

ENHANCING BIOREMEDIATION WITH E-SAFE© AND SHEEN MAGIC IN TREATMENT OF HYDROCARBON CONTAMINATED SOILS/AQUATIC SYSTEMS

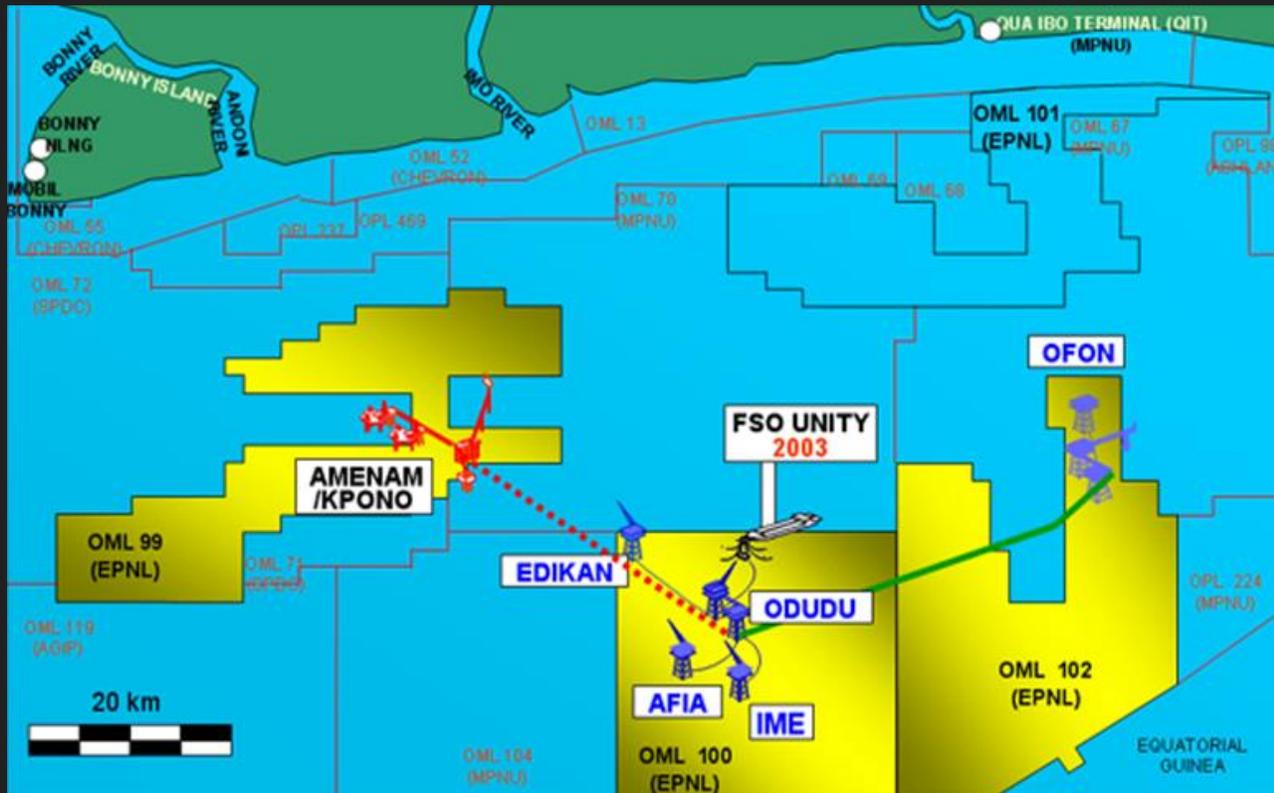
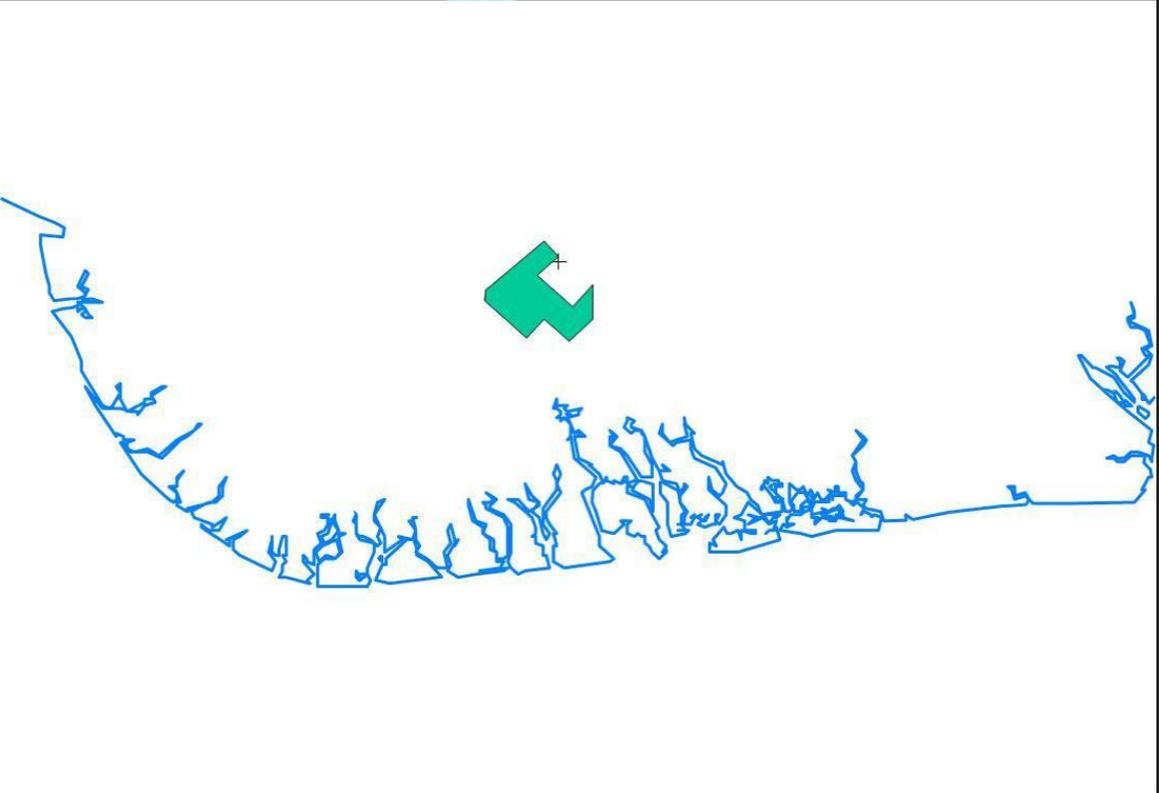
'E-SAFE© RETURNS CONTAMINATED SOILS TO ZERO TPH AND PAH VALUES'

A PLUTUS ENVIRONMENTAL TECHNOLOGIES INC. PRODUCT EFFICACY PRESENTATION TO TOTALENERGIES NIGERIA, TRANS AMADI INDUSTRIAL LAYOUT PORT HARCOURT.

BY

BARCOPET NIGERIA LIMITED/ PLUTUS ENVIRONMENTAL

TOTAL ENERGIES ONSHORE AND OFFSHORE CONCESSIONS



PETROLEUM HYDROCARBON CONTAMINATION CHALLENGE

- TOTALENERGIES IS COMMITTED TO OPERATING IN A MANNER THAT SHOWS RESPECT TO THE ENVIRONMENT. THIS QUOTE FROM TOTALENERGIES 2020 REPORT CAPTURES HER THOUGHTS ON ENVIRONMENTAL PERTURBATION FROM OIL SPILLS.....
- 'The impacts of oil spills are not solely limited to the direct effect on the ecosystem; it devastatingly affects social welfare and aggravates poverty, social conflict, population displacement, and production reduction in communities where they occur'.
- ⊠ 'Oil spillage in oil-producing communities in the Niger Delta region is aggravated by recurrent pipeline vandalism. This vandalism had resulted in significant negative socioeconomic and environmental problems in the region with serious effects on human lives and farmlands'.

PETROLEUM HYDROCARBON CONTAMINATION CHALLENGE

- ❑ Difficult Terrain During Environmental Cleanup
- ❑ Oil Resurgence Post Pipeline Repair
- ❑ Community Disturbance Post Repair
- ❑ Environmental Bioremediation
- ❑ Post Cleanup Certification
- ❑ Current Bioremediation Techniques



Challenges in Bioremediation

- ❓ Slow Degradation Rates
- ❓ Toxic Contaminants
- ❓ Limited Microbial Activity
- ❓ Site-Specific Challenges

BIOREMEDIATION GAME CHANGER

E-Safe and Sheen Magic



Innovative Solutions for Environmental Cleanup

WHAT'S IN IT FOR TOTALENERGIES WITH E-SAFE



WHAT'S IN IT FOR TOTALENERGIES WITH E-SAFE



WHAT'S IN IT FOR TOTALENERGIES WITH E-SAFE



WHAT'S IN IT FOR TOTALENERGIES WITH E-SAFE and SHEEN MAGIC



PRODUCT DESCRIPTION

E-Safe and Sheen magic are hydrocarbon degradation assisting compound made from natural products making them practically non-toxic to the environment.



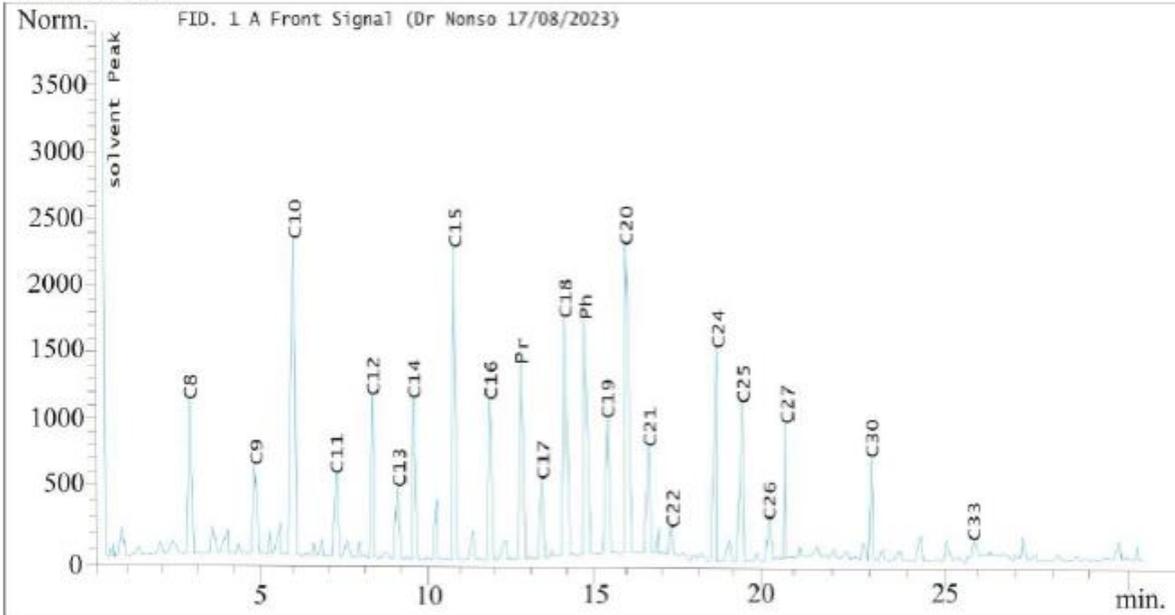
TPH VALUES IN UNTREATED CONTAMINATED SOIL

Injection Date : 17/08/2023 10:42:17 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARAL565

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



TPH Concentration of test soil 21,701.67 ppm

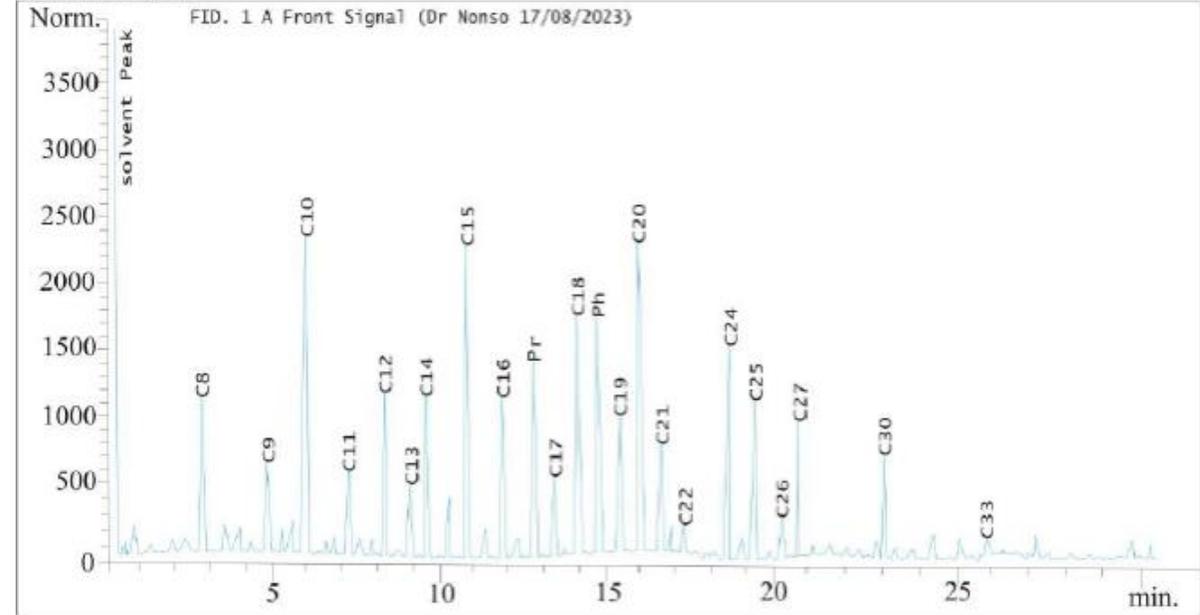
0.00 % TOTAL DEGRADATION ACHIEVED

Injection Date : 17/08/2023 10:42:17 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARAL565

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



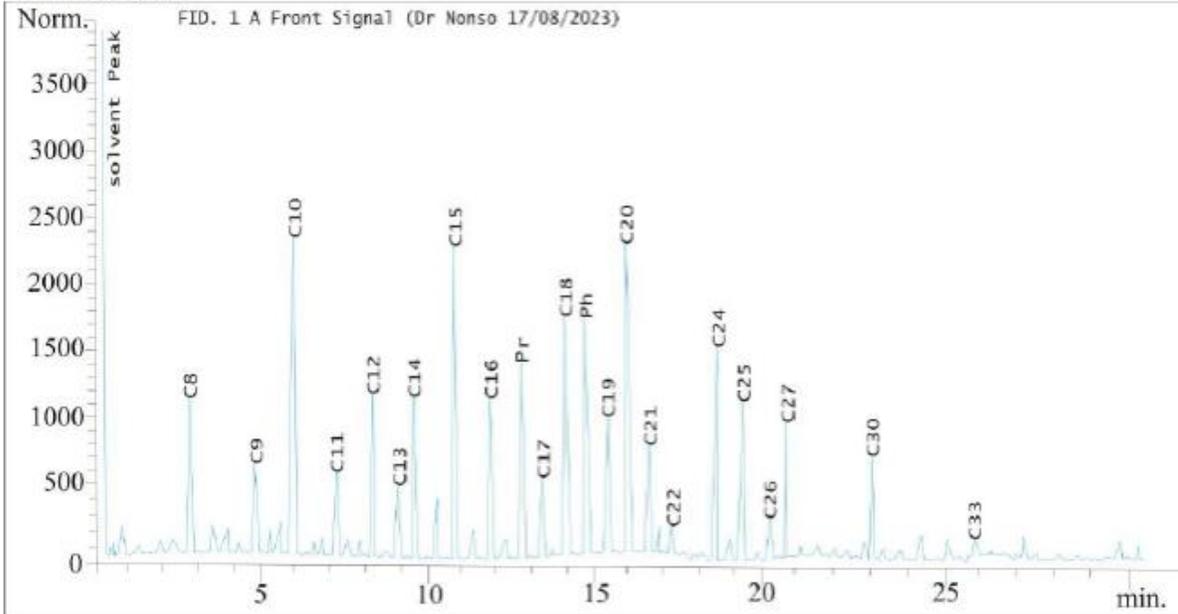
TPH Concentration after 0 weeks with 0ml E-Safe 21,701.67 ppm

Injection Date : 17/08/2023 10:42:17 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARAL565

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



TPH Concentration of test soil 21,701.67 ppm

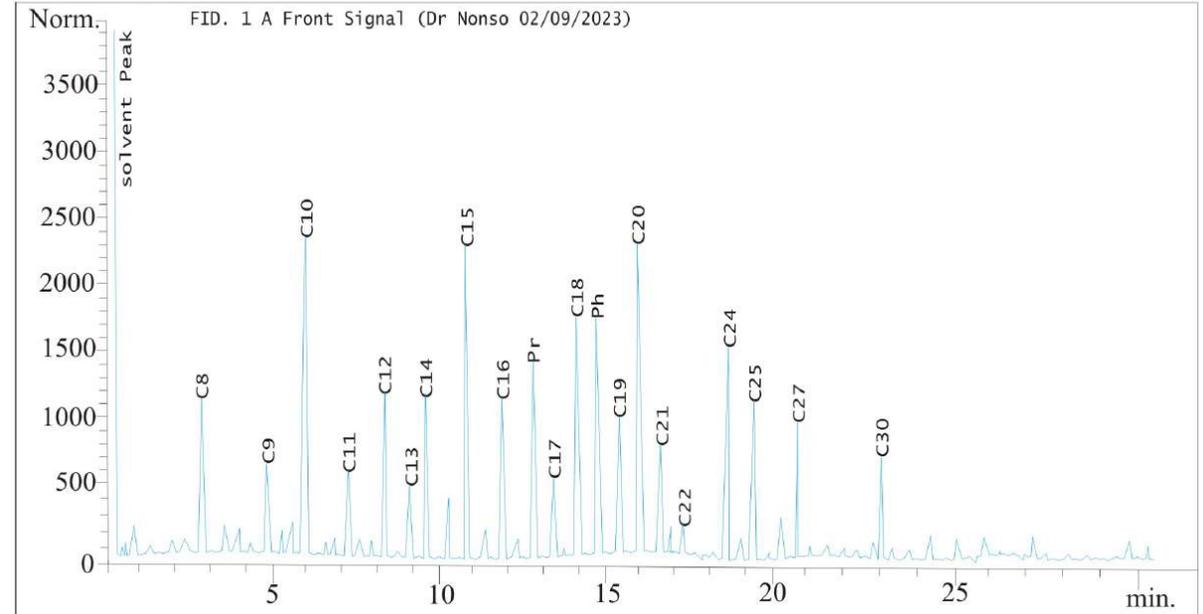
9.44 % TOTAL DEGRADATION ACHIEVED

Injection Date : 02/09/2023 12:52:33 PM
Sample Name : Sandy+Clay soil
Acq. operator : ARAL565

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



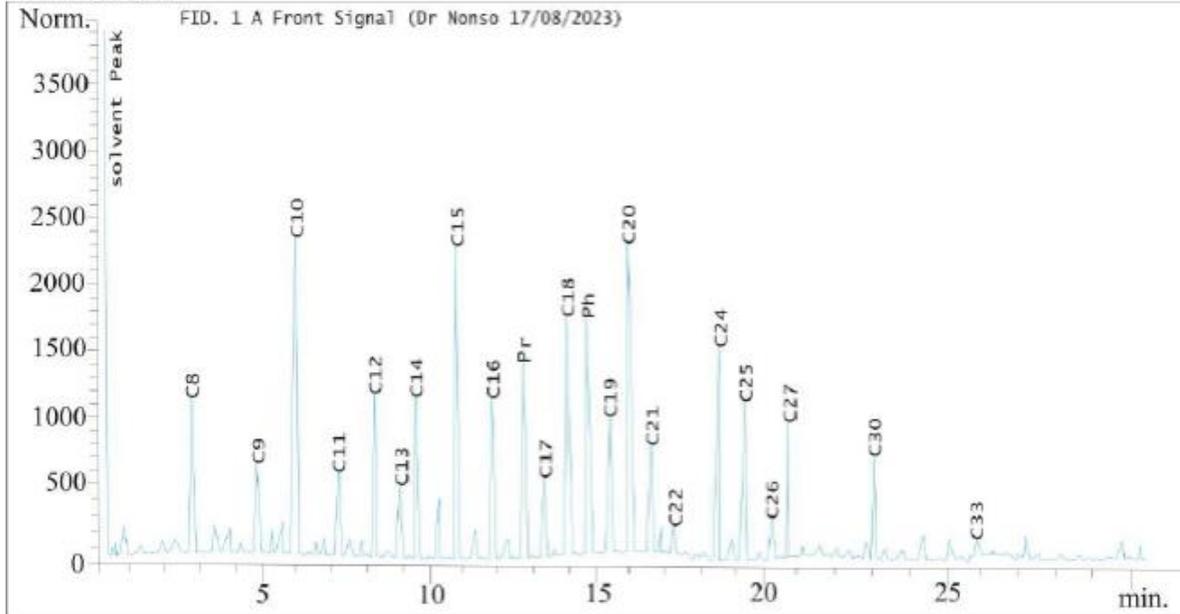
TPH Concentration after 6 weeks with 0ml E-Safe 19653.68 ppm

Injection Date : 17/08/2023 10:42:17 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARAL565

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2

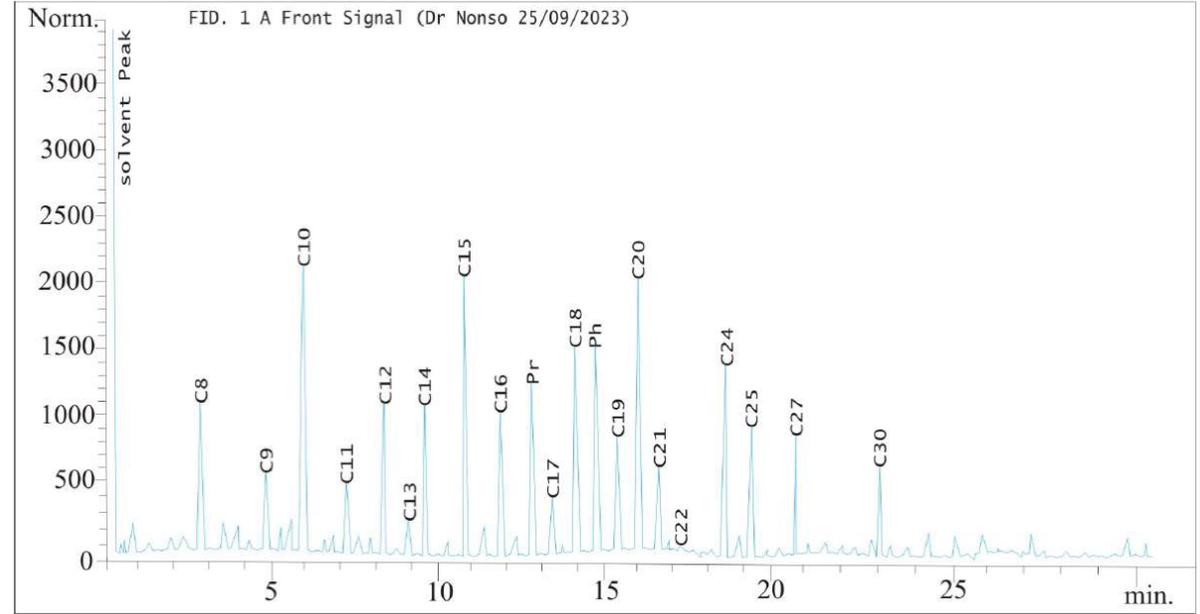


Injection Date : 25/09/2023 8:34:52 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARAL565

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



TPH Concentration of test soil 21,701.67 ppm

12.71 % TOTAL DEGRADATION ACHIEVED

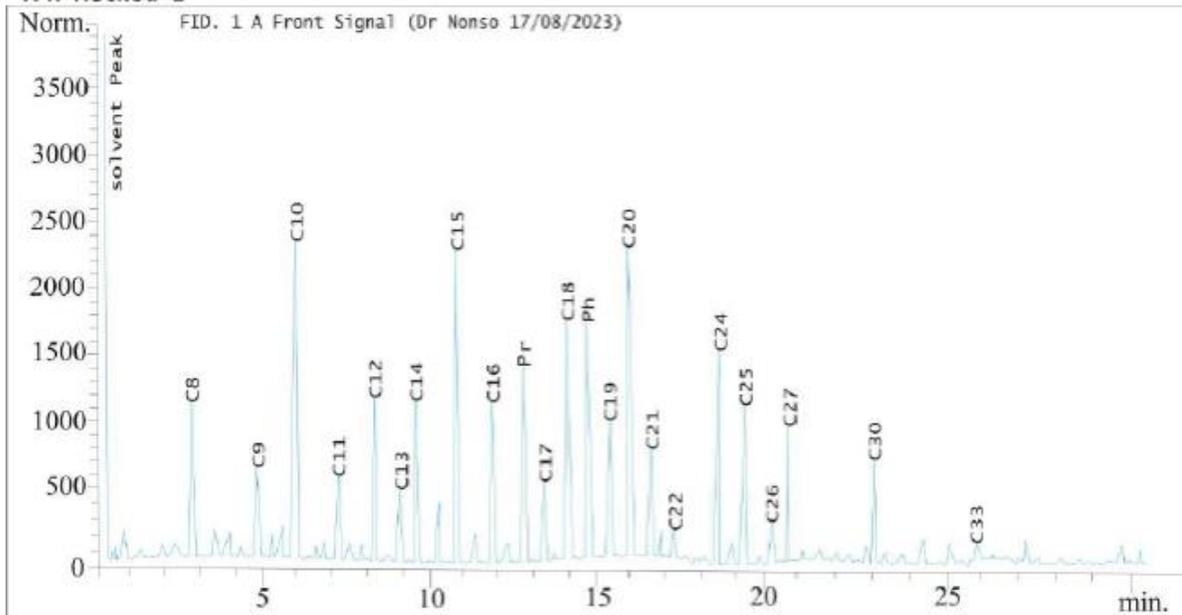
TPH Concentration after 8 weeks with 0ml E-Safe 18944.40 ppm

Injection Date : 17/08/2023 10:42:17 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARAL565

