	
1	8.517	MF					
2	10.194	FM	1.3833	102.25161	49.1918	Benzopyrine	- 000
							N(XY)

Totals :

207.86298

hara ette M. /Koti /Livi /Ko /ueho_ek/hutu/hementati /hemenonatati koti on to to co ko /oot otot Sample Name: M1705020023

Seq. Line : : Teena Samaranayake Acq. Operator Acq. Instrument: HPLC-P2 6.16 10753 Location : 1 Injection Date : 5/19/2017 8:48:06 PM Inj:

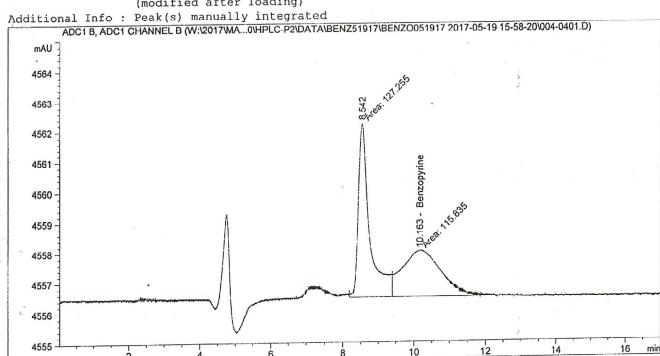
: Z:\HPLC-P2\DATA\BENZ51917\BENZ0051917 2017-05-19 15-58-20\BENZO-SPIKED.M Acq. Method

: 5/19/2017 3:58:00 PM by Teena Samaranayake Last changed

Analysis Method : C:\CHEM32\2\METHODS\BENZO-SPIKED.M

Last changed : 5/23/2017 12:17:37 PM by Teena Samaranayake

(modified after loading)



Area Percent Report

Sorted By

5/23/2017 12:18:26 PM Calib. Data Modified :

1.0000 Multiplier: 1.0000 Dilution: Use Multiplier & Dilution Factor with ISTDs

Signal 1: ADC1 B, ADC1 CHANNEL B

Peak RetTime Type # [min]	Width [min]	Area [mAU*s]	Area %	Name	
1 8.542 MF 2 10.163 FM	0.3664	15115	52.3489 47.6511	? Benzopyrine	00/
Totals :		243.08955			5/23/17

Daca-ETTE H. JEGIT JEWI JEG JULIO 15 / DOLO / DEMONINT JUDINOGGITATI 501, 00 15 10 00 50 7000 0001.1 Sample Name: M1705020024

3 135/23/17

Seq. Line : : Teena Samaranayake Acq. Operator Location : Acq. Instrument: HPLC-P2 6.16 10753 Inj : Injection Date : 5/19/2017 10:06:51 PM

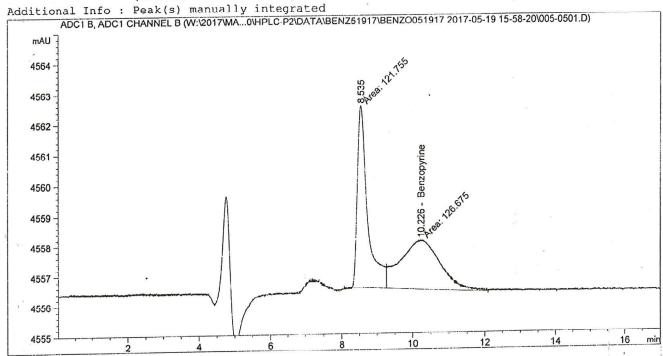
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Last changed : 5/19/2017 3:58:00 PM by Teena Samaranayake

Analysis Method : C:\CHEM32\2\METHODS\BENZO-SPIKED.M

Last changed : 5/23/2017 12:17:37 PM by Teena Samaranayake

(modified after loading)



Area Percent Report

Signal Sorted By

5/23/2017 12:18:26 PM Calib. Data Modified :

1.0000 Multiplier: 1.0000 Dilution: Use Multiplier & Dilution Factor with ISTDs

Signal 1: ADC1 B, ADC1 CHANNEL B

11	RetTime [min]		Width [min]	Area [mAU*s]	Area %	Name
1	8.535 10.226	MF	0.3370	121.75466	49.009/	? Benzopyrine

Totals :

248.42989