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



TPH Concentration of test soil 21,701.67 ppm

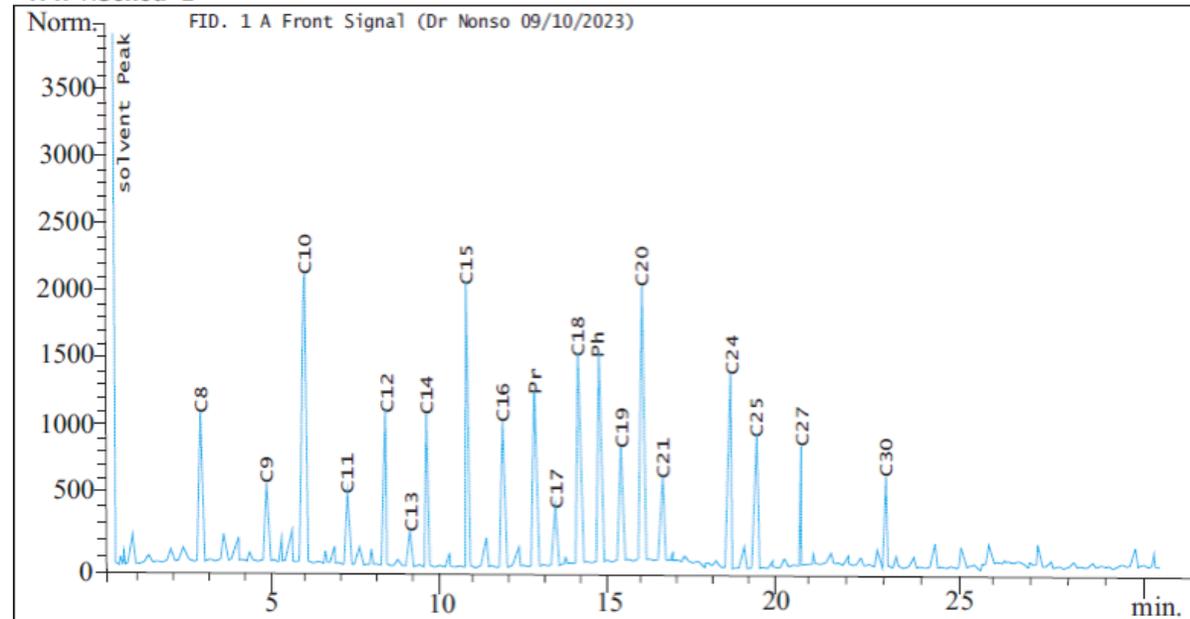
17.05 % TOTAL DEGRADATION ACHIEVED

Injection Date : 09/10/2023 8:34:52 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARAL565

Location : Vial 6
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



TPH Concentration after 10 weeks with 0ml E-Safe 18001.96 ppm



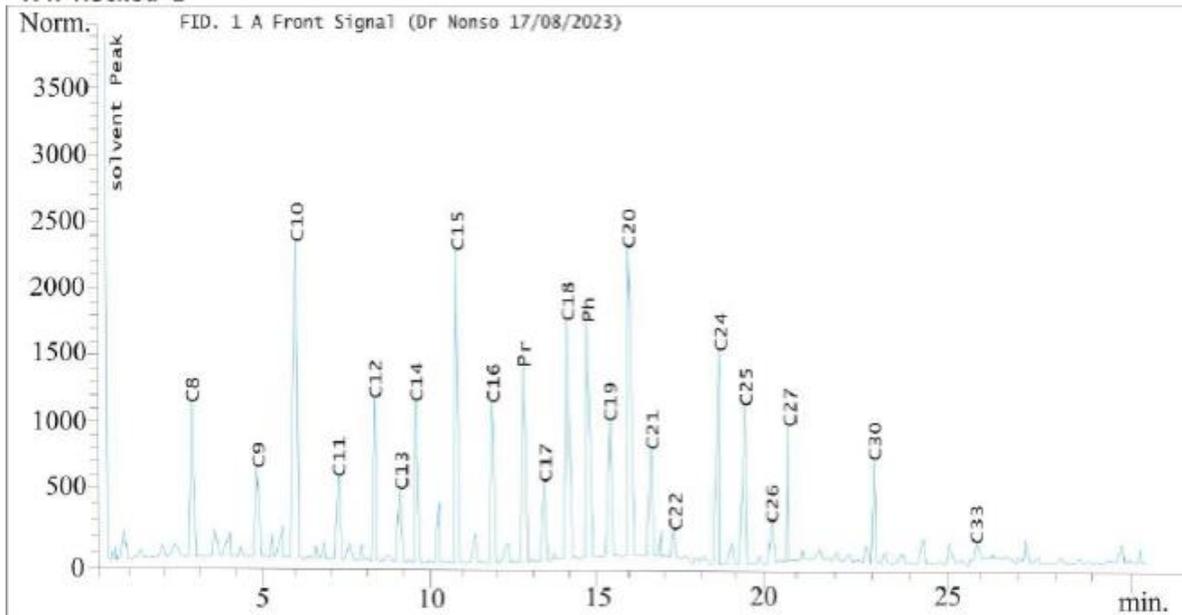
CONTROL CONTAMINATED SOIL

Injection Date : 17/08/2023 10:42:17 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARAL565

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



TPH Concentration of test soil 21,701.67 ppm

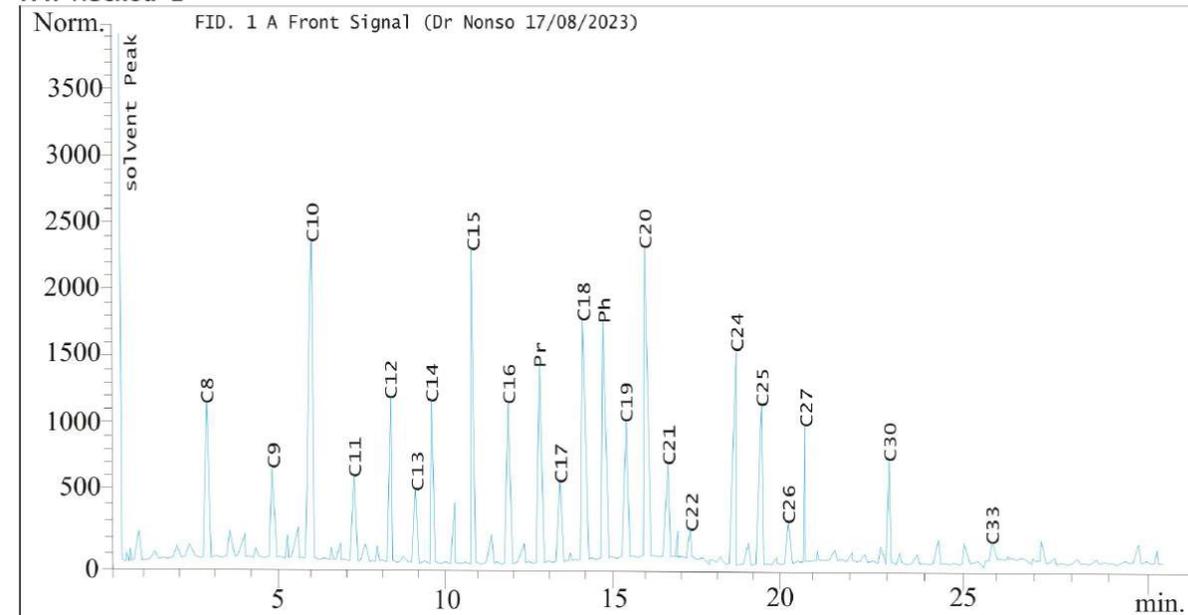
2.30 % TOTAL DEGRADATION ACHIEVED

Injection Date : 17/08/2023 10:19:58 AM
Sample Name : Control
Acq. operator : ARAL565

Location : Vial 2
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



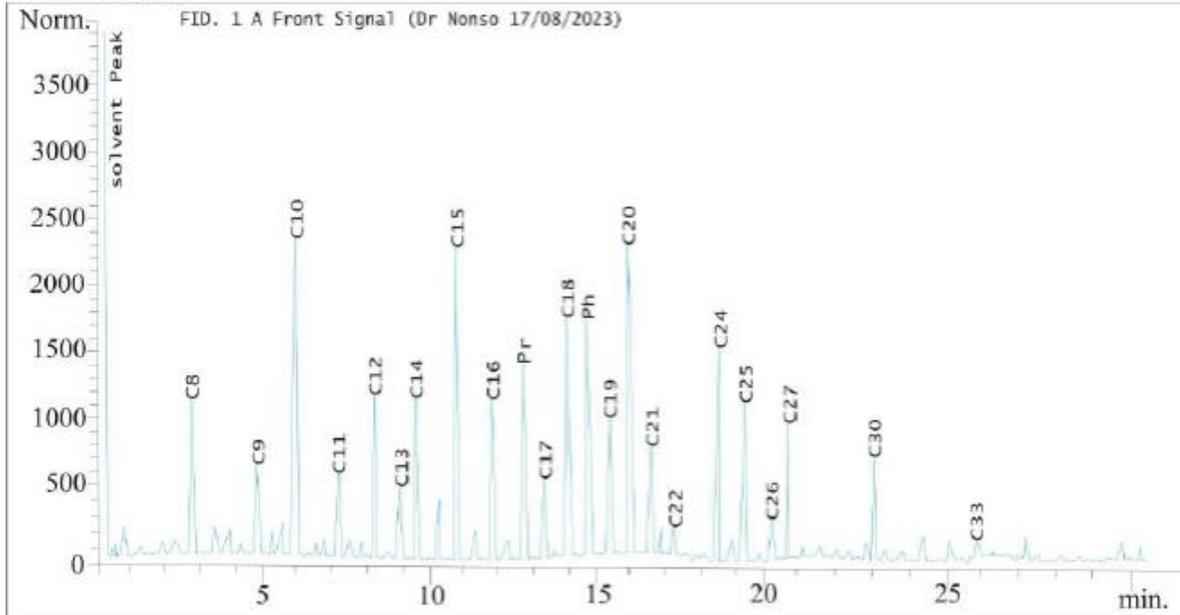
TPH Concentration after 4 weeks with 0ml E-Safe 21,201.76 ppm

Injection Date : 17/08/2023 10:42:17 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARAL565

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



TPH Concentration of test soil 21,701.67 ppm

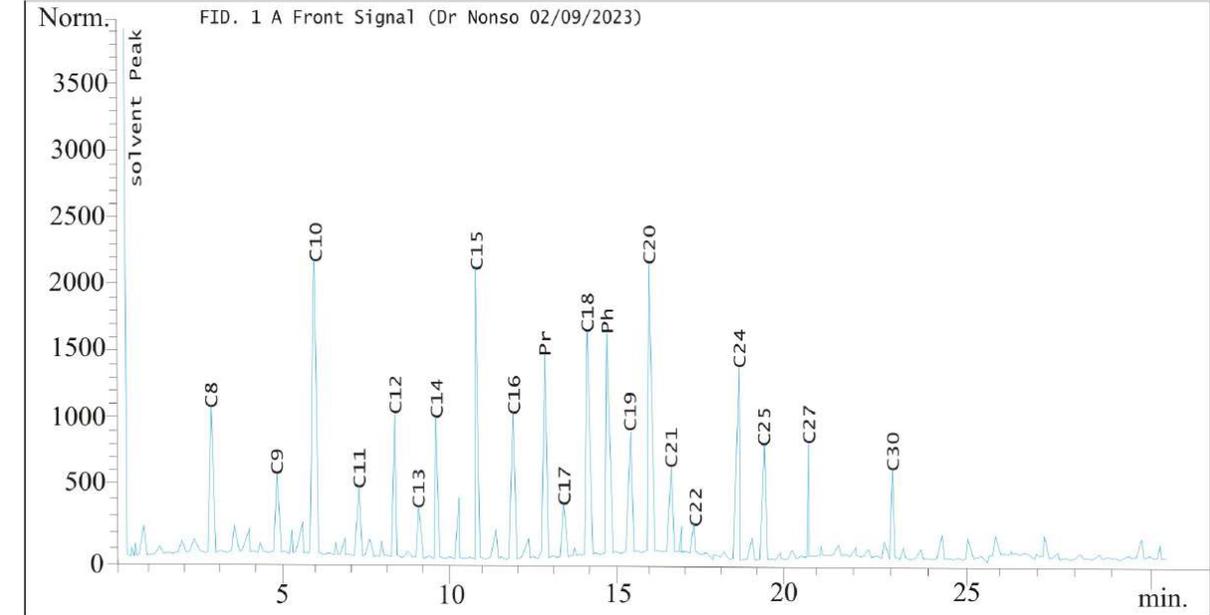
9.73 % TOTAL DEGRADATION ACHIEVED

Injection Date : 02/09/2023 01:27:11 PM
Sample Name : Control
Acq. operator : ARAL565

Location : Vial 2
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



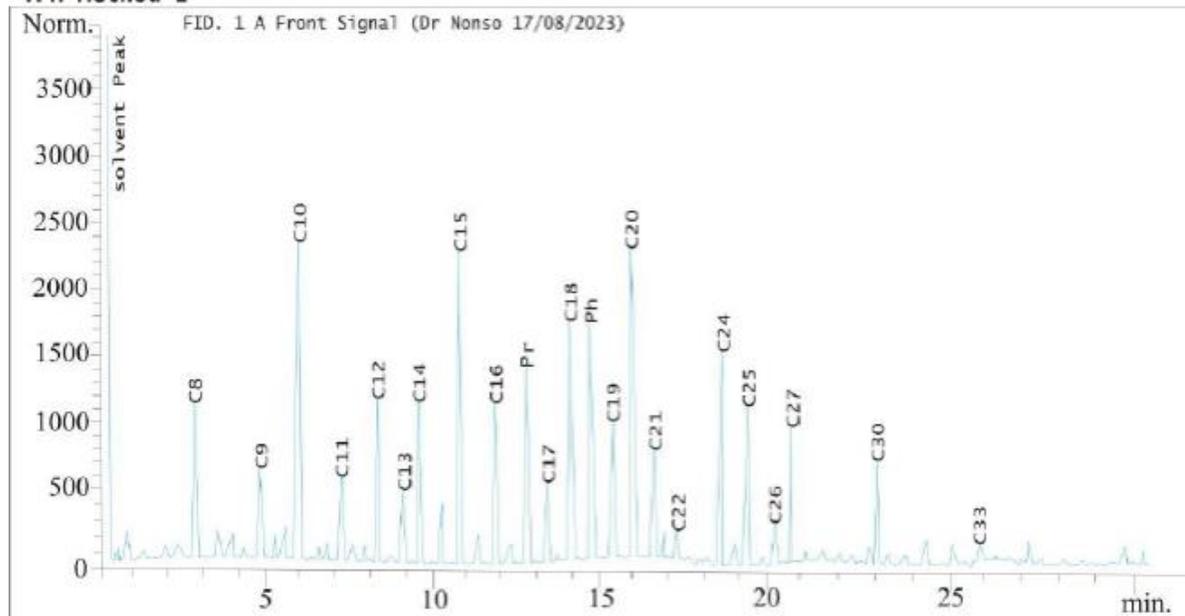
TPH Concentration after 6 weeks with 0ml E-Safe 19590.63 ppm

Injection Date : 17/08/2023 10:42:17 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARAL565

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



TPH Concentration of test soil 21,701.67 ppm

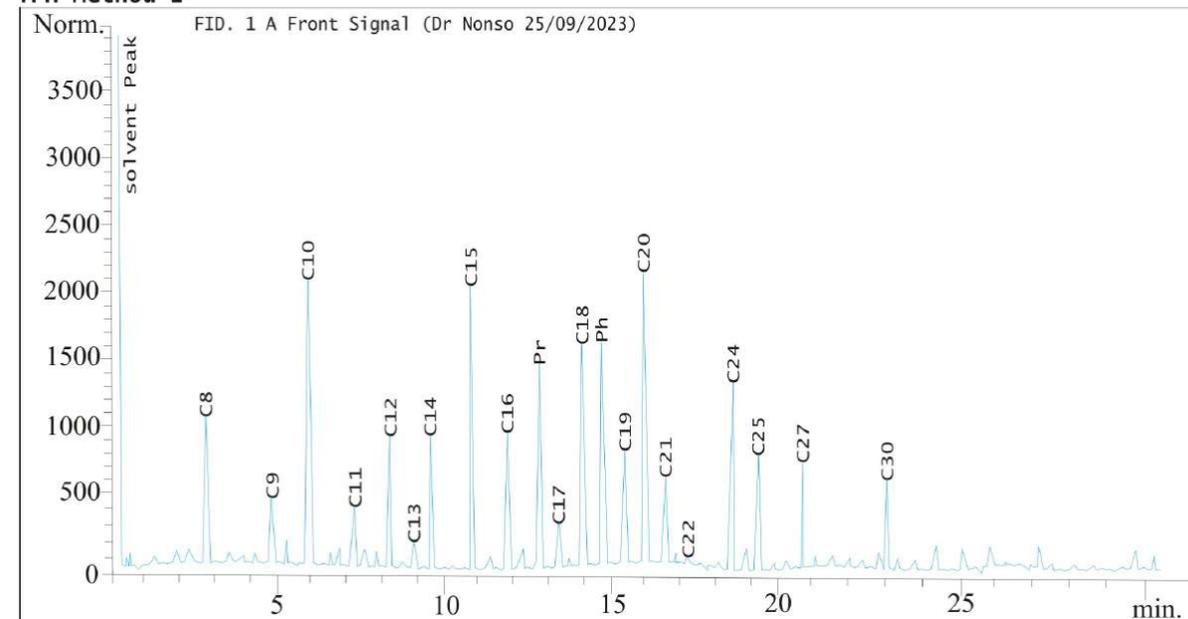
13.37 % TOTAL DEGRADATION ACHIEVED

Injection Date : 25/09/2023 09:09:42 AM
Sample Name : Control
Acq. operator : ARAL565

Location : Vial 2
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



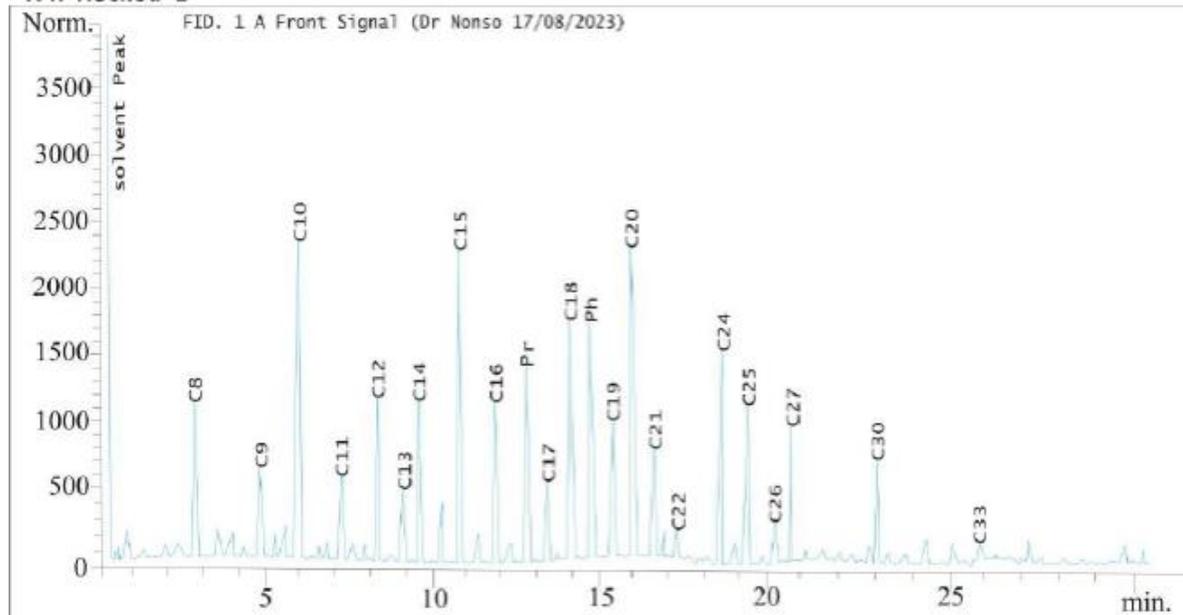
TPH Concentration after 8 weeks with 0ml E-Safe 18800.07 ppm

Injection Date : 17/08/2023 10:42:17 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARAL565

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



TPH Concentration of test soil 21,701.67 ppm

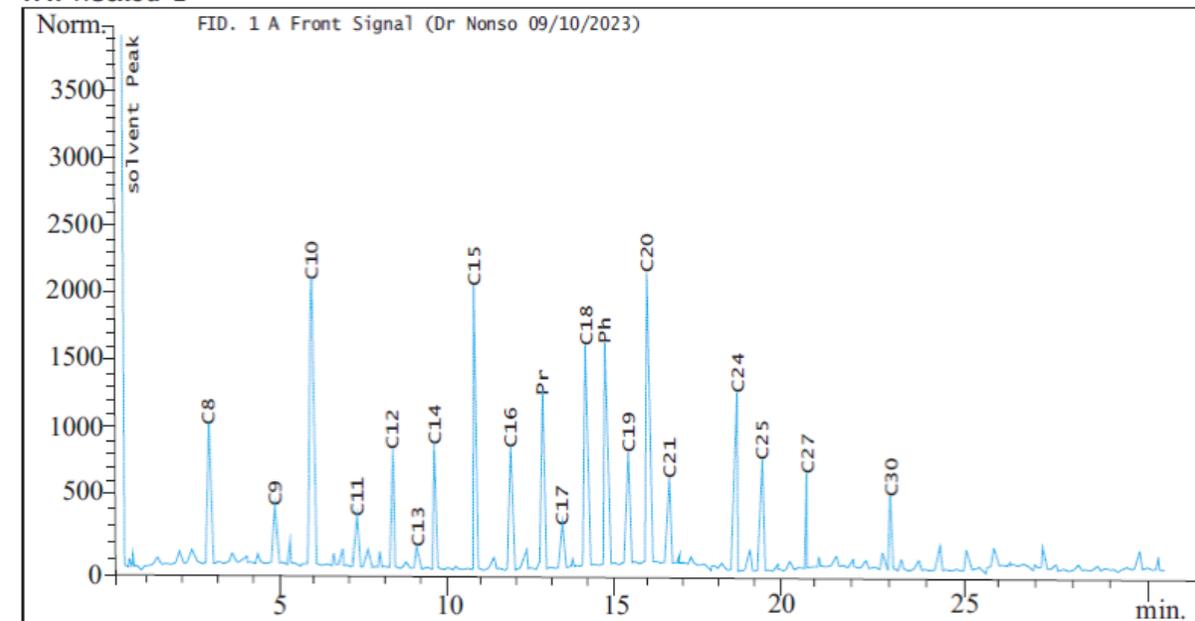
17.99 % TOTAL DEGRADATION ACHIEVED

Injection Date : 09/10/2023 01:27:11 PM
Sample Name : Control
Acq. operator : ARAL565

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

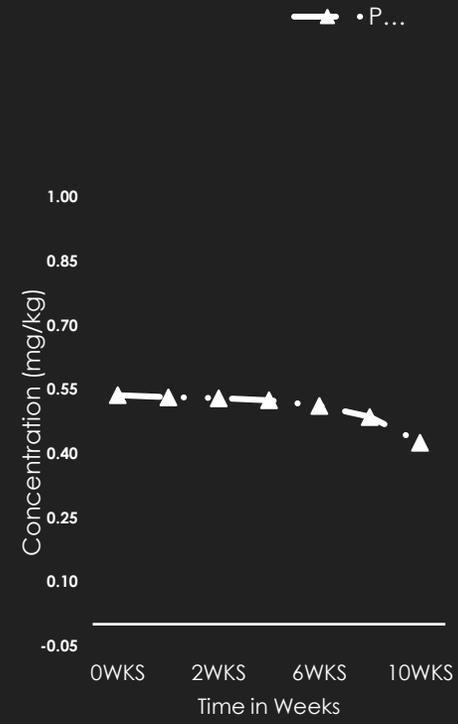
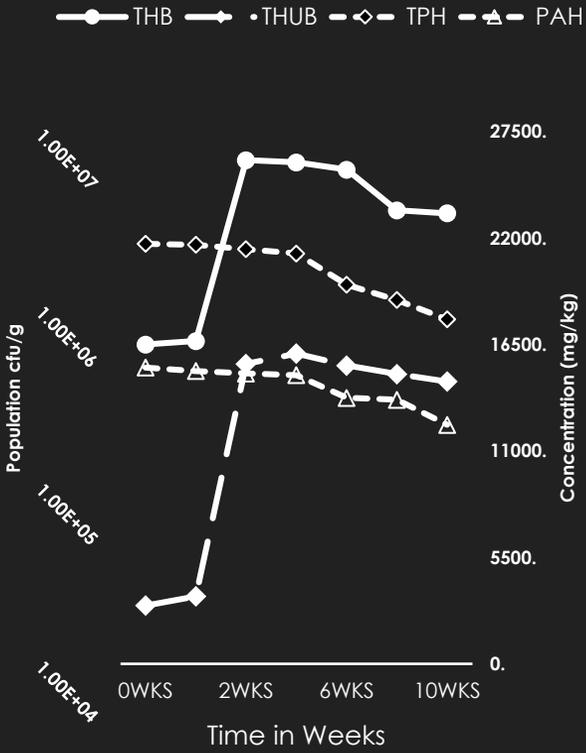
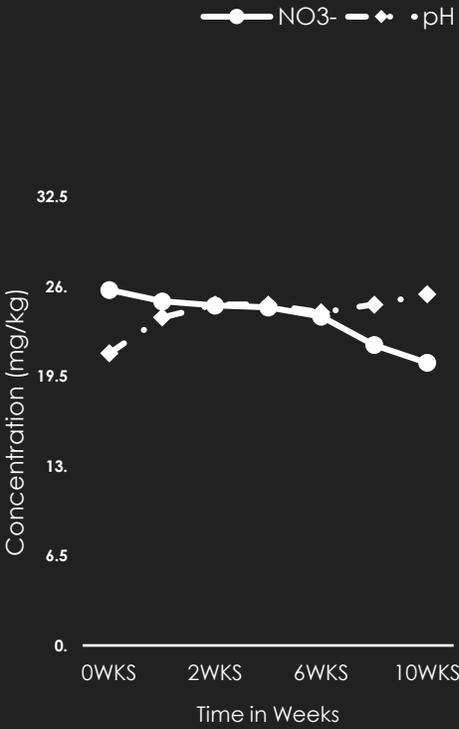
Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



TPH Concentration after 10 weeks with 0ml E-Safe 18800.07 ppm

PHYSICO-CHEMISTRY AND MICROBIOLOGY OF 0ml E_SAFE /4KG SOIL BIODEGRADATION PROCESS (NATURAL ATTENUATION)



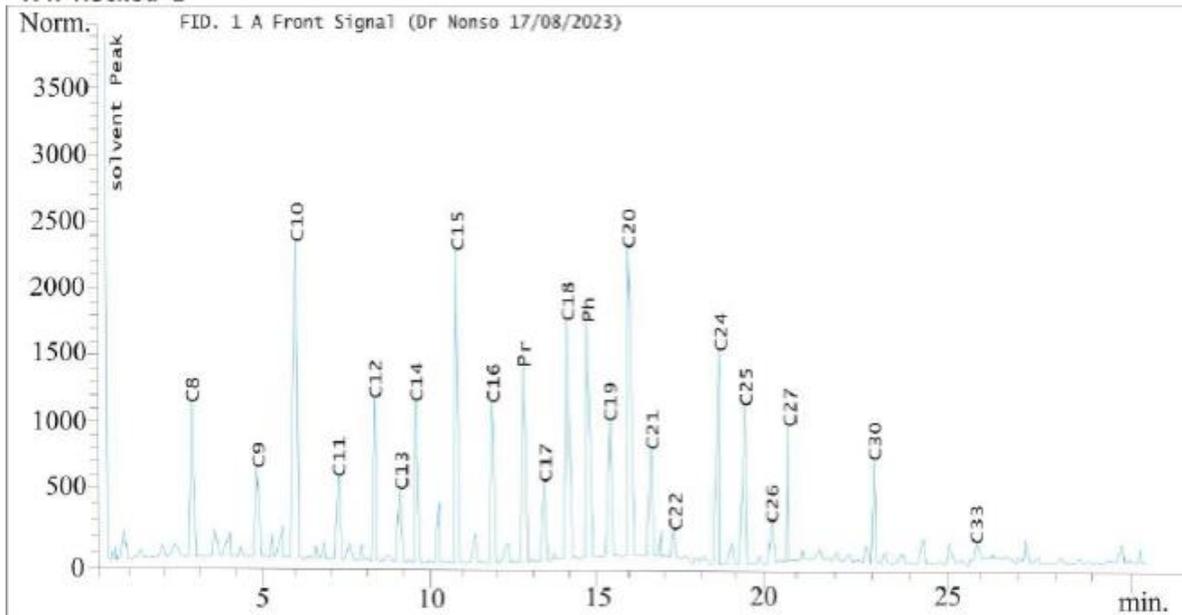
**6ml E-SAFE IN 4KG
CONTAMINATED SOIL
TREATMENT**

Injection Date : 17/08/2023 10:42:17 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARAL565

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



TPH Concentration of test soil 21,701.67 ppm

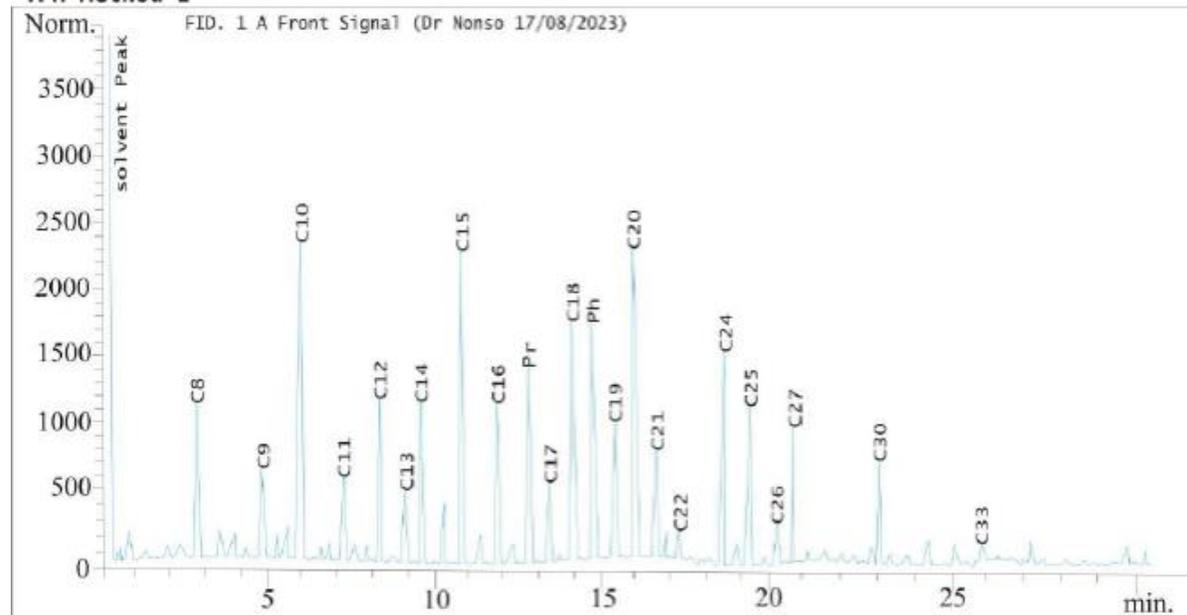
0.00% TOTAL DEGRADATION ACHIEVED

Injection Date : 17/08/2023 10:42:17 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARAL565

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



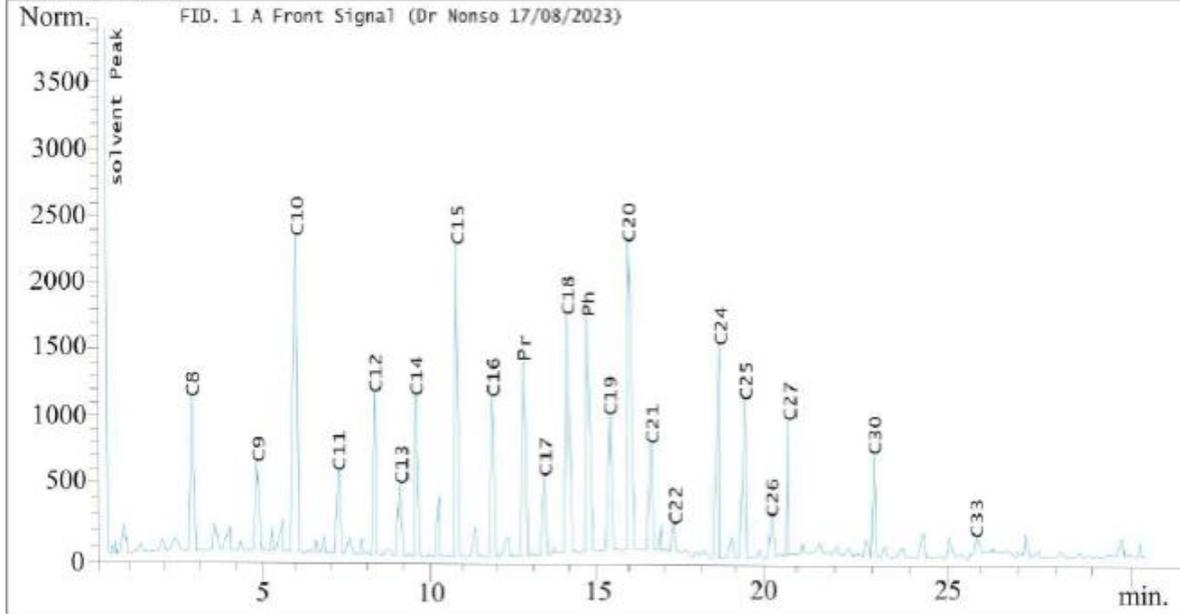
TPH Concentration after 0 weeks with 6ml E-Safe 21701.67 ppm

Injection Date : 17/08/2023 10:42:17 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARAL565

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



TPH Concentration of test soil 21,701.67 ppm

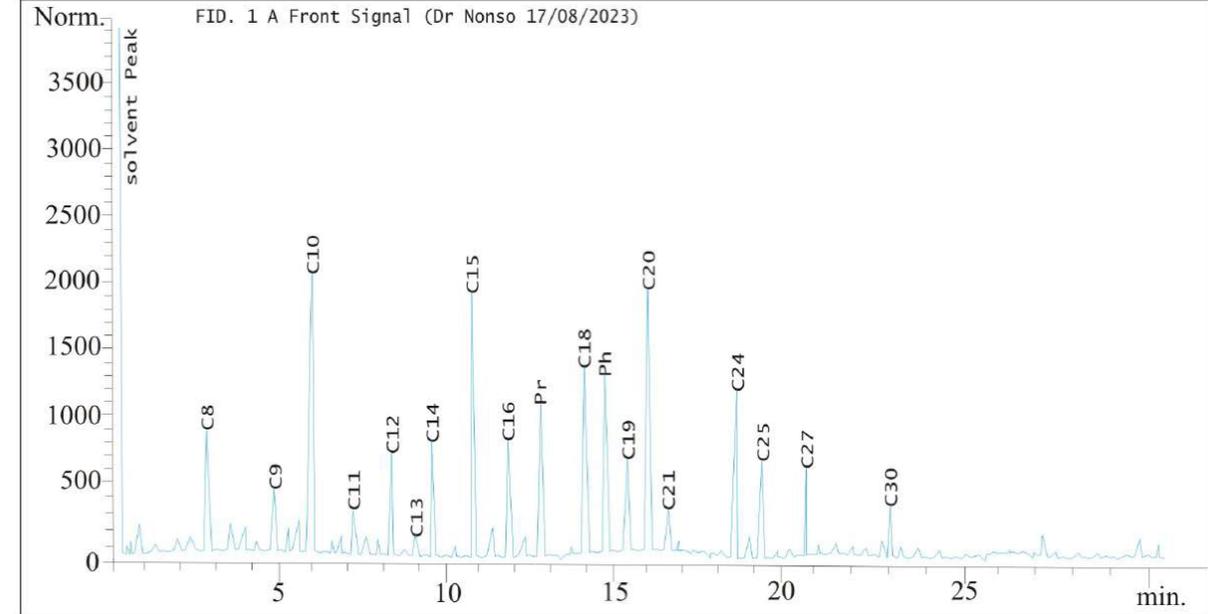
28.87 % TOTAL DEGRADATION ACHIEVED

Injection Date : 17/08/2023 10:52:36 AM
Sample Name : Sample 6
Acq. operator : ARAL565

Location : Vial 3
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



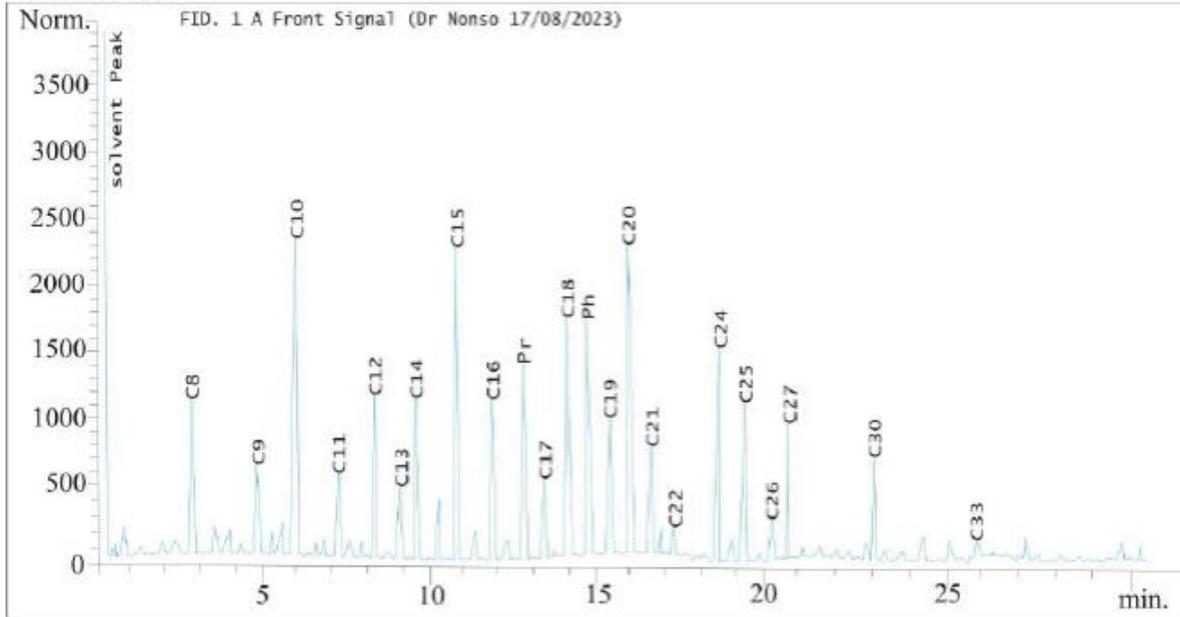
TPH Concentration after 4 weeks with 6ml E-Safe 15,435.45 ppm

Injection Date : 17/08/2023 10:42:17 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARAL565

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



TPH Concentration of test soil 21,701.67 ppm

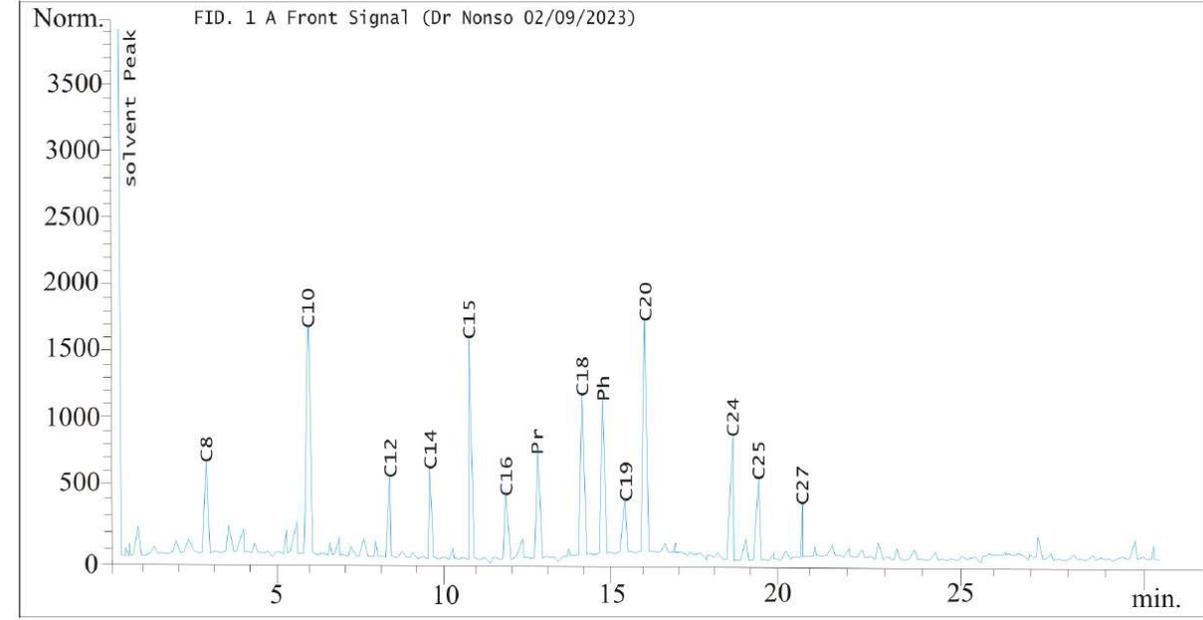
51.09% TOTAL DEGRADATION ACHIEVED

Injection Date : 02/09/2023 02:02:54 PM
Sample Name : Sample 6
Acq. operator : ARAL565

Location : Vial 3
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



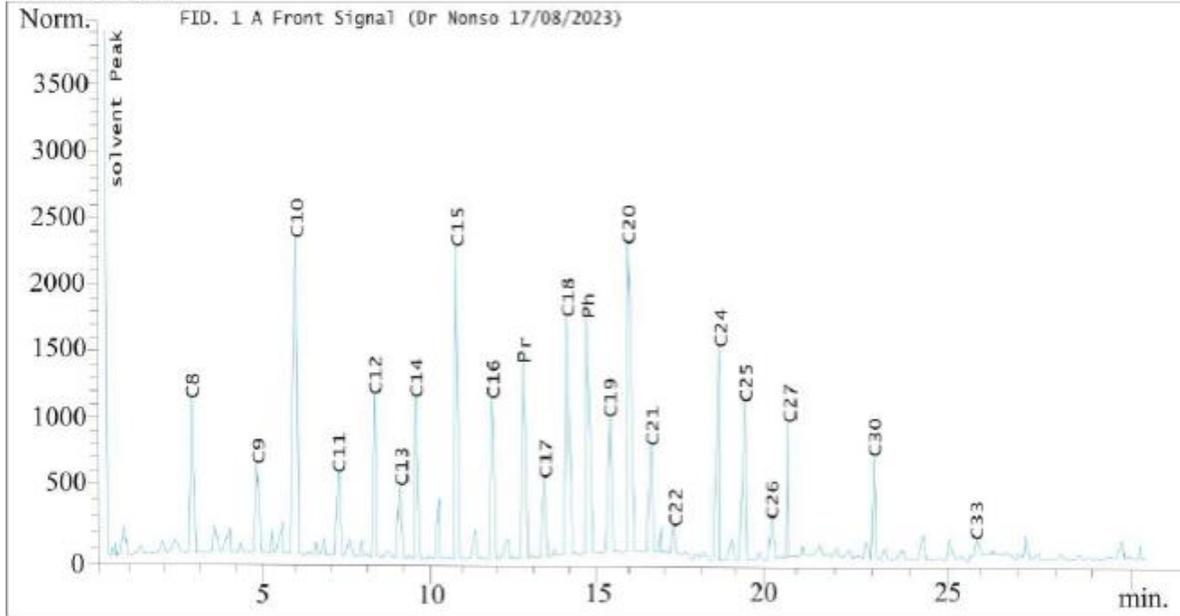
TPH Concentration after 6 weeks with 6ml E-Safe 10615.17 ppm

Injection Date : 17/08/2023 10:42:17 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARAL565

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2

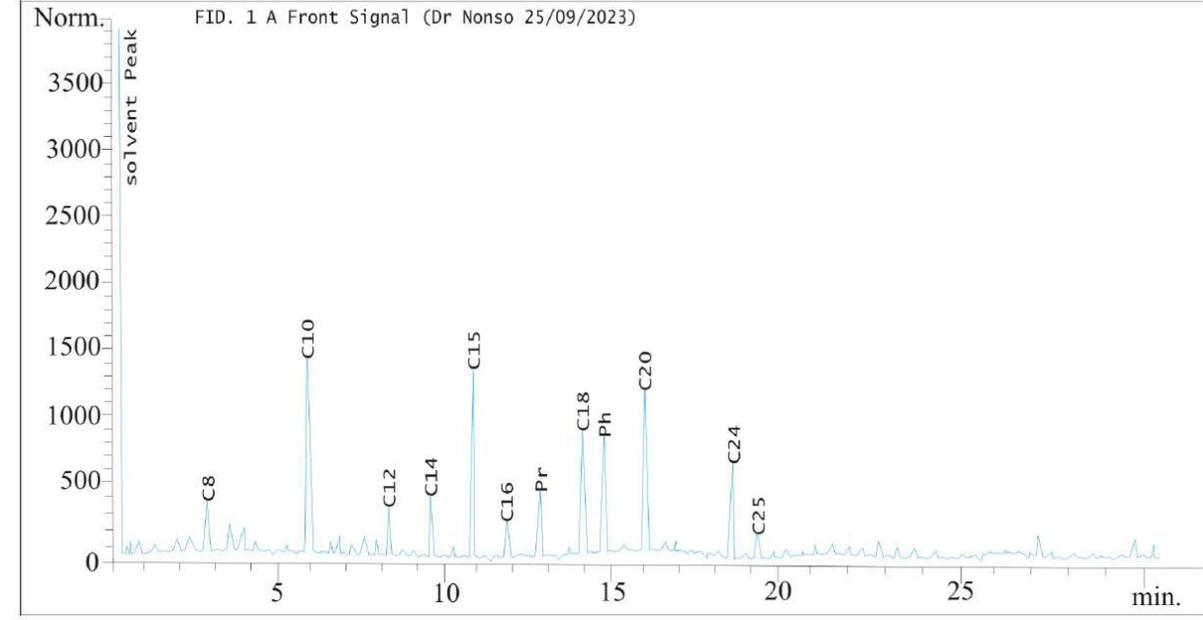


Injection Date : 25/09/2023 09:44:26 AM
Sample Name : Sample 6
Acq. operator : ARAL565

Location : Vial 3
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



TPH Concentration of test soil 21,701.67 ppm

TPH Concentr. after 8 weeks with 6ml E-Safe 6943.47 ppm

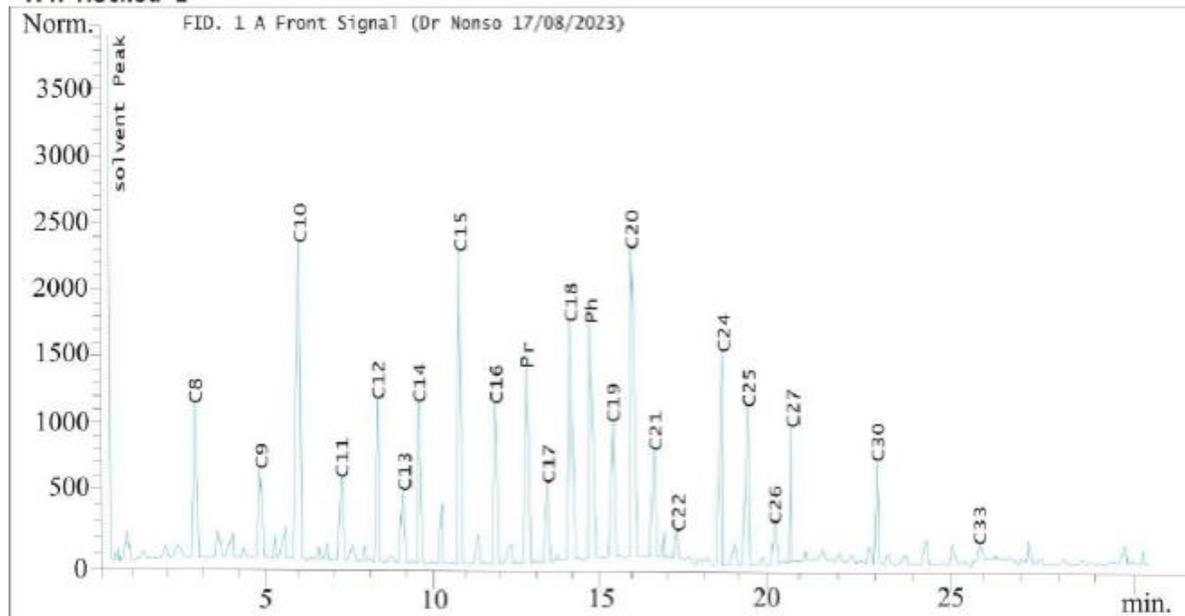
68.00% TOTAL DEGRADATION ACHIEVED

Injection Date : 17/08/2023 10:42:17 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARAL565

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2

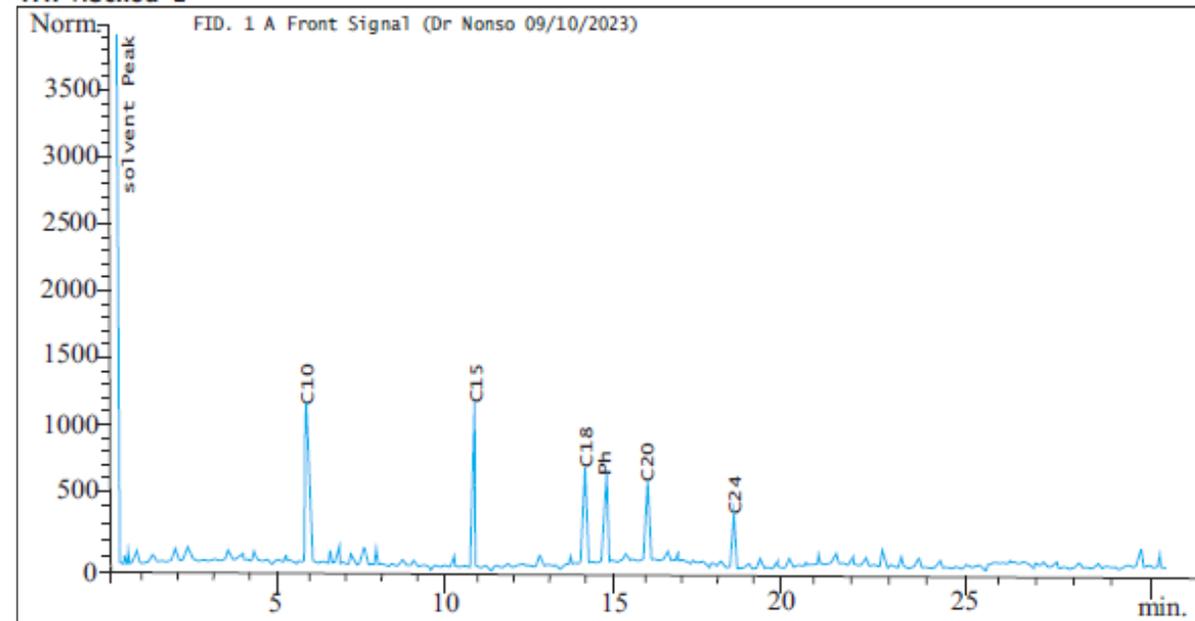


Injection Date : 09/10/2023 02:02:54 PM
Sample Name : Sample 6
Acq. operator : ARAL565

Location : Vial 2
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2

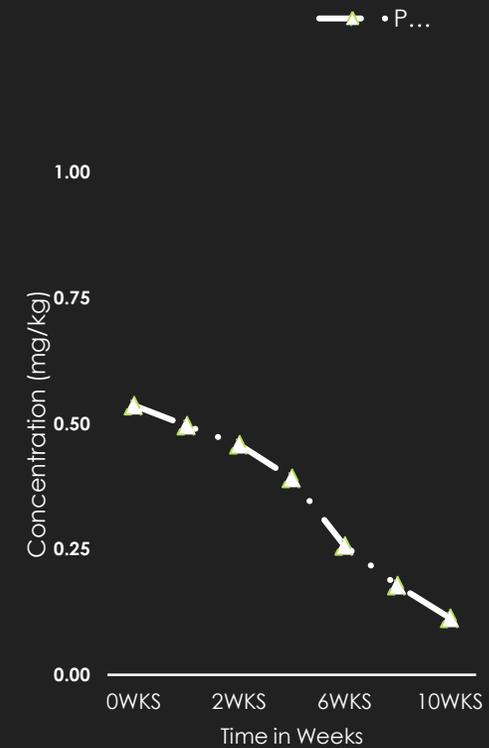
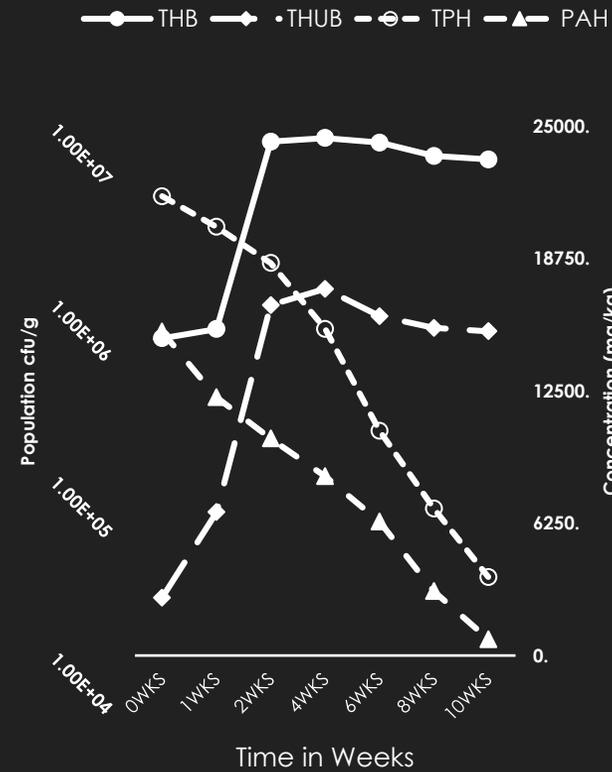
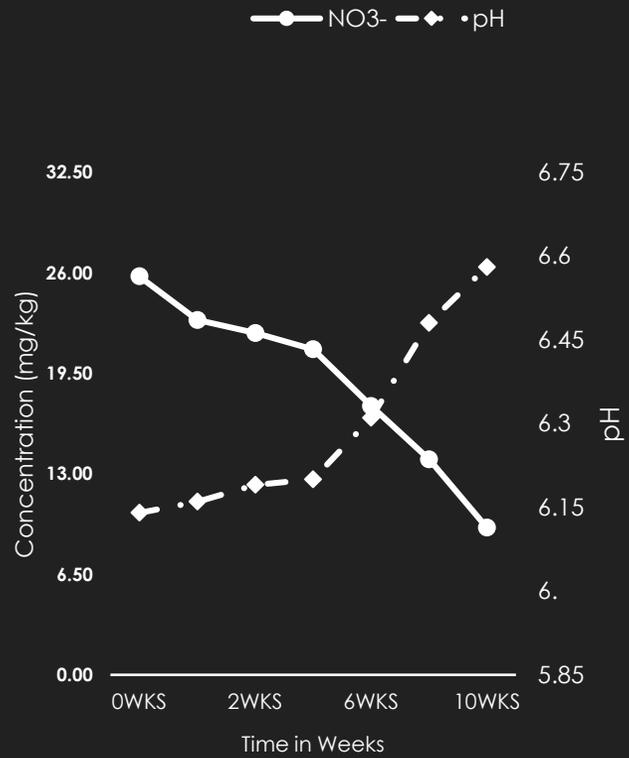


TPH Concentration of test soil 21,701.67 ppm

82.91% TOTAL DEGRADATION ACHIEVED

TPH Conc. after 10 weeks with 6ml E-Safe 3709.38 ppm

PHYSICO-CHEMISTRY AND MICROBIOLOGY OF 6ml E_SAFE /4KG SOIL ENHANCED-BIODEGRADATION PROCESS



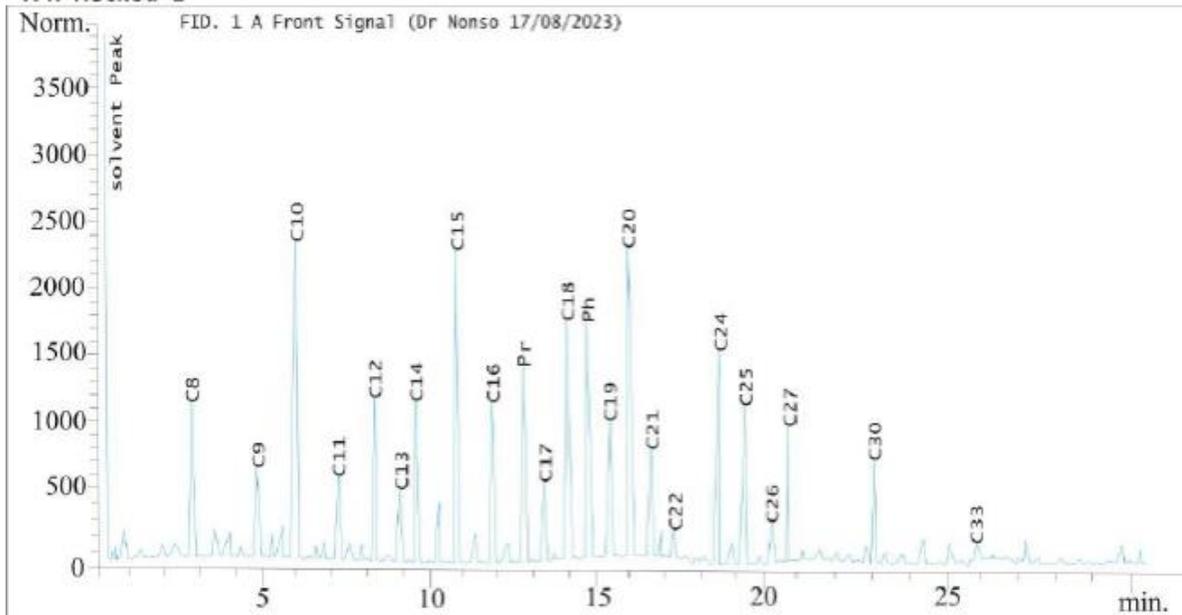
**12ML E-SAFE IN 4KG OF
CONTAMINATED SOIL
TREATMENT**

Injection Date : 17/08/2023 10:42:17 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARAL565

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2

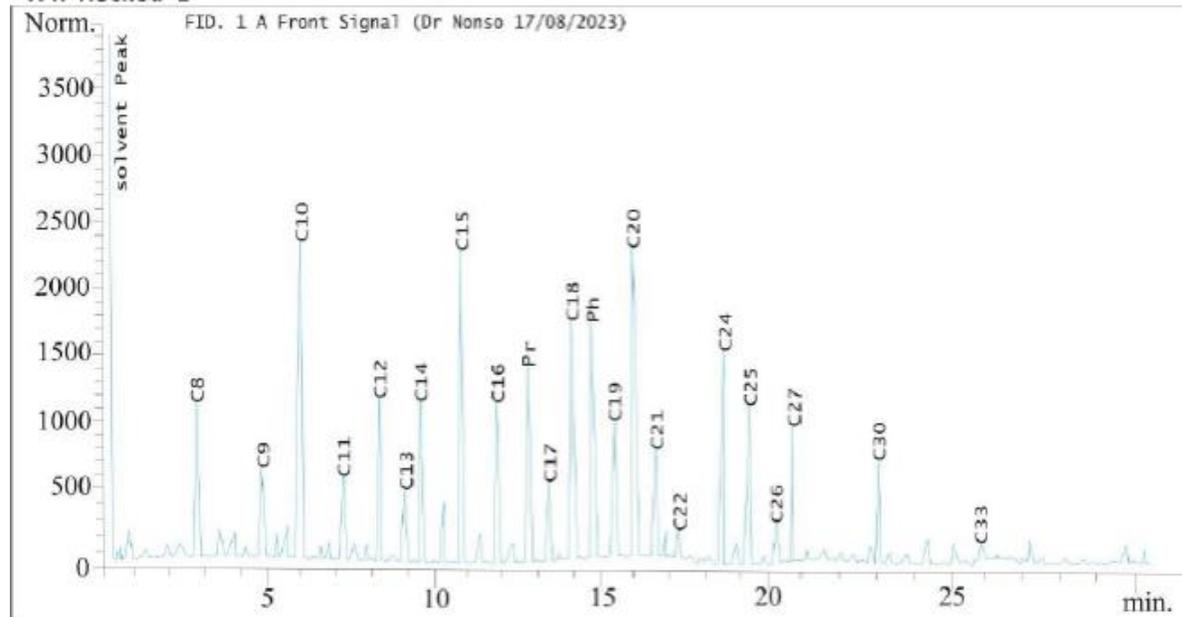


Injection Date : 17/08/2023 10:42:17 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARAL565

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



TPH Concentration of test soil 21,701.67 ppm

0.00% TOTAL DEGRADATION ACHIEVED

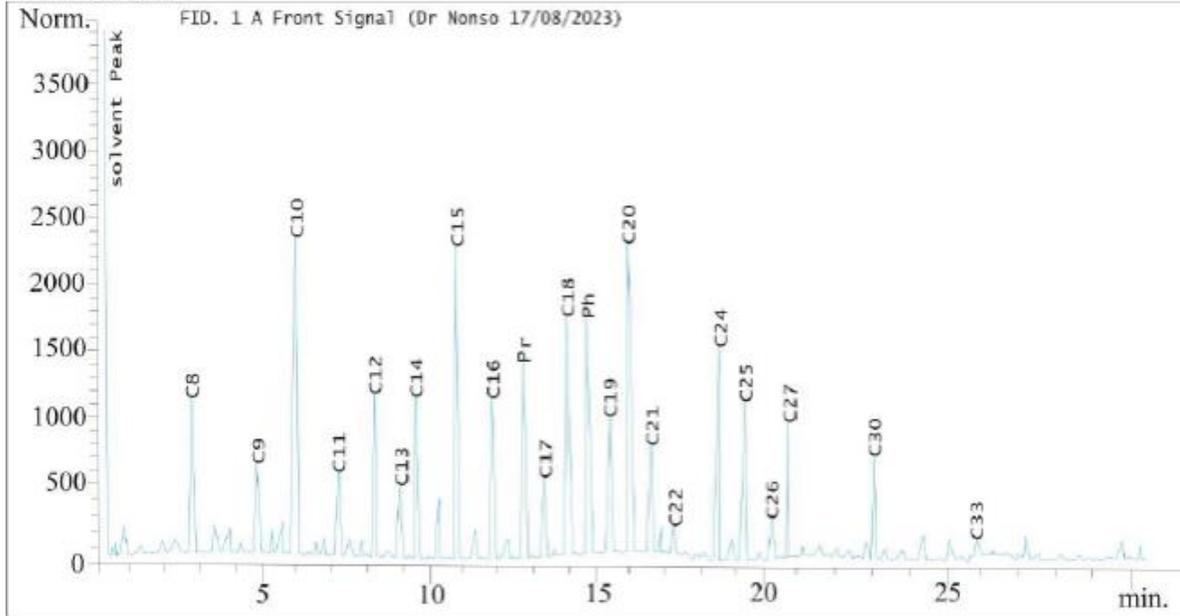
TPH Concentration after 0 week with 12ml E-Safe 21,701.67 ppm

Injection Date : 17/08/2023 10:42:17 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARAL565

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



TPH Concentration of test soil 21,701.67 ppm

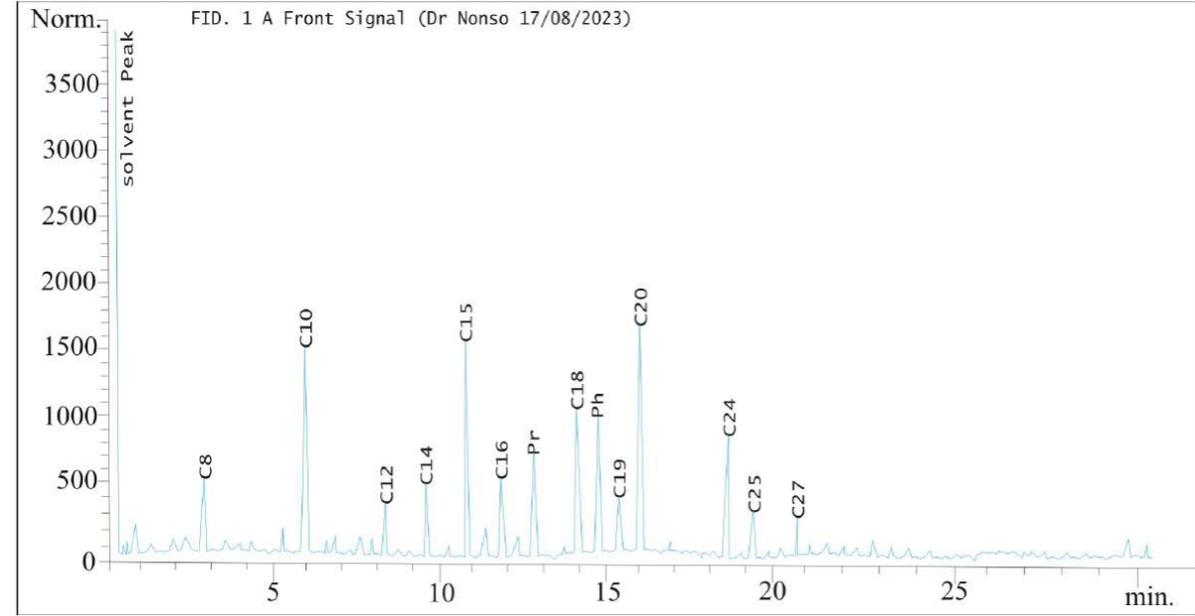
56.24 % TOTAL DEGRADATION ACHIEVED

Injection Date : 17/08/2023 11:27:40 AM
Sample Name : Sample 12
Acq. operator : ARAL565

Location : Vial 4
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



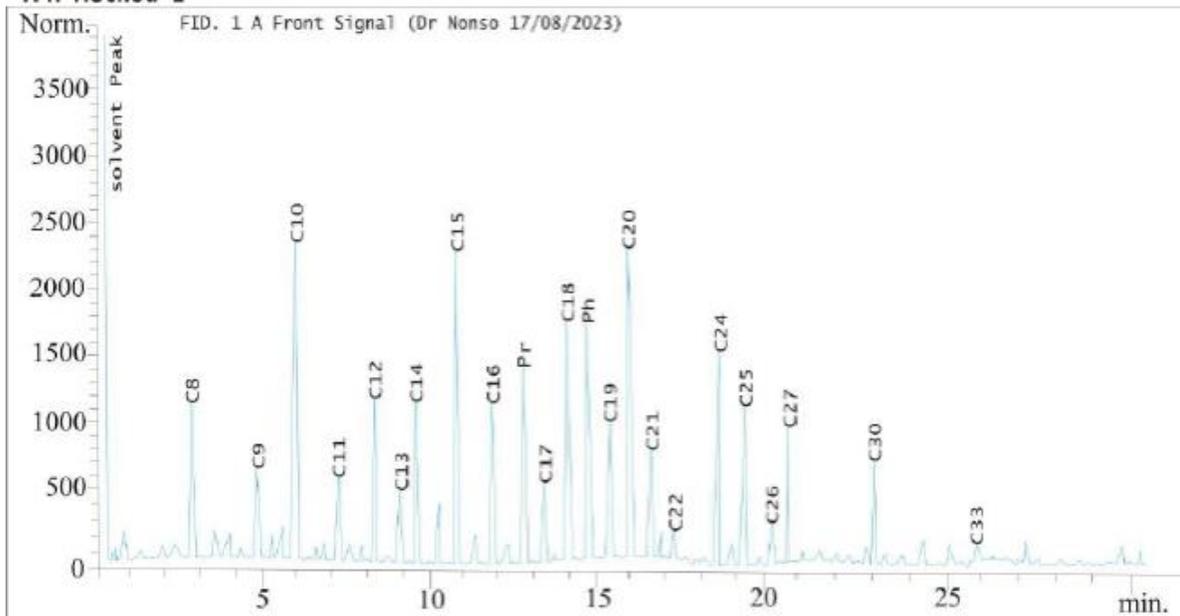
TPH Concentration after 4 weeks with 12ml E-Safe 9,495.58 ppm

Injection Date : 17/08/2023 10:42:17 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARAL565

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



TPH Concentration of test soil 21,701.67 ppm

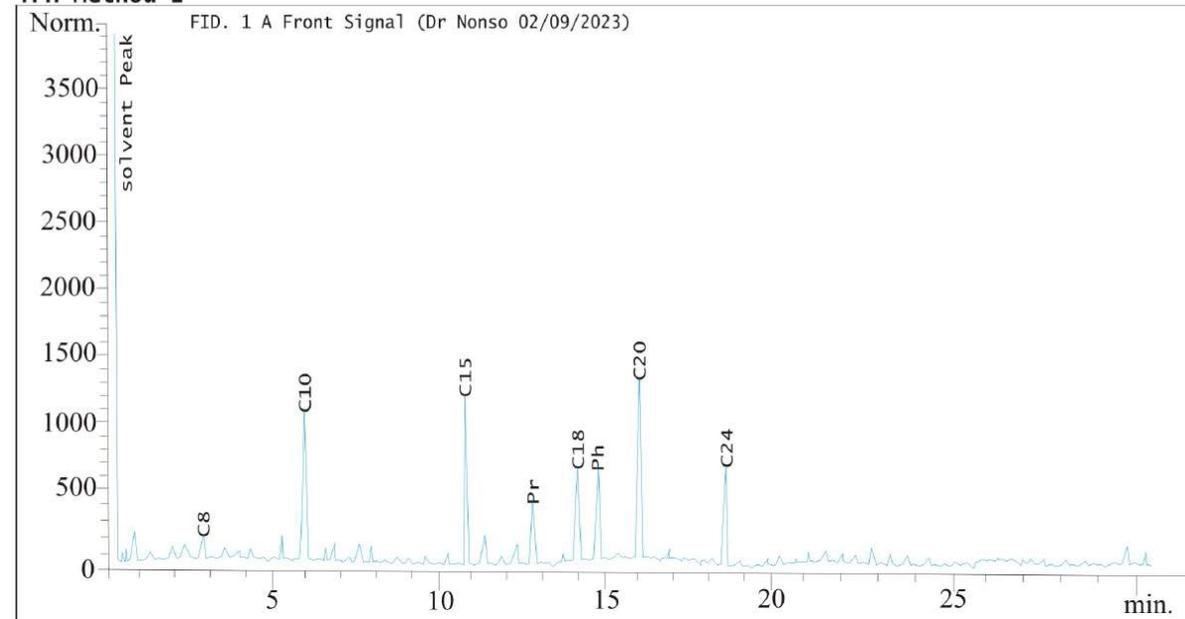
75.38 % TOTAL DEGRADATION ACHIEVED

Injection Date : 02/09/2023 02:37:16 PM
Sample Name : Sample 12
Acq. operator : ARAL565

Location : Vial 4
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



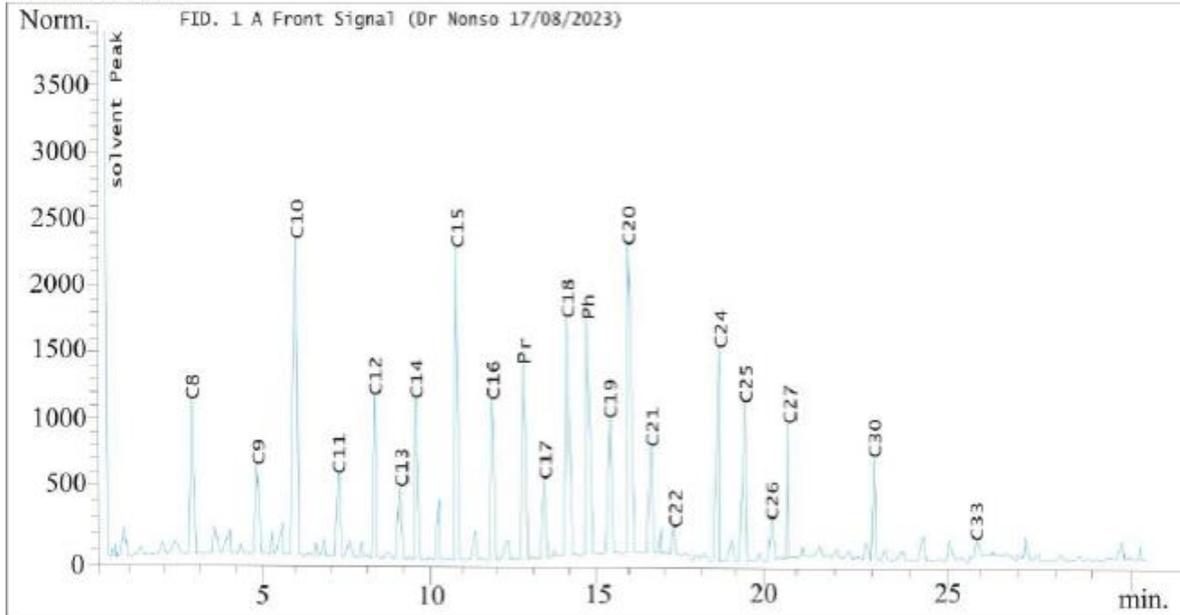
TPH Concentration after 6 weeks with 12ml E-Safe 5,342.35 ppm

Injection Date : 17/08/2023 10:42:17 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARAL565

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



TPH Concentration of test soil 21,701.67 ppm

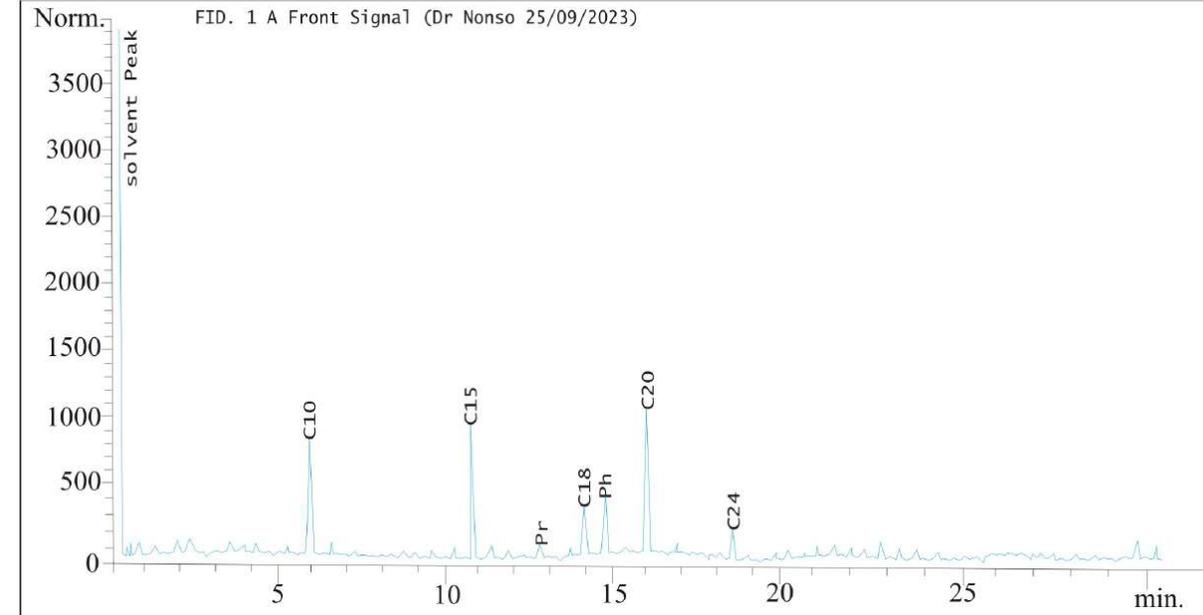
85.28 % TOTAL DEGRADATION ACHIEVED

Injection Date : 25/09/2023 10:19:53 AM
Sample Name : Sample 12
Acq. operator : ARAL565

Location : Vial 4
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



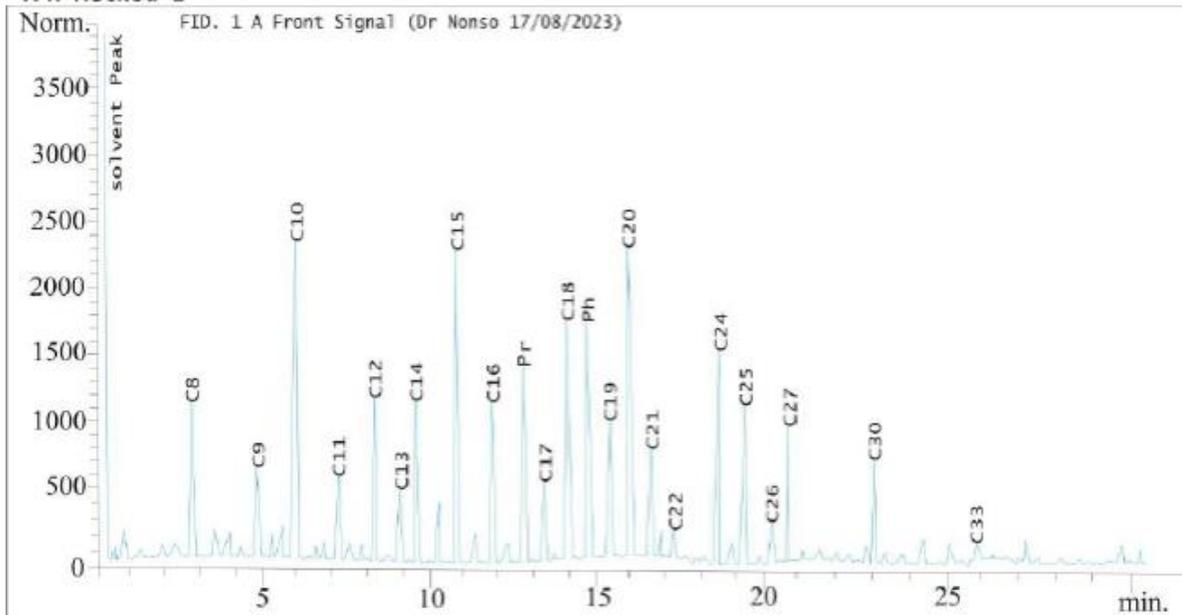
TPH Concentration after 8 weeks with 12ml E-Safe 3,195.10 ppm

Injection Date : 17/08/2023 10:42:17 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARAL565

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



TPH Concentration of test soil 21,701.67 ppm

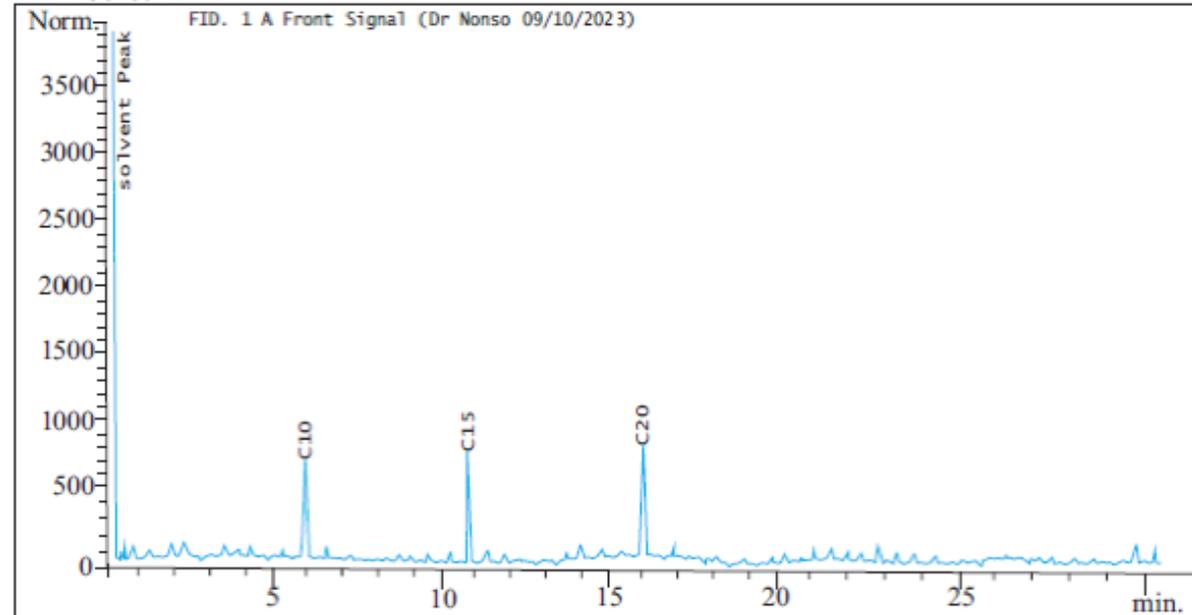
91.58 % TOTAL DEGRADATION ACHIEVED

Injection Date : 09/10/2023 02:37:16 PM
Sample Name : Sample 12
Acq. operator : ARAL565

Location : Vial 3
Inj : 1
Inj Volume : 1 µl

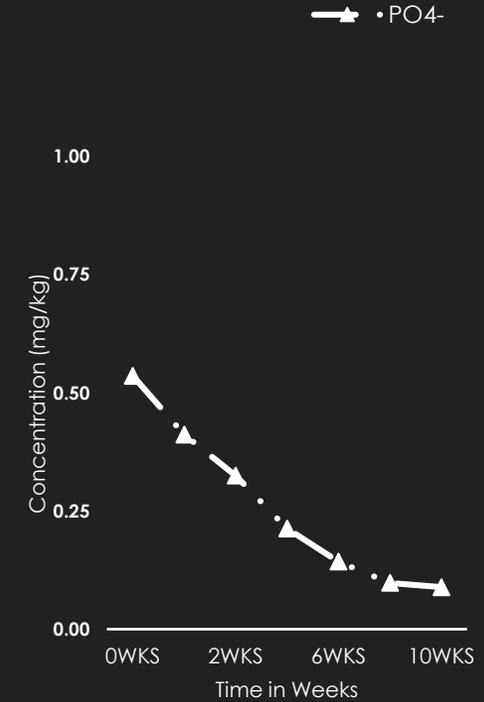
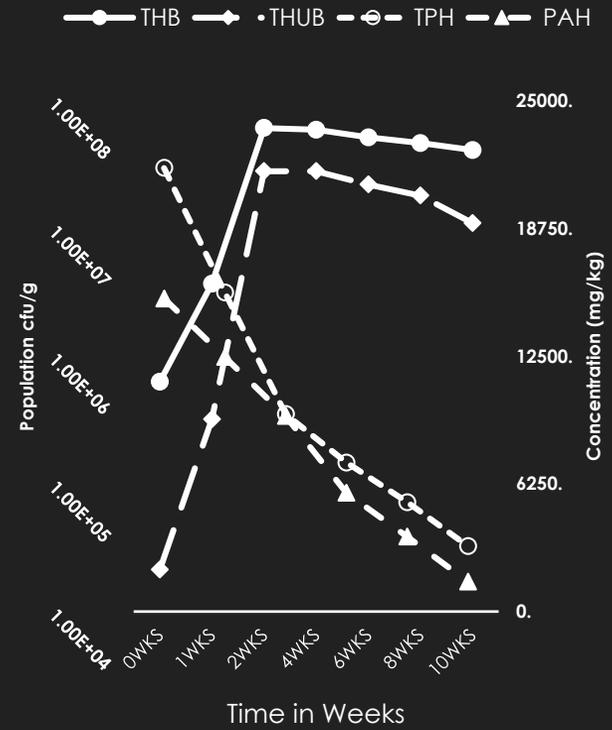
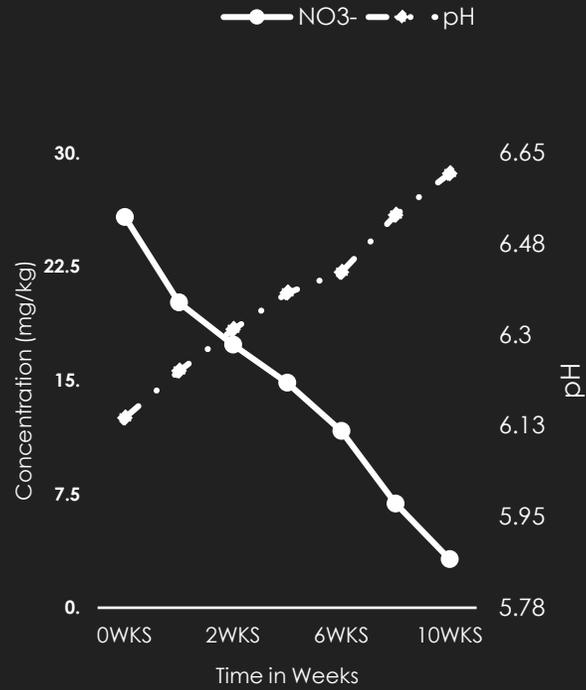
Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



TPH Concentration after 10 weeks with 12ml E-Safe 1827.59 ppm

PHYSICO-CHEMISTRY AND MICROBIOLOGY OF 12ml E_SAFE /4KG SOIL ENHANCED-BIODEGRADATION PROCESS



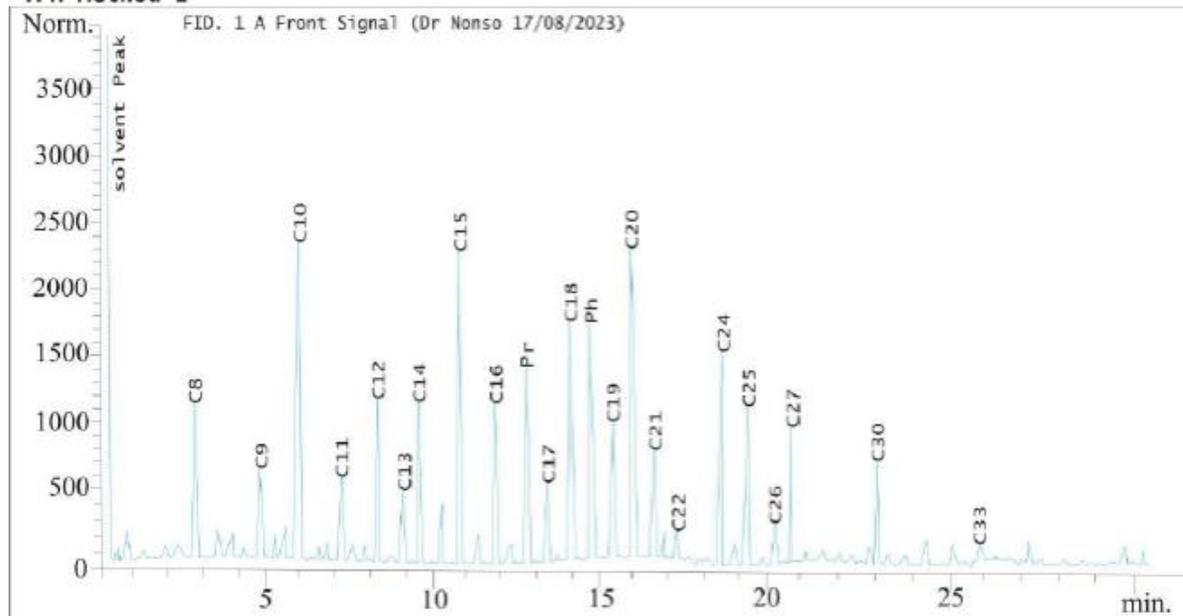
24ml E-SAFE IN 4KG OF CONTAMINATED SOIL TREATMENT

Injection Date : 17/08/2023 10:42:17 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARAL565

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



TPH Concentration of test soil 21,701.67 ppm

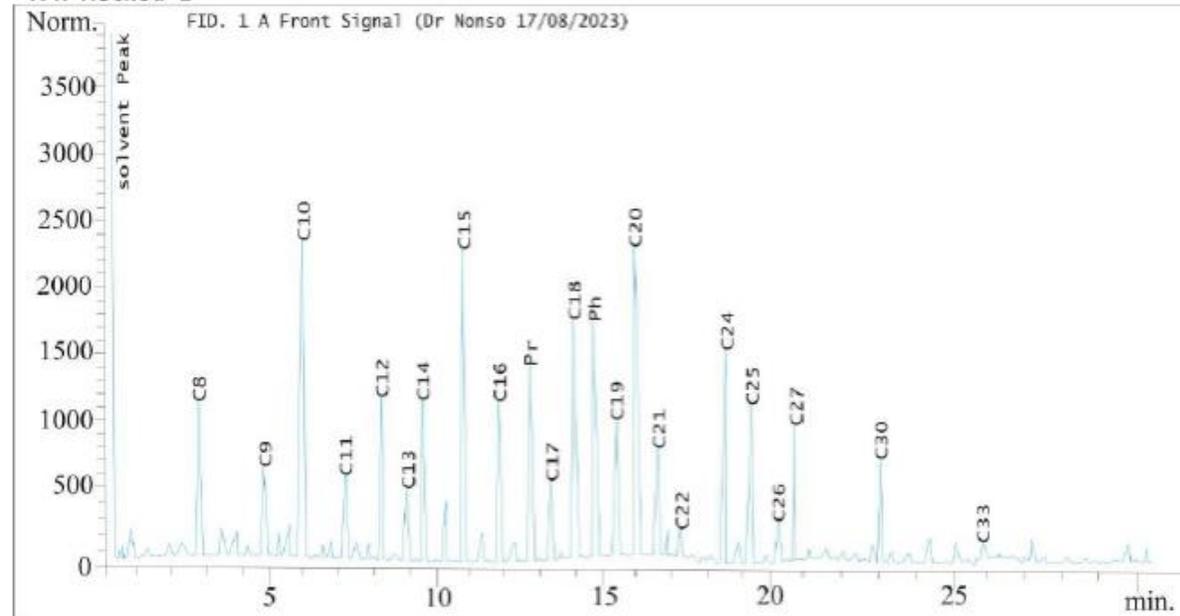
0.00 % TOTAL DEGRADATION ACHIEVED

Injection Date : 17/08/2023 10:42:17 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARAL565

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



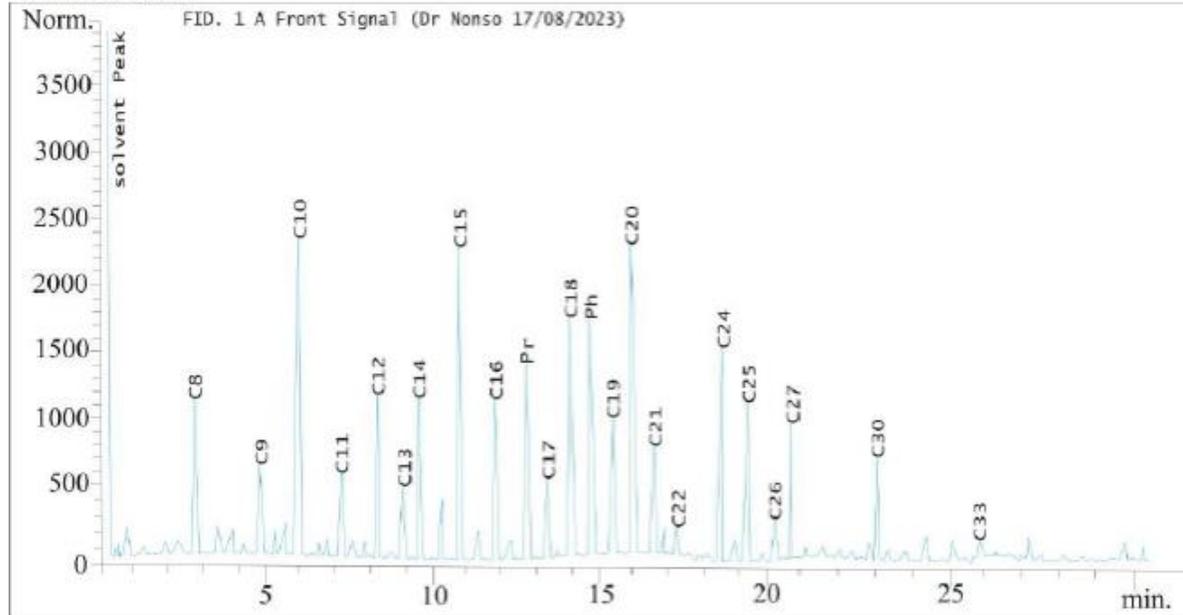
TPH Concentration after 0 week with 24ml E-Safe 21,701.67 ppm

Injection Date : 17/08/2023 10:42:17 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARAL565

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



TPH Concentration of test soil 21,701.67 ppm

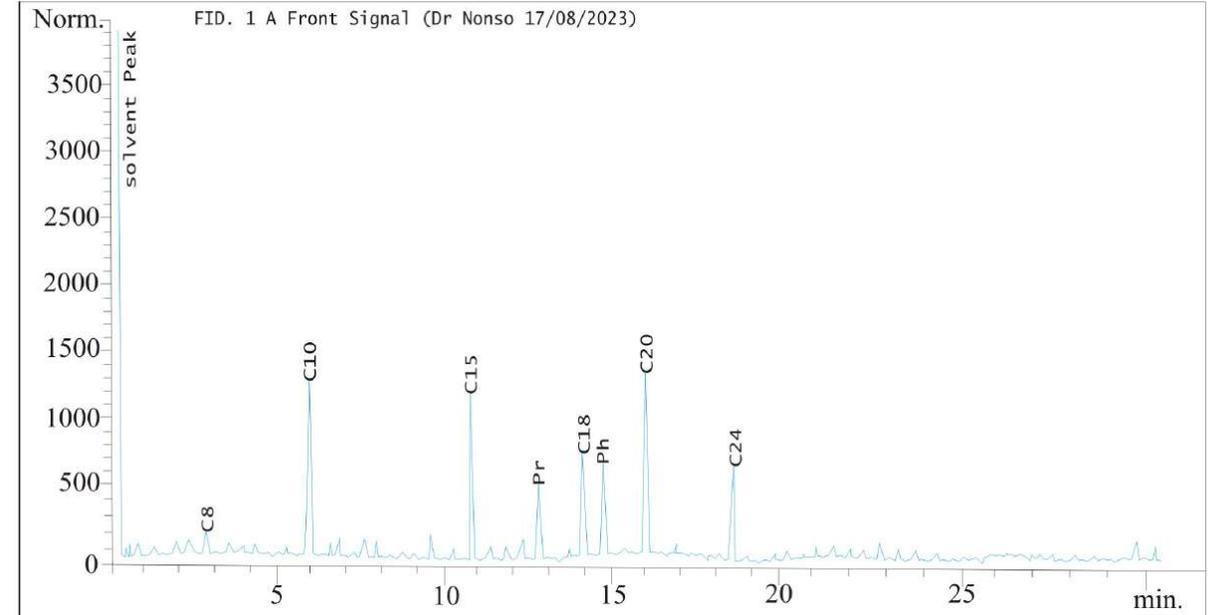
75.63 % TOTAL DEGRADATION ACHIEVED

Injection Date : 17/08/2023 12:02:19 PM
Sample Name : Sample 24
Acq. operator : ARAL565

Location : Vial 5
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



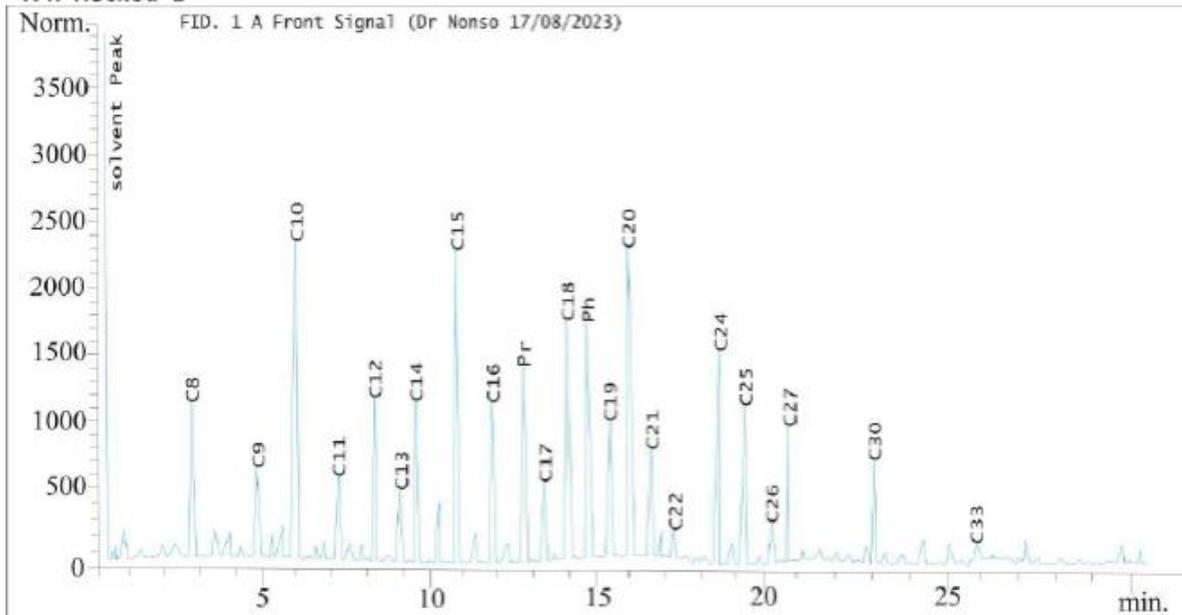
TPH Concentration after 4 weeks with 24ml E-Safe 5,287.88 ppm

Injection Date : 17/08/2023 10:42:17 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARAL565

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



TPH Concentration of test soil 21,701.67 ppm

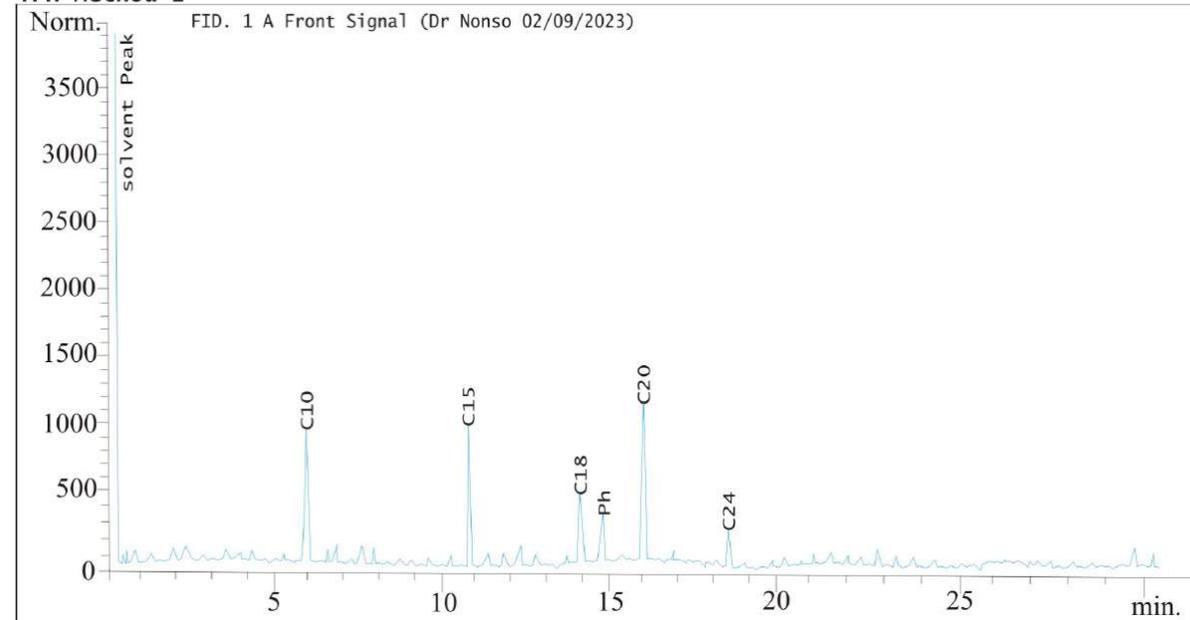
84.99 % TOTAL DEGRADATION ACHIEVED

Injection Date : 02/09/2023 03:12:43 PM
Sample Name : Sample 24
Acq. operator : ARAL565

Location : Vial 5
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



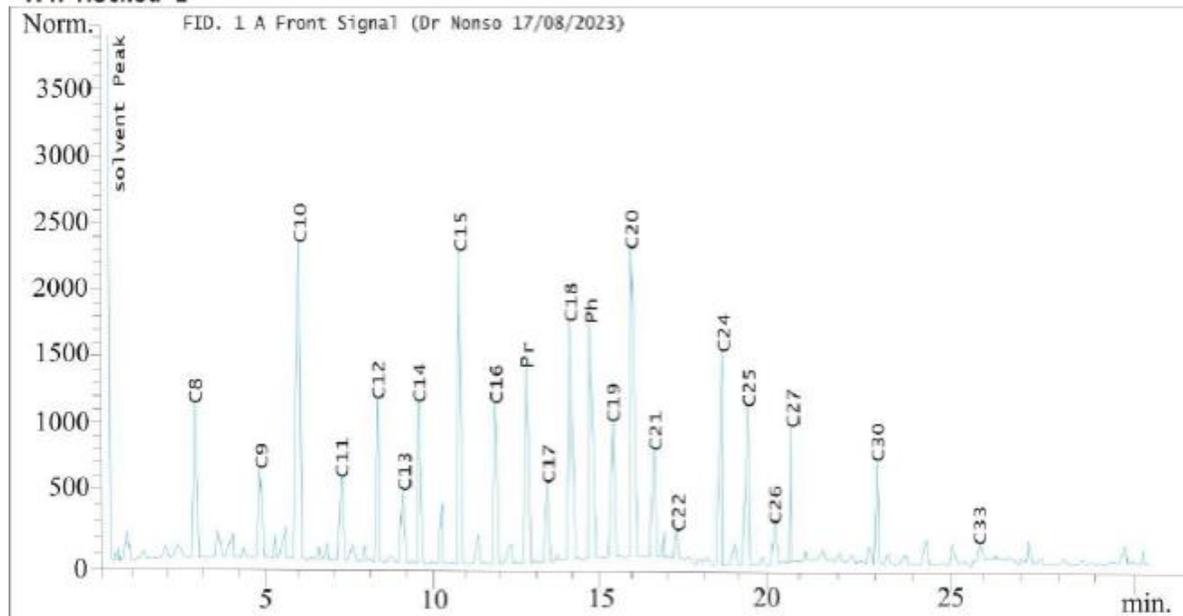
TPH Concentration after 6 weeks with 24ml E-Safe 3258.18 ppm

Injection Date : 17/08/2023 10:42:17 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARAL565

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



TPH Concentration of test soil 21,701.67 ppm

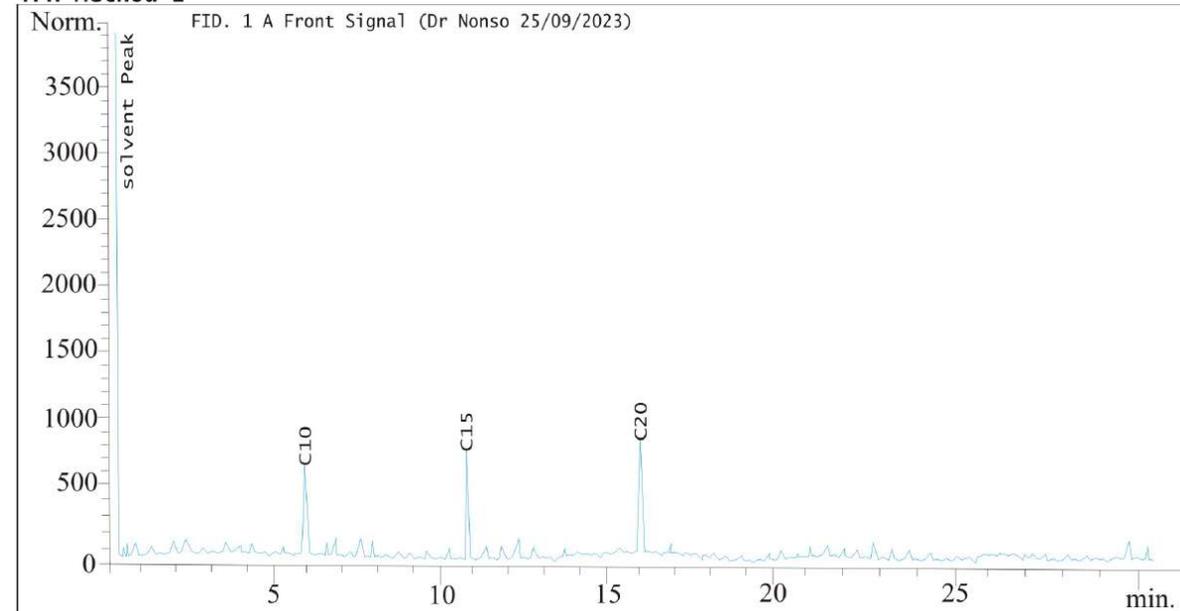
91.73 % TOTAL DEGRADATION ACHIEVED

Injection Date : 25/09/2023 10:54:18 AM
Sample Name : Sample 24
Acq. operator : ARAL565

Location : Vial 5
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



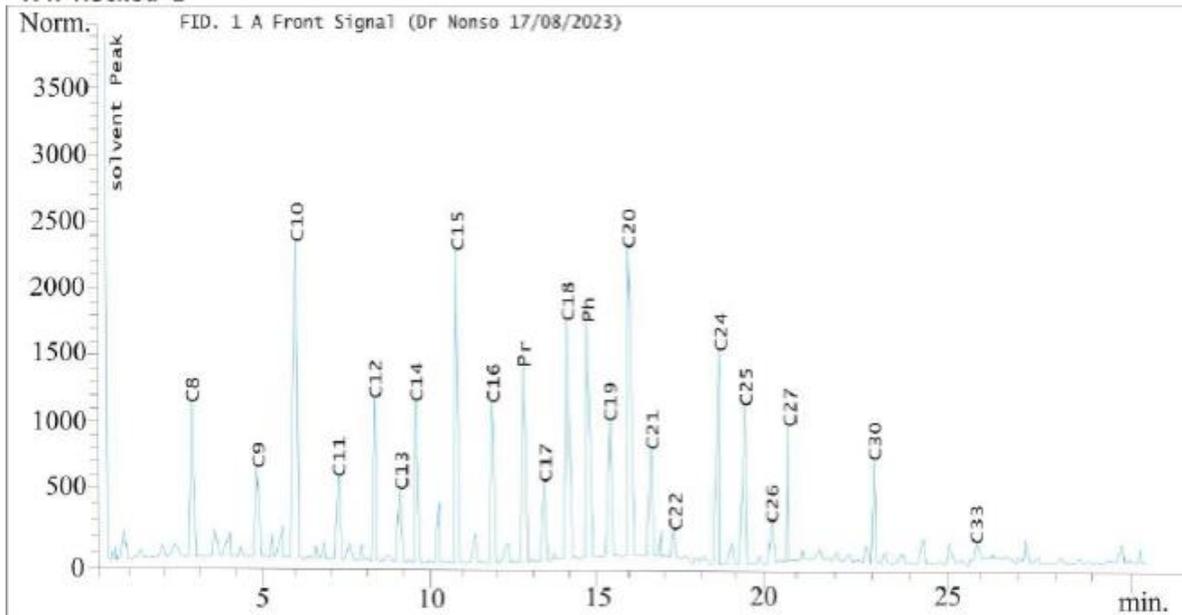
TPH Concentration after 8 weeks with 24ml E-Safe 1088.79 ppm

Injection Date : 17/08/2023 10:42:17 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARAL565

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2

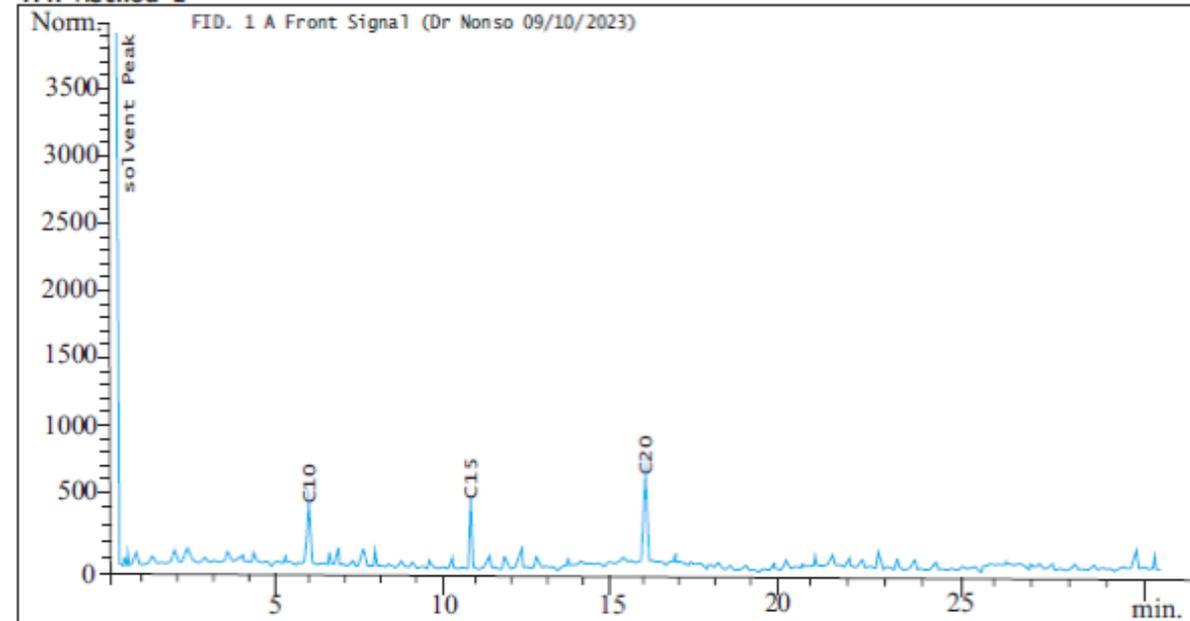


Injection Date : 09/10/2023 03:12:43 PM
Sample Name : Sample 24
Acq. operator : ARAL565

Location : Vial 4
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2

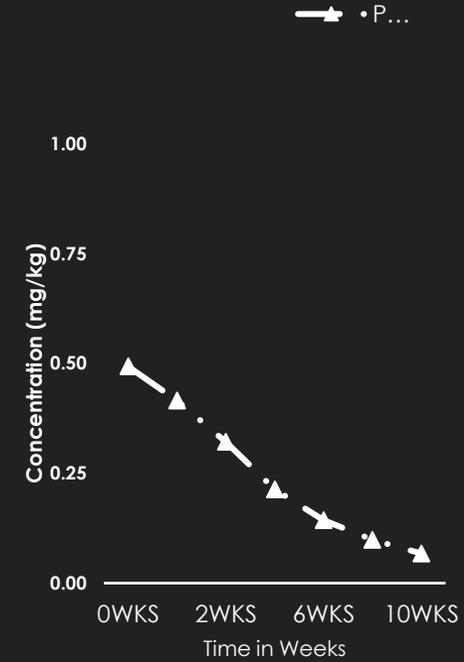
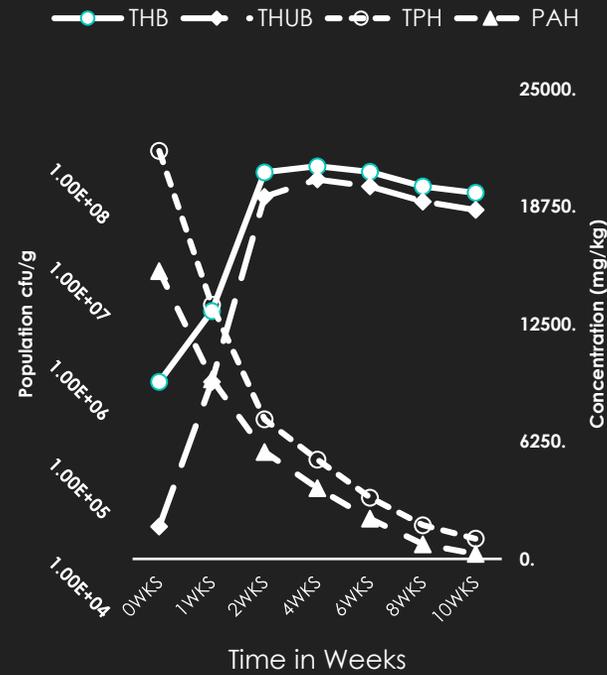
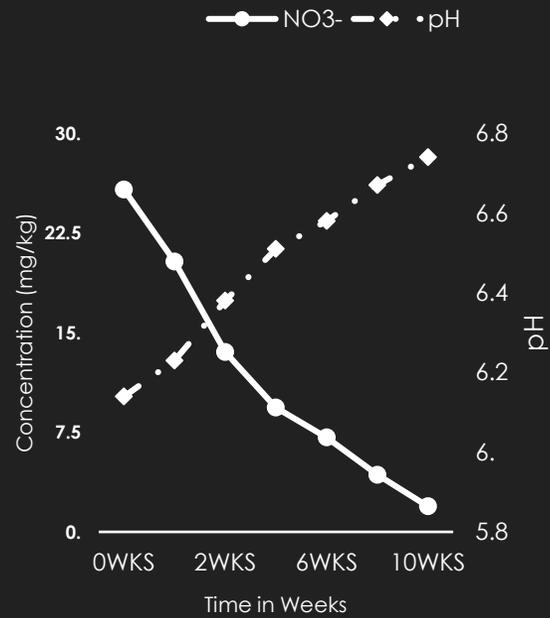


TPH Concentration of test soil 21,701.67 ppm

TPH Concentration after 10 weeks with 24ml E-Safe 1078.79 ppm

95.03 % TOTAL DEGRADATION ACHIEVED

PHYSICO-CHEMISTRY AND MICROBIOLOGY OF 24ml E_SAFE /4KG SOIL ENHANCED-BIODEGRADATION PROCESS



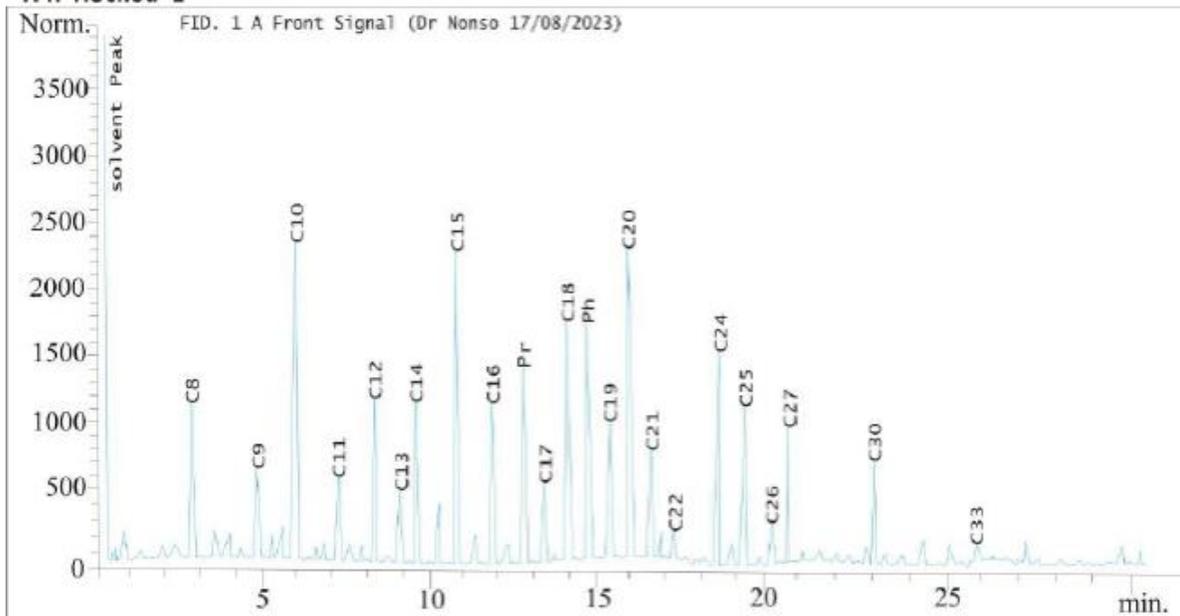
48ml E-SAFE IN 4KG OF CONTAMINATED SOIL TREATMENT

Injection Date : 17/08/2023 10:42:17 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARAL565

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



TPH Concentration of test soil 21,701.67 ppm

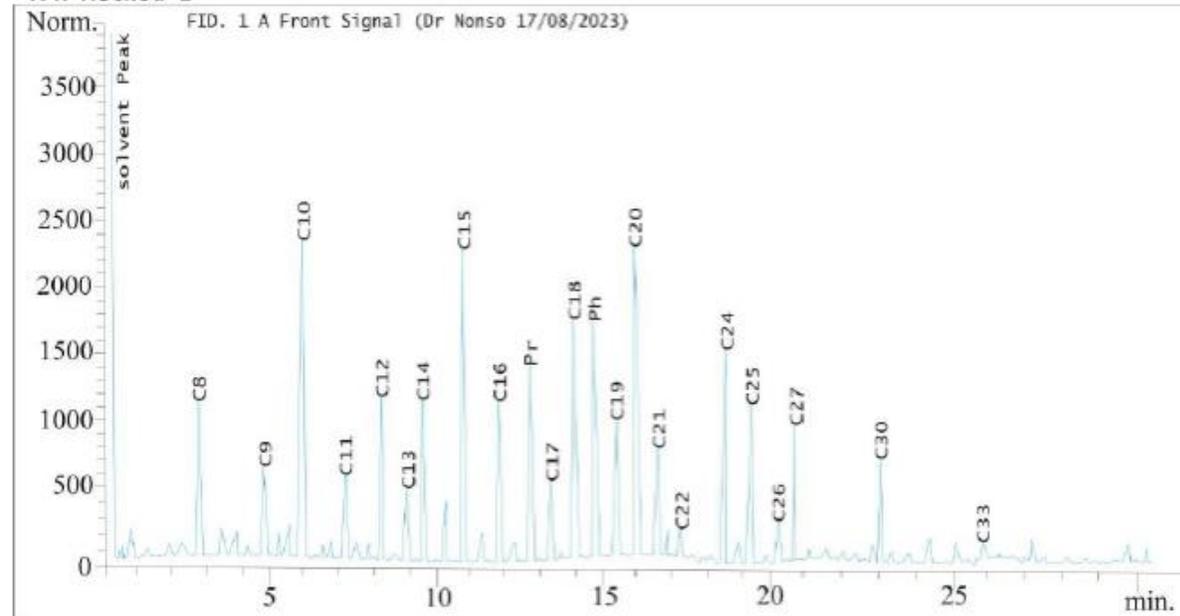
0.00 % TOTAL DEGRADATION ACHIEVED

Injection Date : 17/08/2023 10:42:17 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARAL565

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



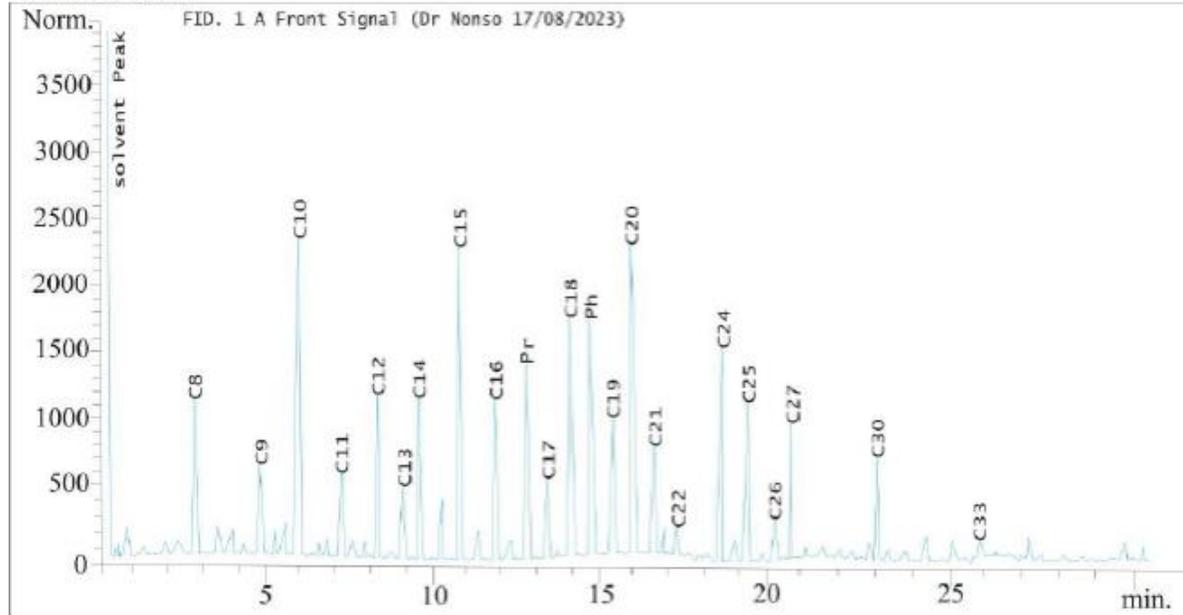
TPH Concentration after 0 week with 48ml E-Safe 21,701.67 ppm

Injection Date : 17/08/2023 10:42:17 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARAL565

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2

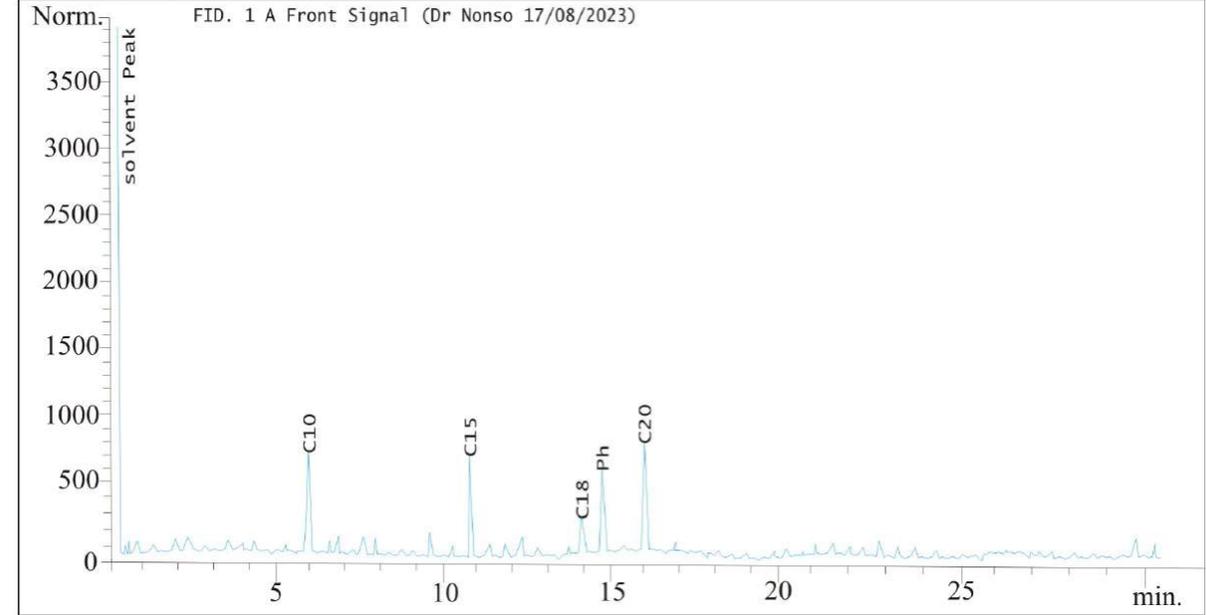


Injection Date : 17/08/2023 12:37:11 PM
Sample Name : Sample 48
Acq. operator : ARAL565

Location : Vial 6
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



TPH Concentration of test soil 21,701.67 ppm

88.41 % TOTAL DEGRADATION ACHIEVED

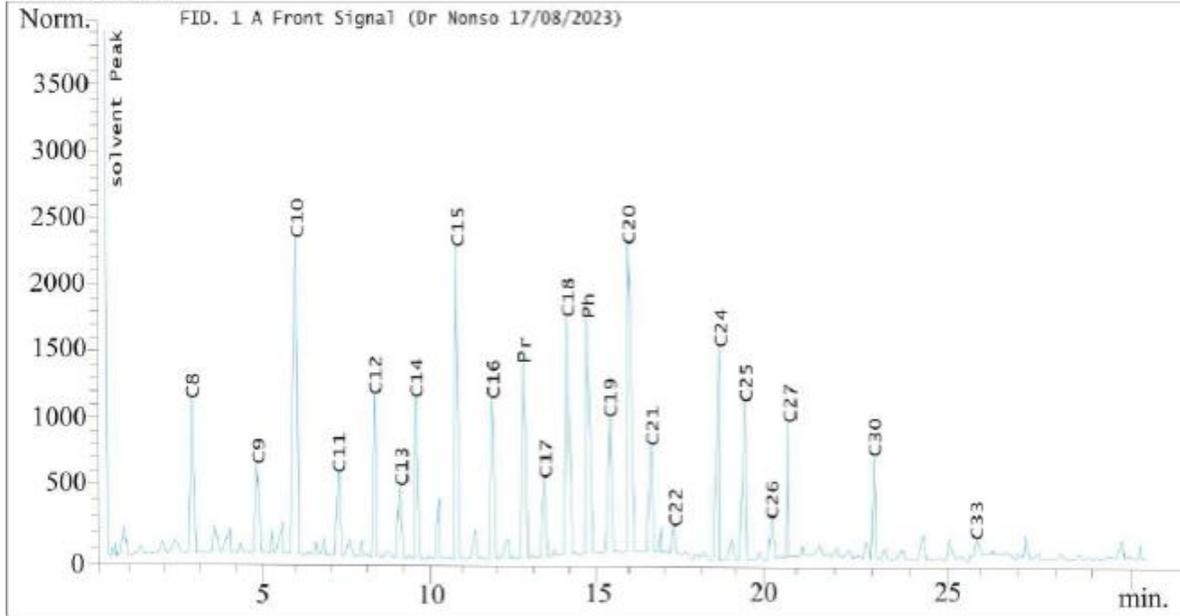
TPH Concentration after 4 weeks with 48ml E-Safe 2,515.18 ppm

Injection Date : 17/08/2023 10:42:17 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARAL565

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2

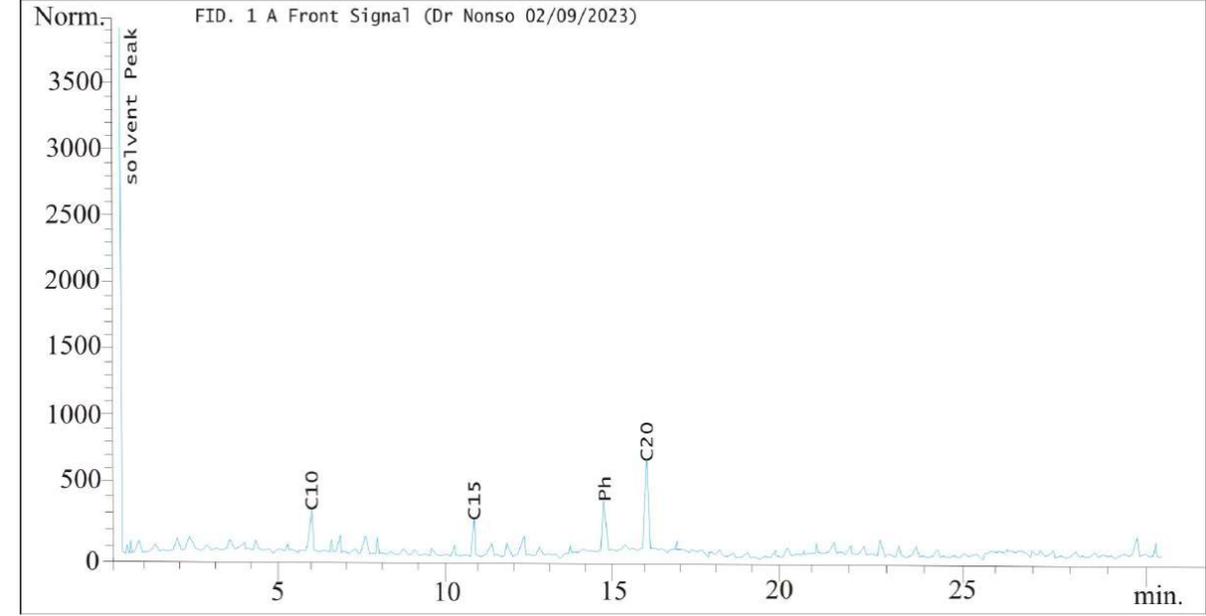


Injection Date : 02/09/2023 03:47:30 PM
Sample Name : Sample 48
Acq. operator : ARAL565

Location : Vial 6
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



TPH Concentration of test soil 21,701.67 ppm

94.98 % TOTAL DEGRADATION ACHIEVED

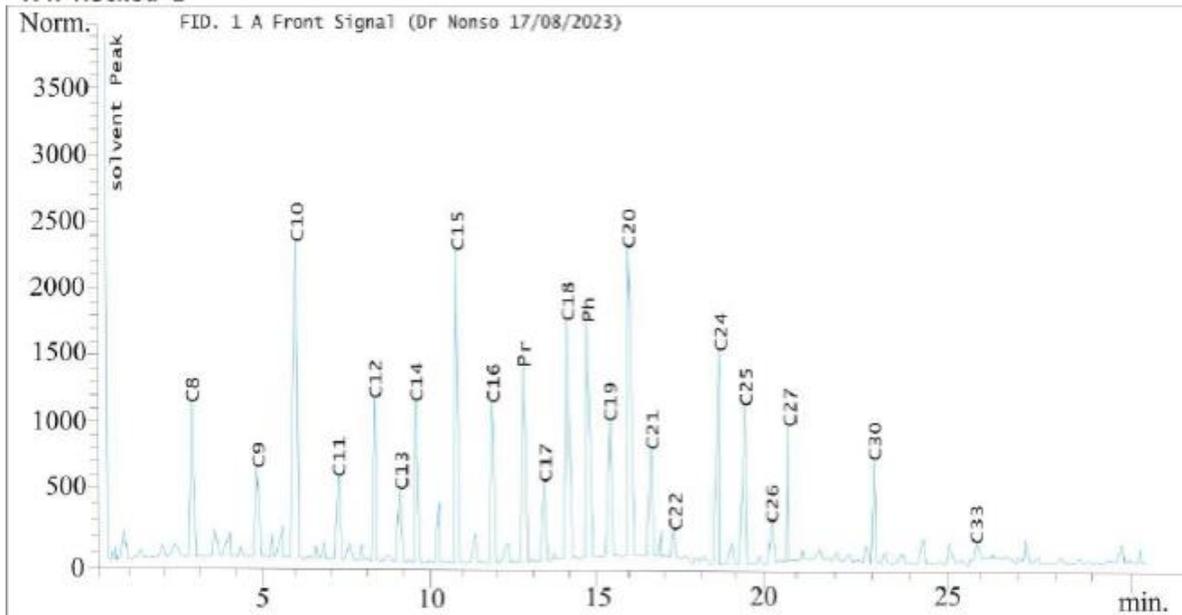
TPH Concentration after 6 weeks with 48ml E-Safe 1088.79 ppm

Injection Date : 17/08/2023 10:42:17 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARAL565

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2

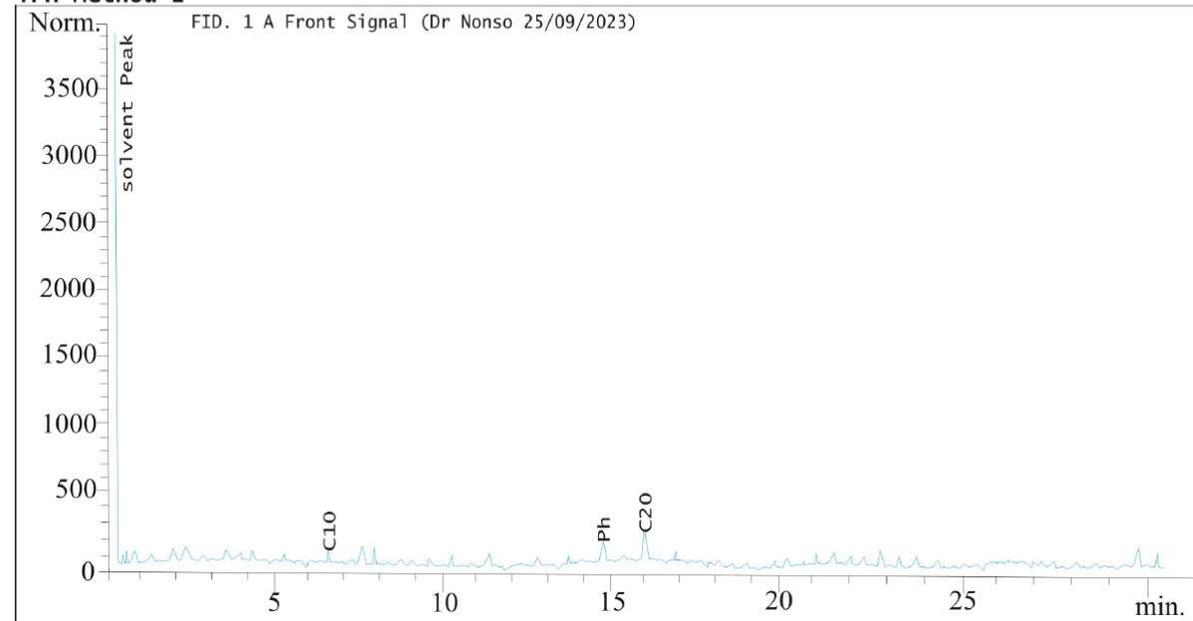


Injection Date : 25/09/2023 11:29:46 AM
Sample Name : Sample 48
Acq. operator : ARAL565

Location : Vial 6
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



TPH Concentration of test soil 21,701.67 ppm

98.79 % TOTAL DEGRADATION ACHIEVED

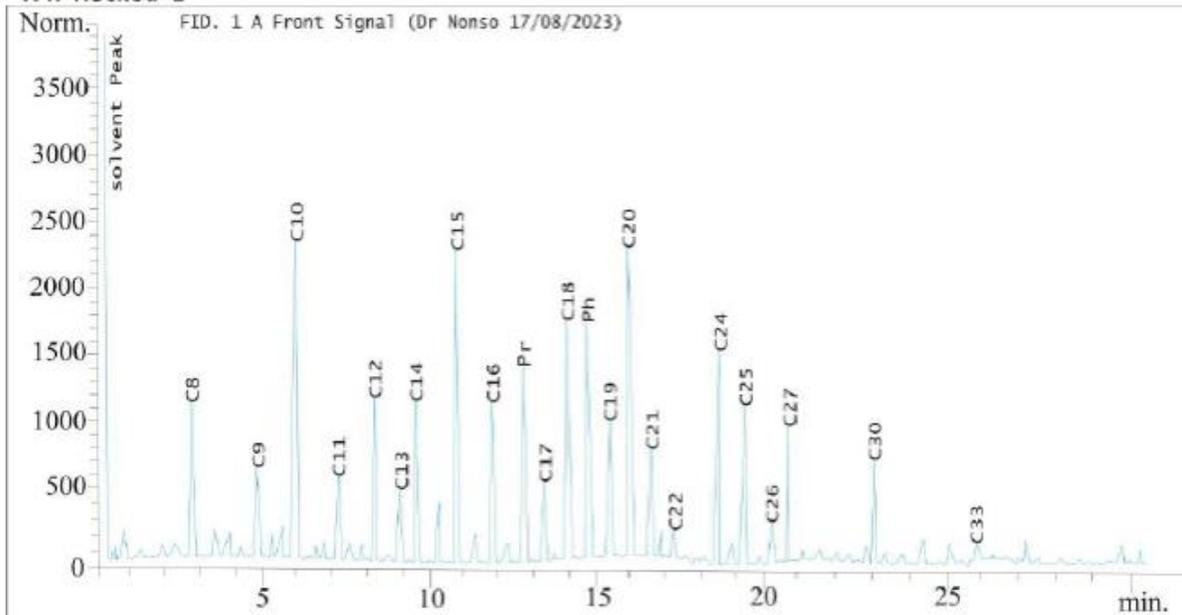
TPH Concentration after 8 weeks with 48ml E-Safe 265.10 ppm

Injection Date : 17/08/2023 10:42:17 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARAL565

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

TPH Method 2



TPH Concentration of test soil 21,701.67 ppm

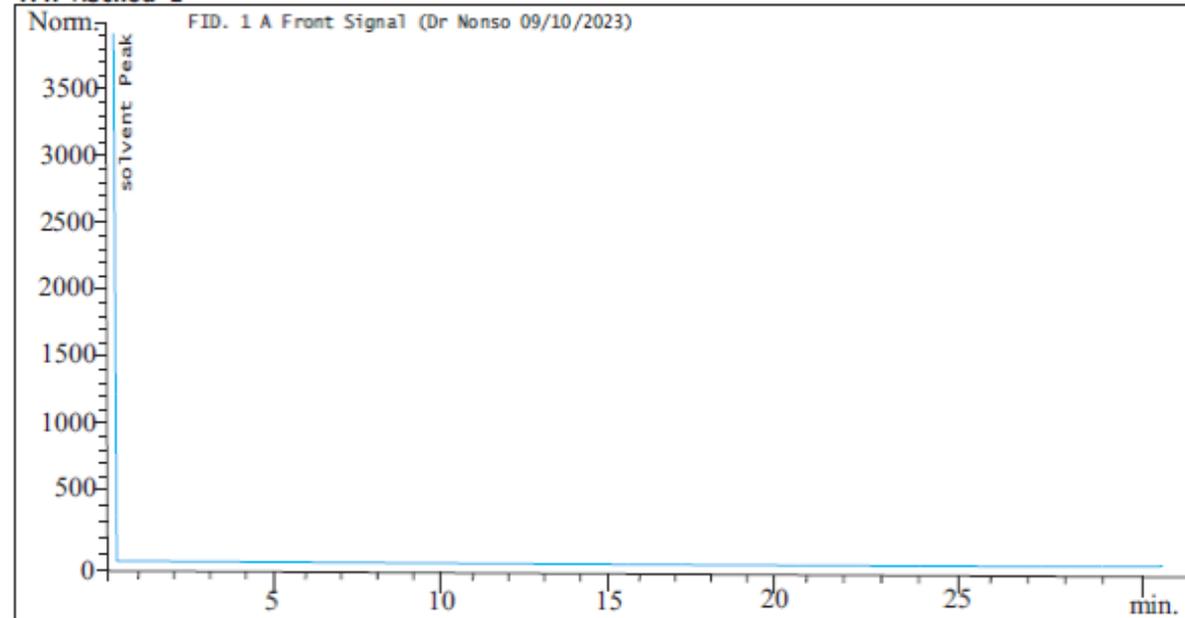
100.00 % TOTAL DEGRADATION ACHIEVED

Injection Date : 09/10/2023 03:47:30 PM
Sample Name : Sample 48
Acq. operator : ARAL565

Location : Vial 5
Inj : 1
Inj Volume : 1 µl

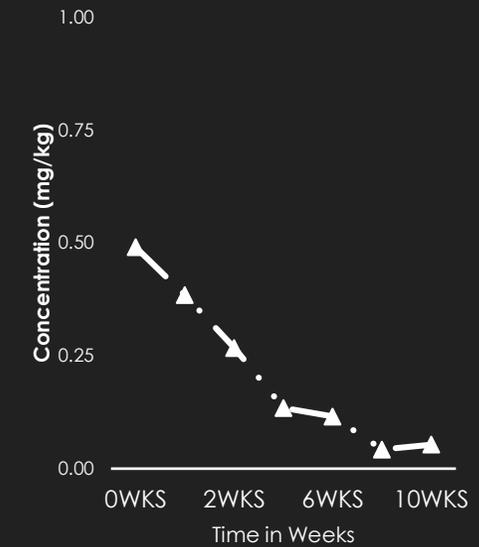
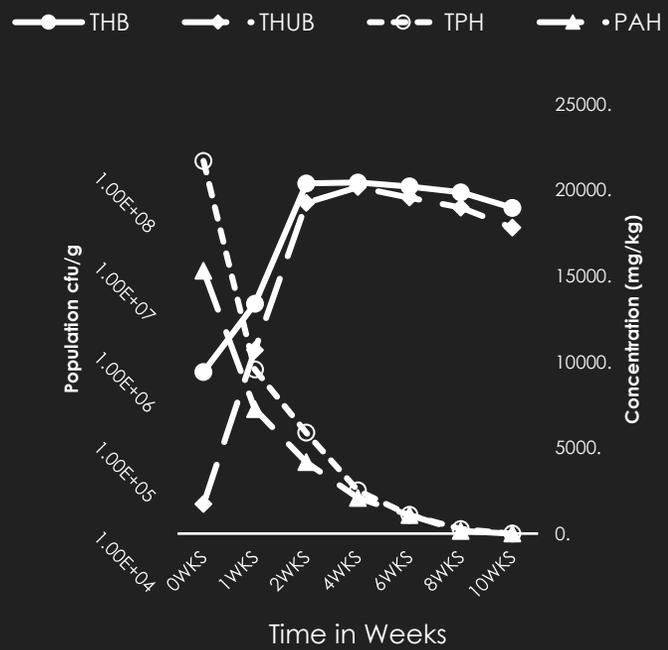
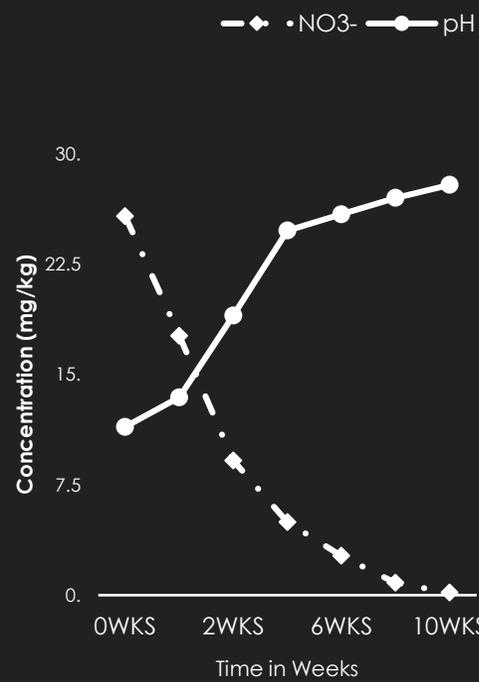
Method : C:/HPCHEM/1/METHODS/TPH-2.M
Last Changed : 17/04/2023 09:51:36 AM by ARAL565

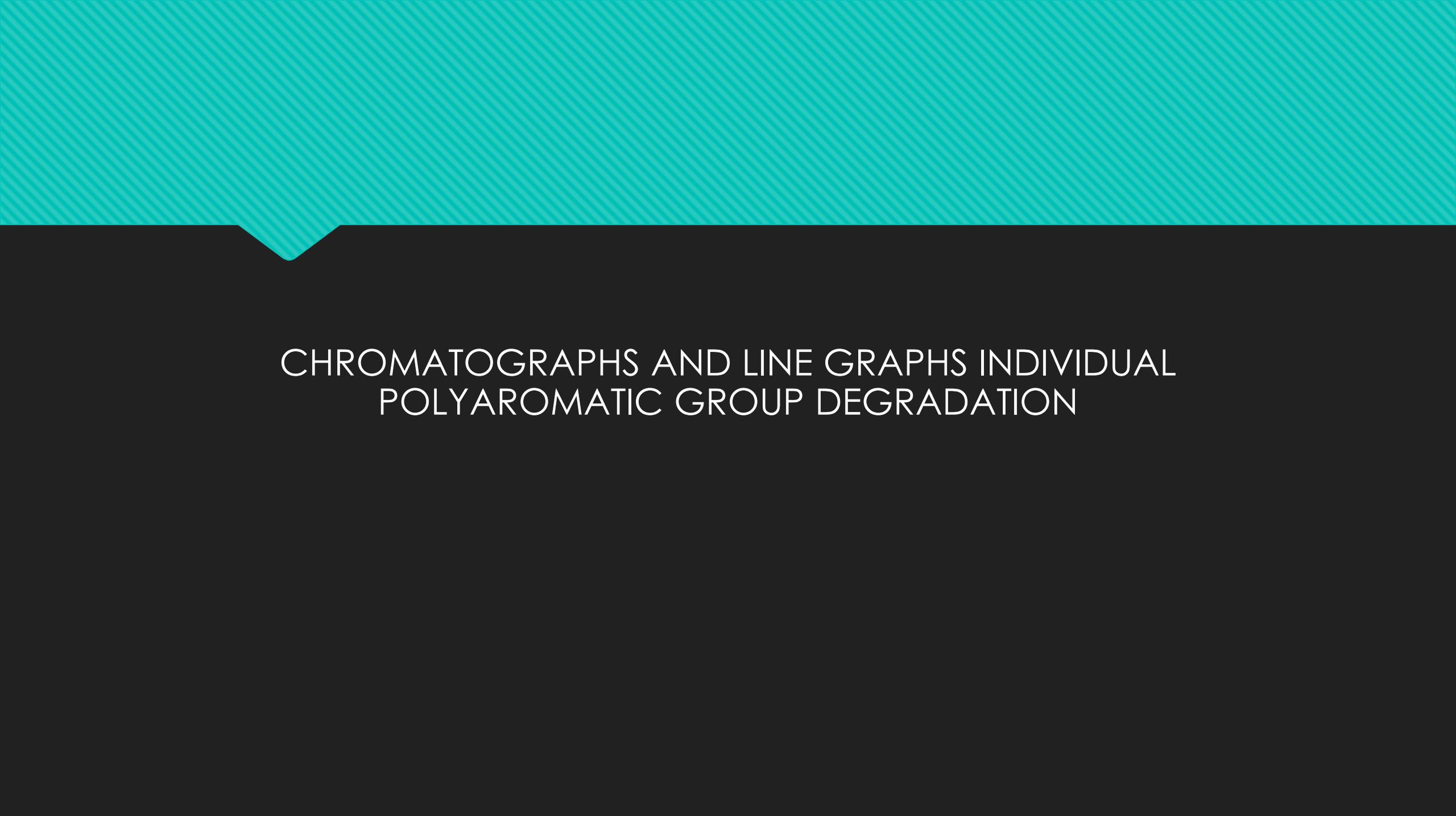
TPH Method 2



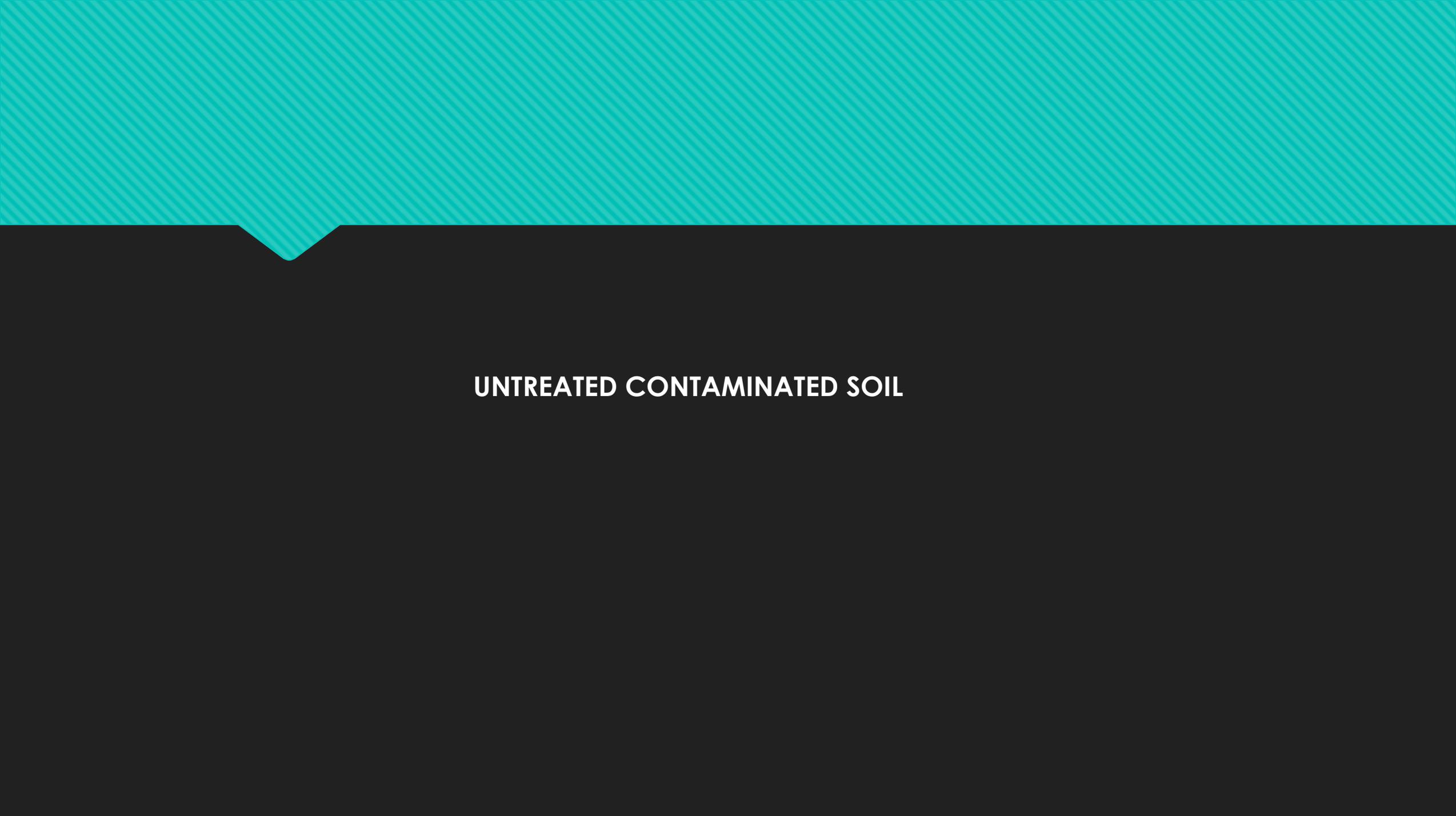
TPH Concentration after 10 weeks with 48ml E-Safe 0.00.00 ppm

PHYSICO-CHEMISTRY AND MICROBIOLOGY OF 48ml E_SAFE /4KG SOIL ENHANCED-BIODEGRADATION PROCESS



The background consists of a teal upper section with a diagonal line pattern and a solid black lower section. A white notch is cut out from the top edge of the black section.

CHROMATOGRAPHS AND LINE GRAPHS INDIVIDUAL POLYAROMATIC GROUP DEGRADATION



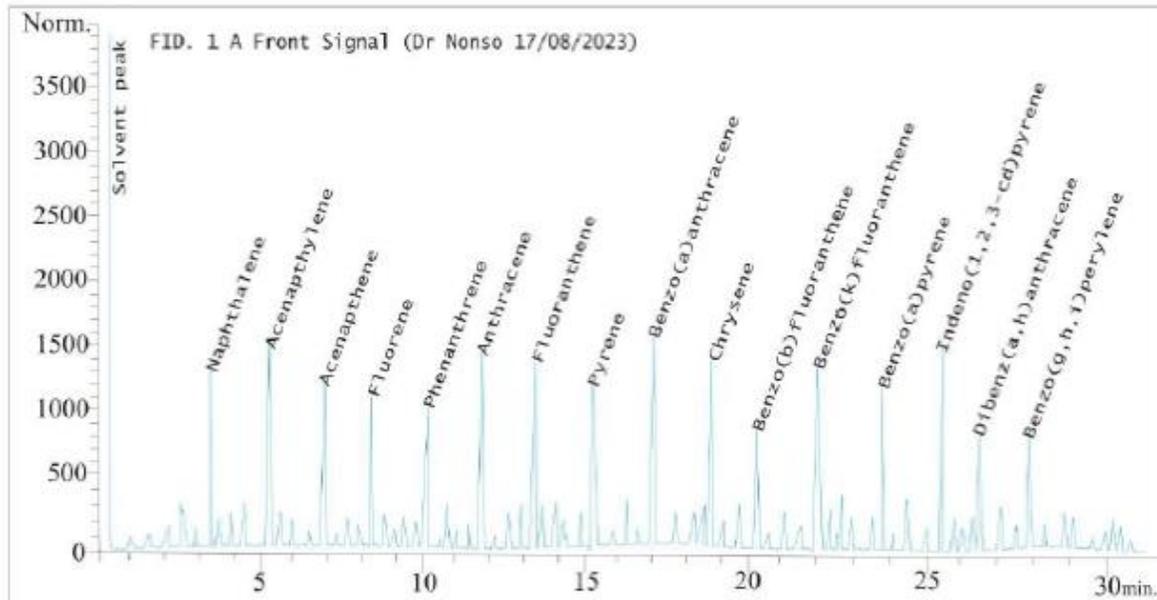
UNTREATED CONTAMINATED SOIL

Injection Date : 17/08/2023 09:10:33 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARALS75

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



PAH Concentration of test soil 15,308 ppm

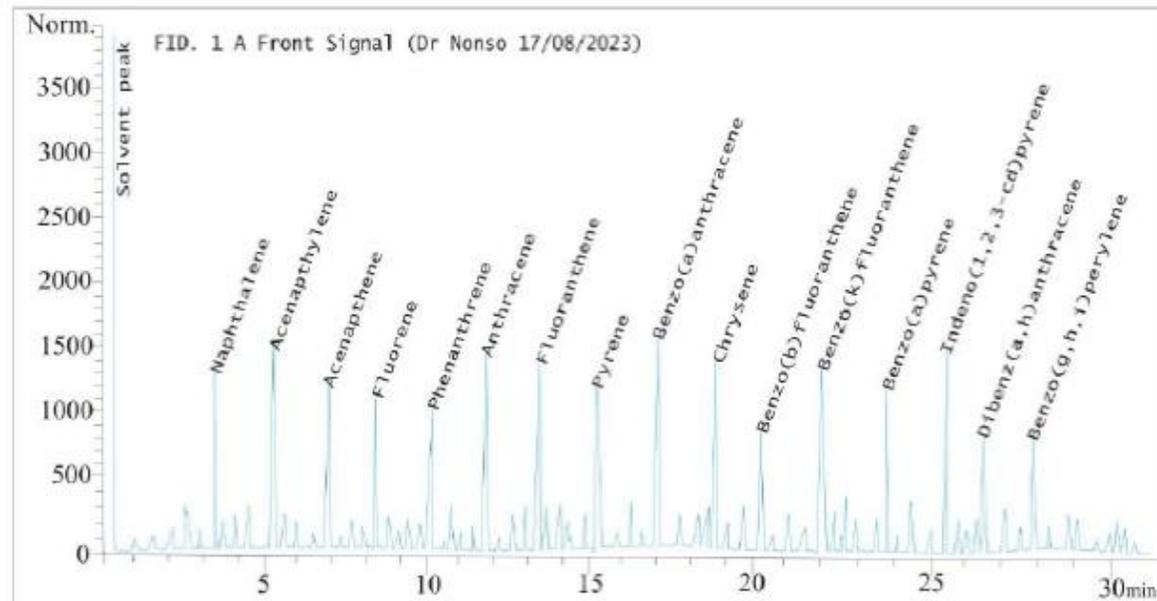
0.00 % TOTAL DEGRADATION ACHIEVED

Injection Date : 17/08/2023 09:10:33 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARALS75

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



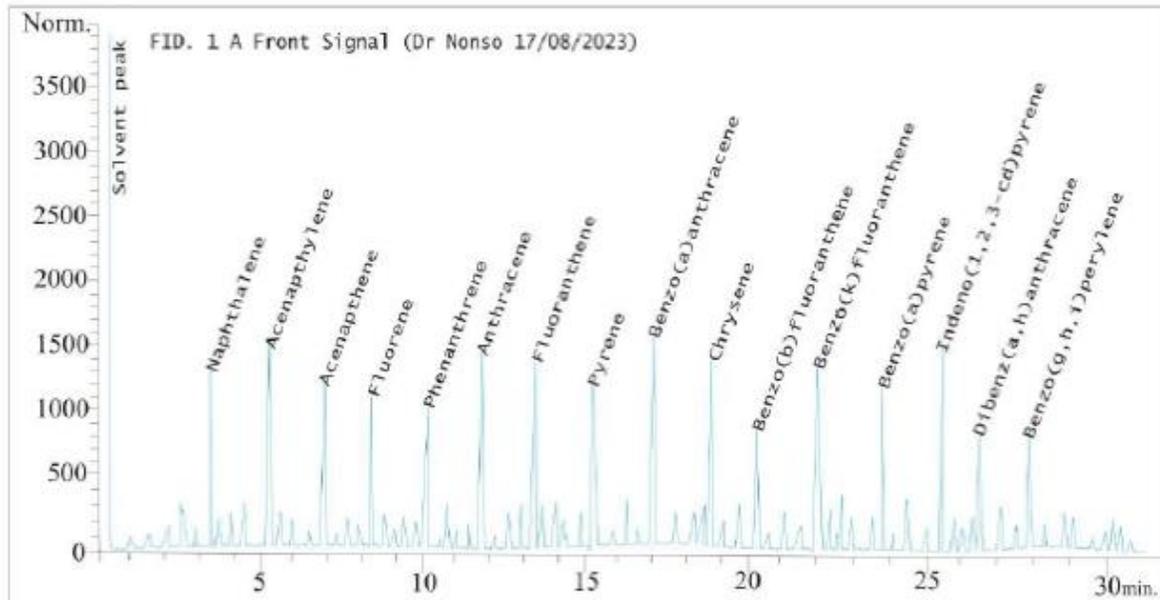
PAH Concentration after 0 weeks with 0ml E-Safe 15308 ppm

Injection Date : 17/08/2023 09:10:33 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARALS75

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



PAH Concentration of test soil 15,308 ppm

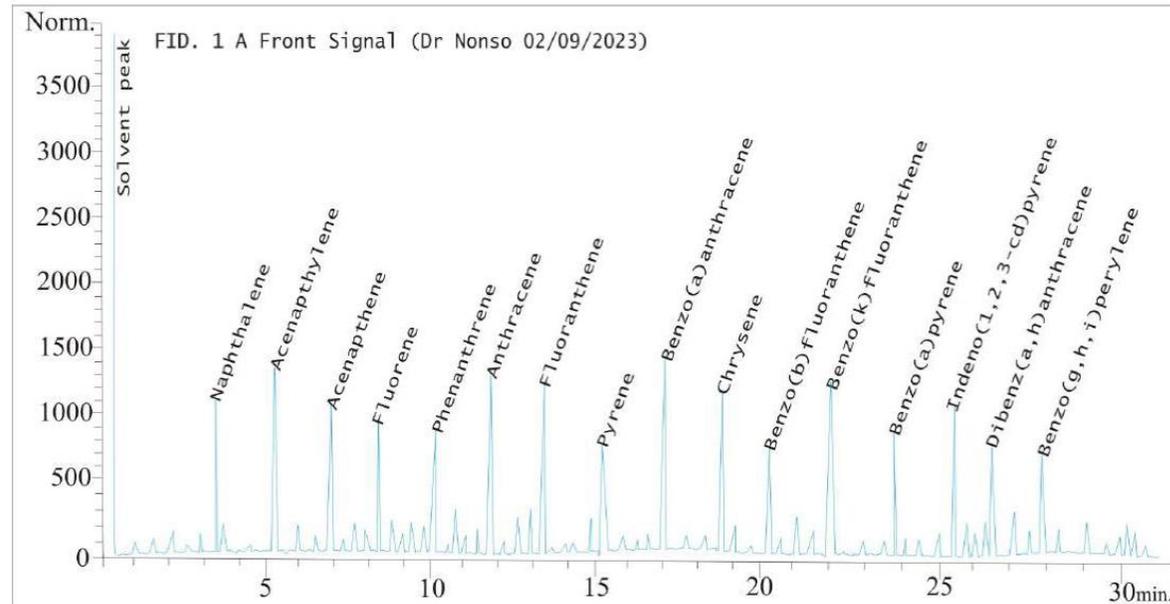
7.88 % TOTAL DEGRADATION ACHIEVED

Injection Date : 02/09/2023 10:46:51 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARALS75

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



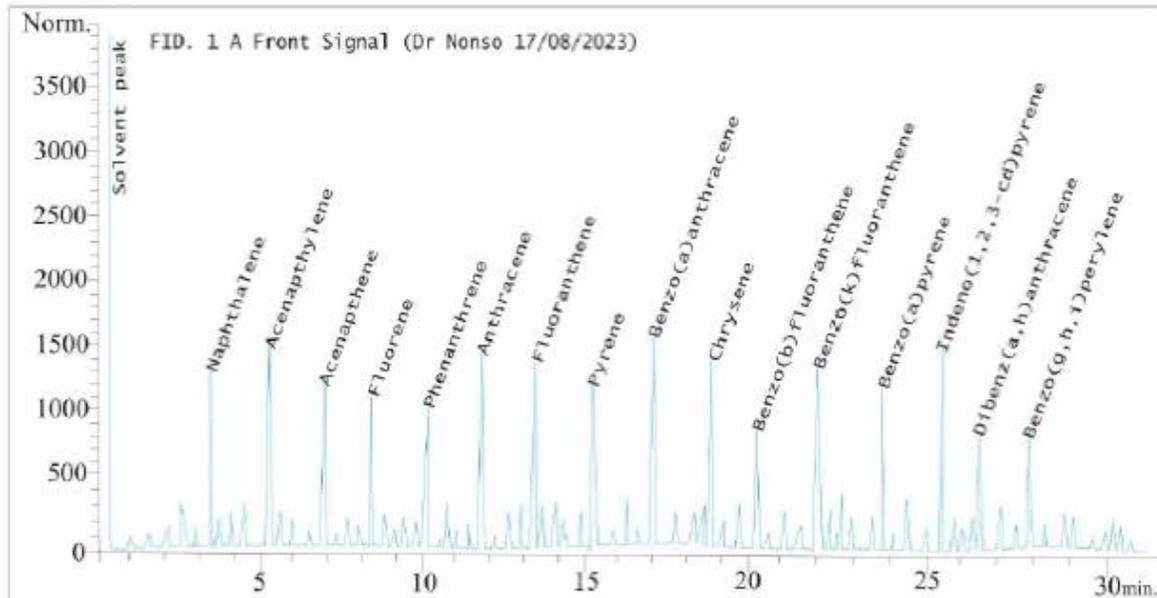
PAH Concentration after 6 weeks with 0ml E-Safe 14,102.77 ppm

Injection Date : 17/08/2023 09:10:33 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARALS75

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



PAH Concentration of test soil 15,308 ppm

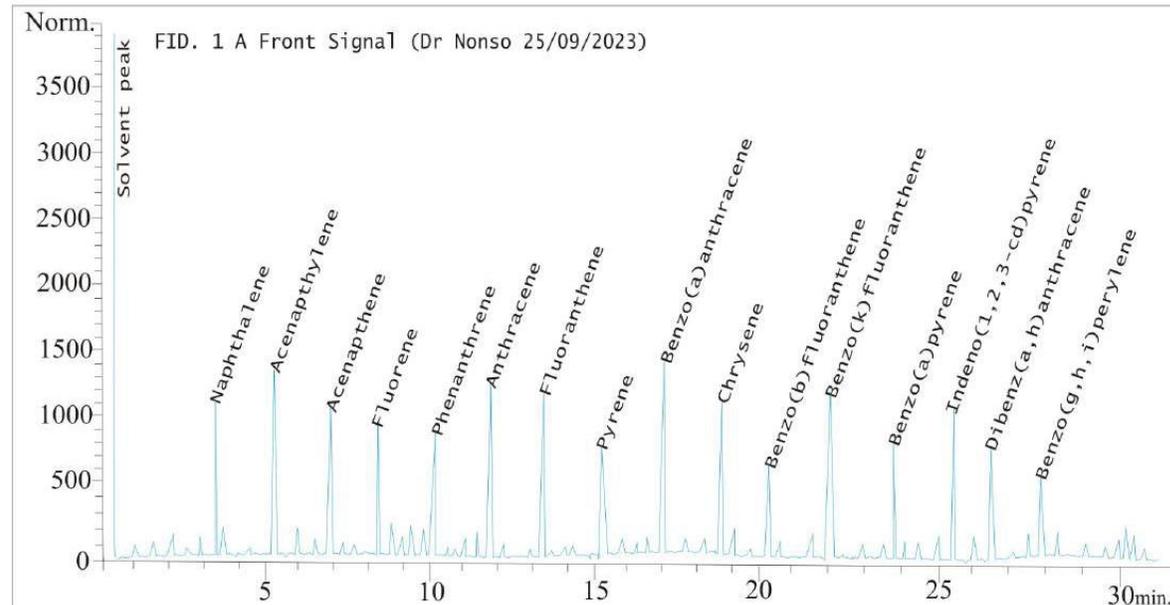
10.57 % TOTAL DEGRADATION ACHIEVED

Injection Date : 25/09/2023 12:48:36 PM
Sample Name : Sandy+Clay soil
Acq. operator : ARALS75

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



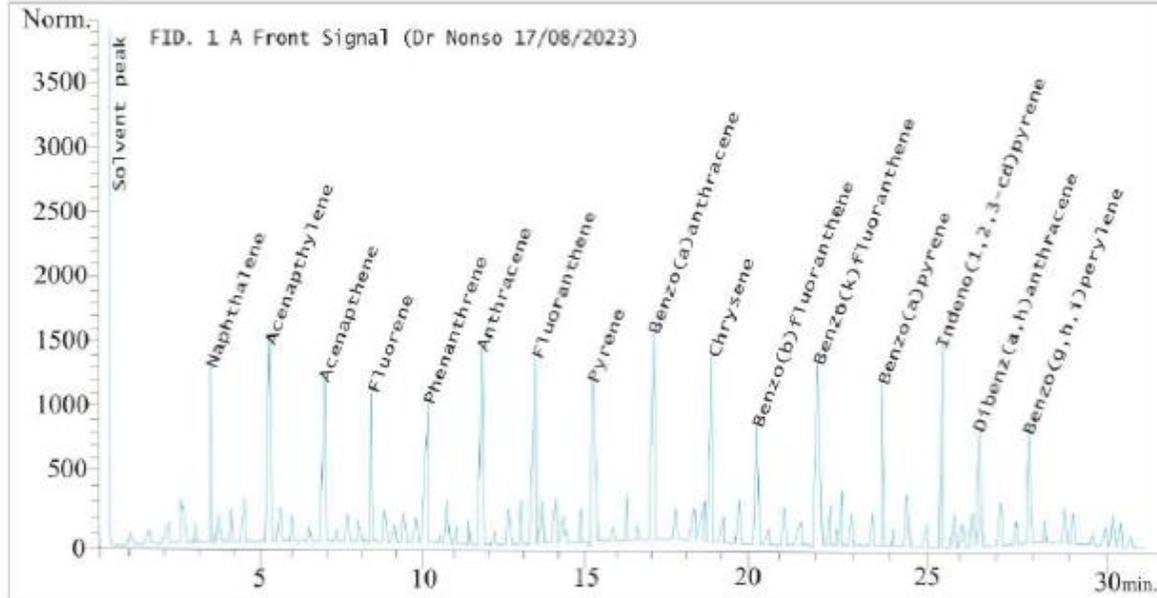
PAH Concentration after 8 weeks with 0ml E-Safe 13690.09 ppm

Injection Date : 17/08/2023 09:10:33 AM
 Sample Name : Sandy+Clay soil
 Acq. operator : ARALS75

Method : C:/HPCHEM/1/METHODS/PAH-2.M
 Last Changed : 23/04/2023 08:36:51 AM by ARALS75

Location : Vial 1
 Inj : 1
 Inj Volume : 1 µl

PAH Method 2



PAH Concentration of test soil 15,308 ppm

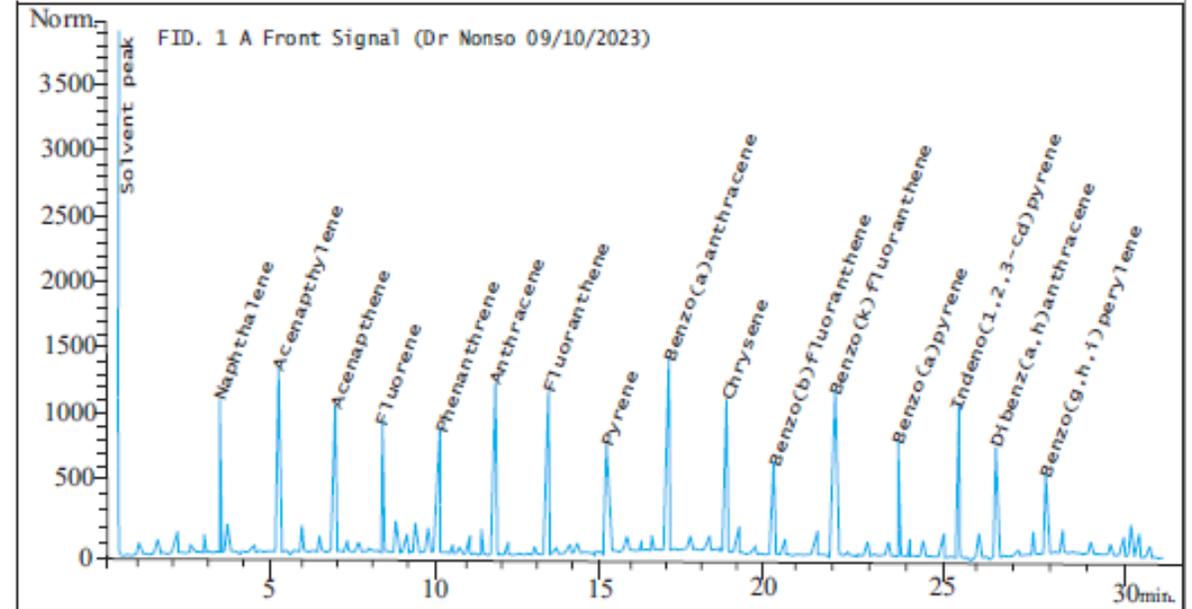
14.37 % TOTAL DEGRADATION ACHIEVED

Injection Date : 09/10/2023 01:41:52 PM
 Sample Name : Sandy+Clay soil
 Acq. operator : ARALS75

Method : C:/HPCHEM/1/METHODS/PAH-2.M
 Last Changed : 23/04/2023 08:36:51 AM by ARALS75

Location : Vial 6
 Inj : 1
 Inj Volume : 1 µl

PAH Method 2



PAH Concentration after 10 weeks with 0ml E-Safe 13108.70 ppm

The image features a teal-colored top section with a fine, diagonal hatched pattern. Below this is a solid black section. A jagged, white-outlined horizontal line separates the two sections, with a small downward-pointing triangle on the left side. Centered in the black section is the text "CONTROL CONTAMINATED SOIL" in white, uppercase, sans-serif font.

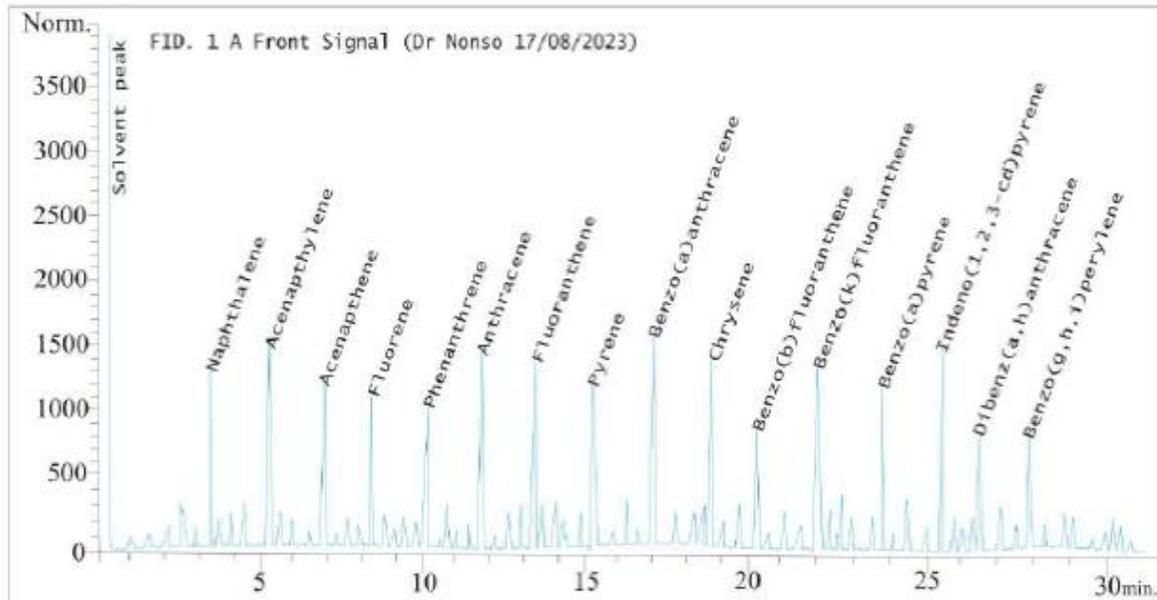
CONTROL CONTAMINATED SOIL

Injection Date : 17/08/2023 09:10:33 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARALS75

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



PAH Concentration of test soil 15,308 ppm

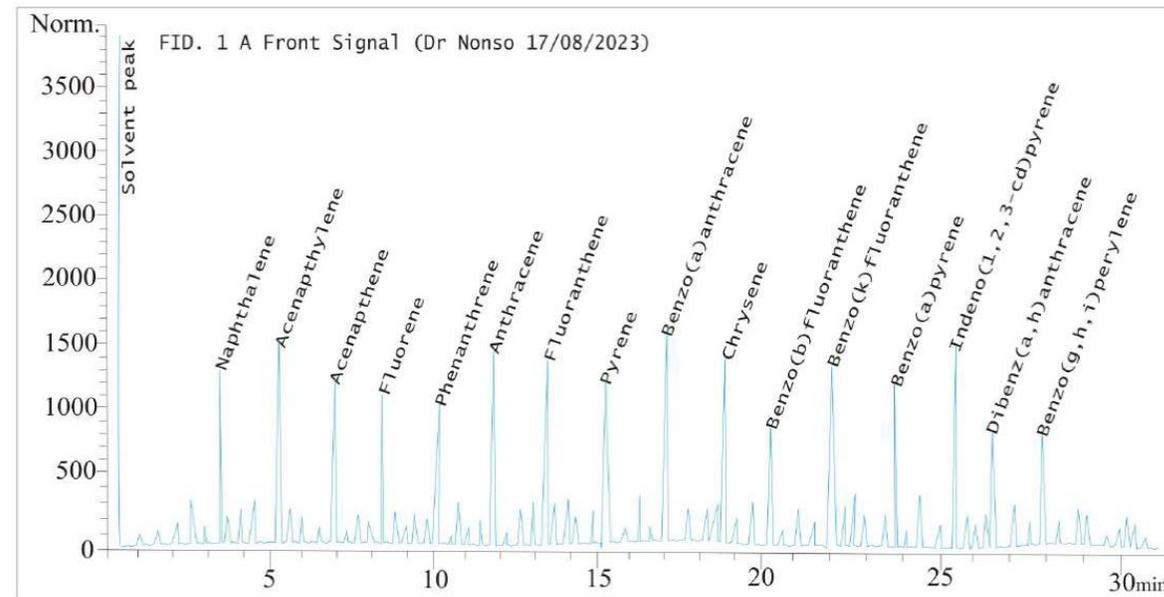
2.57 % TOTAL DEGRADATION ACHIEVED

Injection Date : 17/08/2023 09:45:30 AM
Sample Name : Control
Acq. operator : ARALS75

Location : Vial 3
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



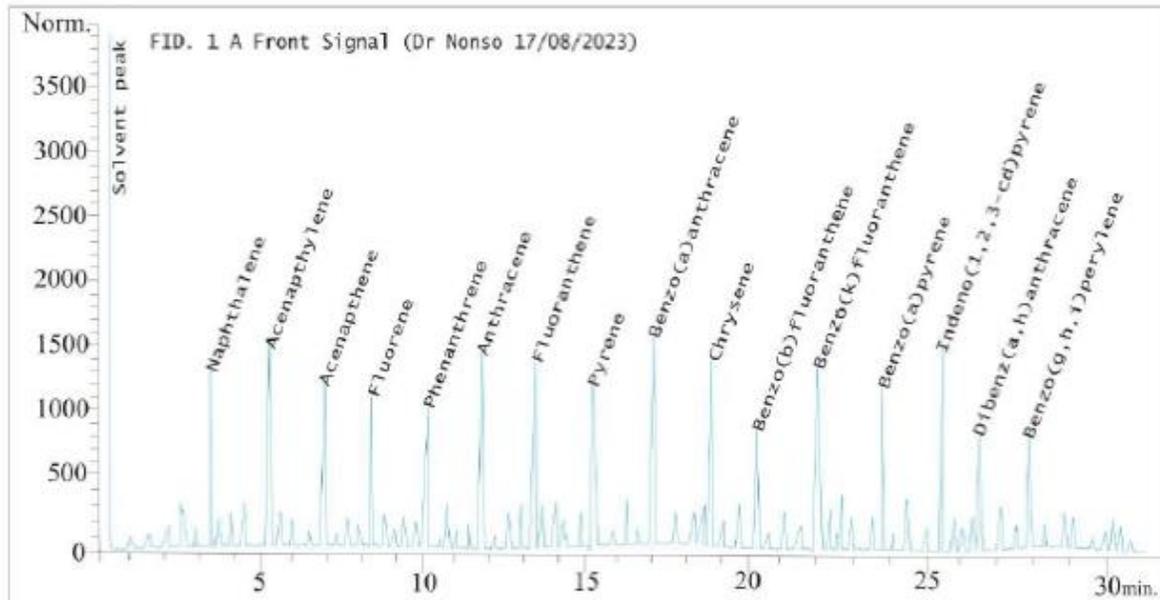
PAH Concentration after 4 weeks with 0ml E-Safe 14915.04 ppm

Injection Date : 17/08/2023 09:10:33 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARALS75

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



PAH Concentration of test soil 15,308 ppm

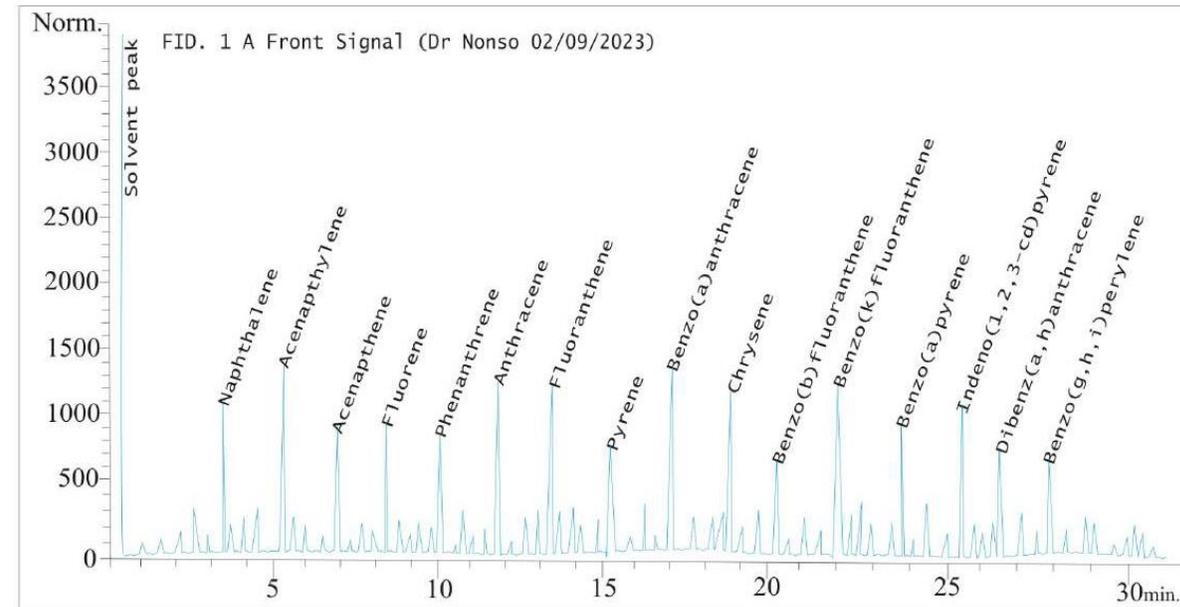
10.24 % TOTAL DEGRADATION ACHIEVED

Injection Date : 02/09/2023 11:21:58 AM
Sample Name : Control
Acq. operator : ARALS75

Location : Vial 2
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



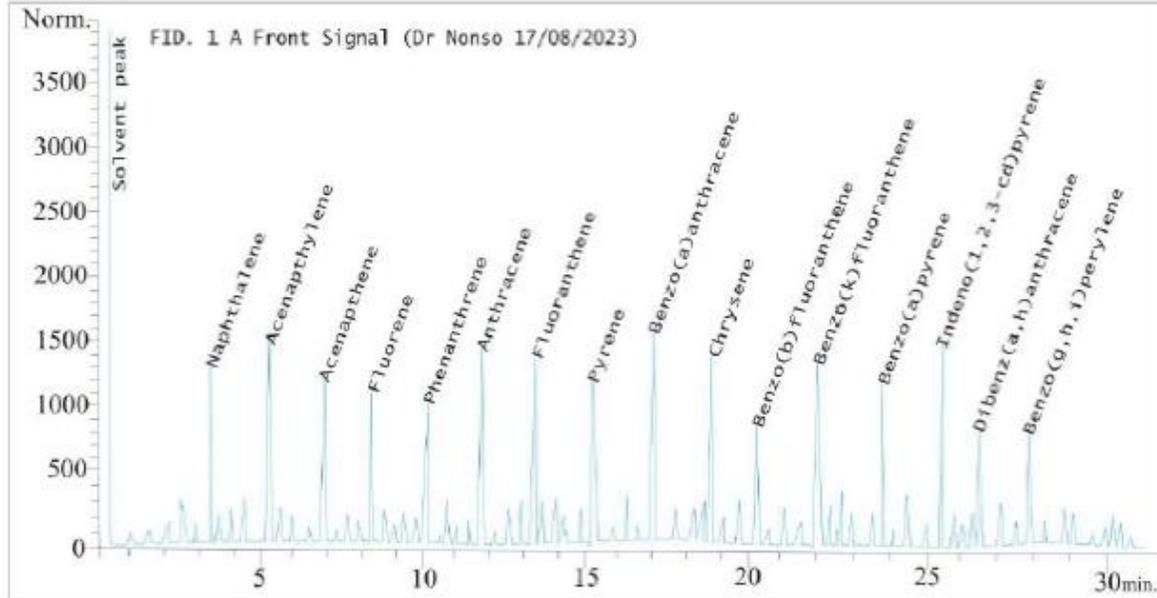
PAH Concentration after 6 weeks with 0ml E-Safe 13741.02 ppm

Injection Date : 17/08/2023 09:10:33 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARALS75

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



PAH Concentration of test soil 15,308 ppm

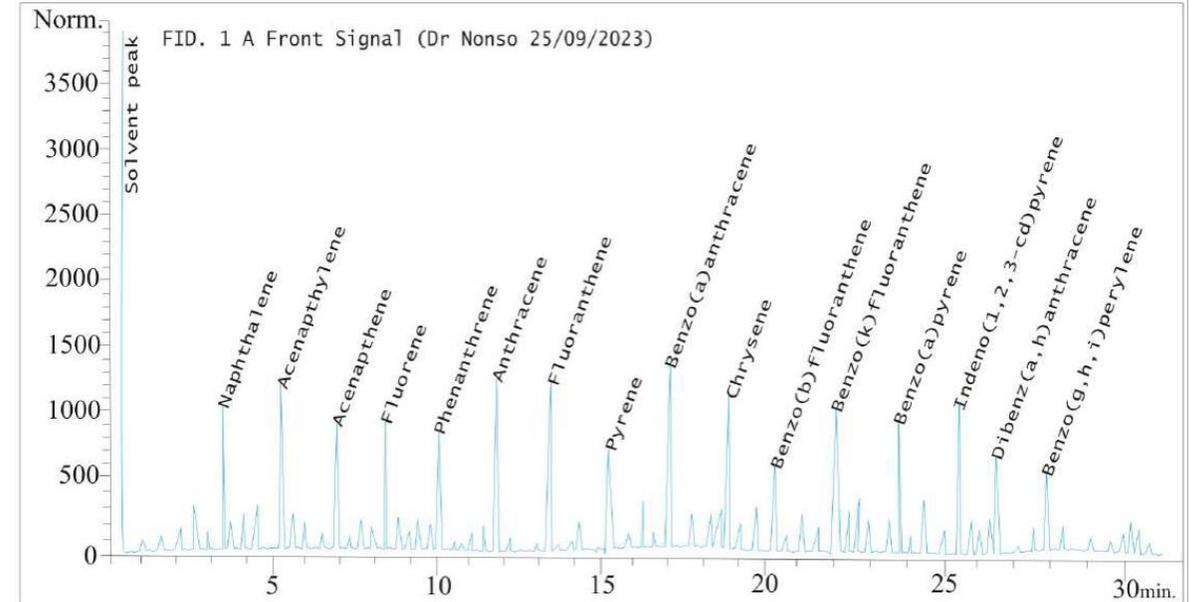
13.62 % TOTAL DEGRADATION ACHIEVED

Injection Date : 25/09/2023 01:23:17 PM
Sample Name : Control
Acq. operator : ARALS75

Location : Vial 2
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



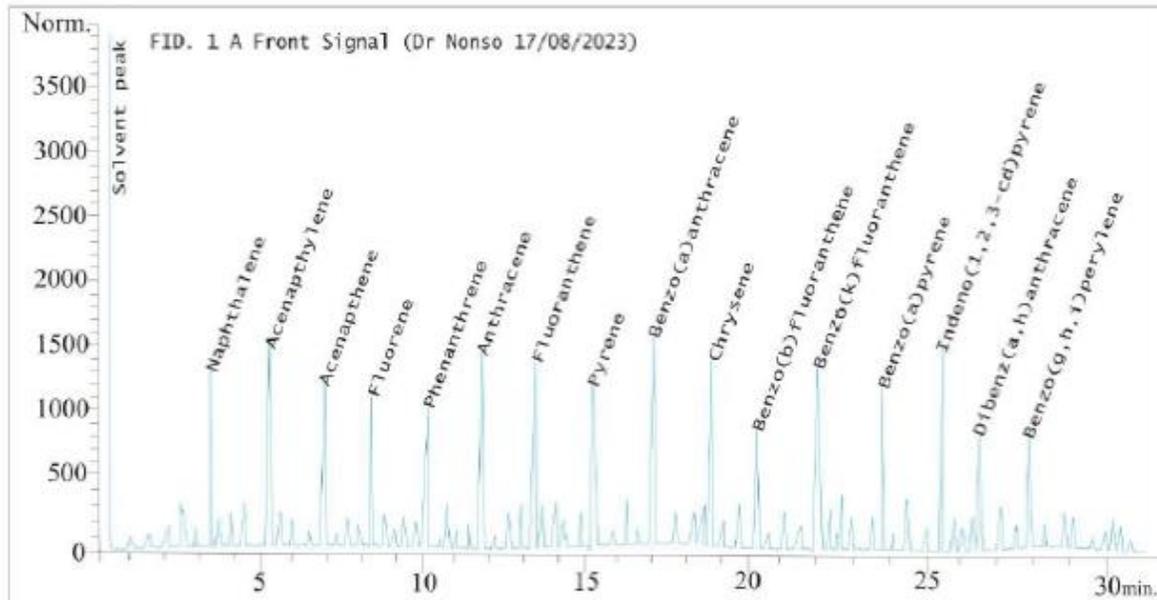
PAH Concentration after 8 weeks with 0ml E-Safe 13223.00 ppm

Injection Date : 17/08/2023 09:10:33 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARALS75

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



PAH Concentration of test soil 15,308 ppm

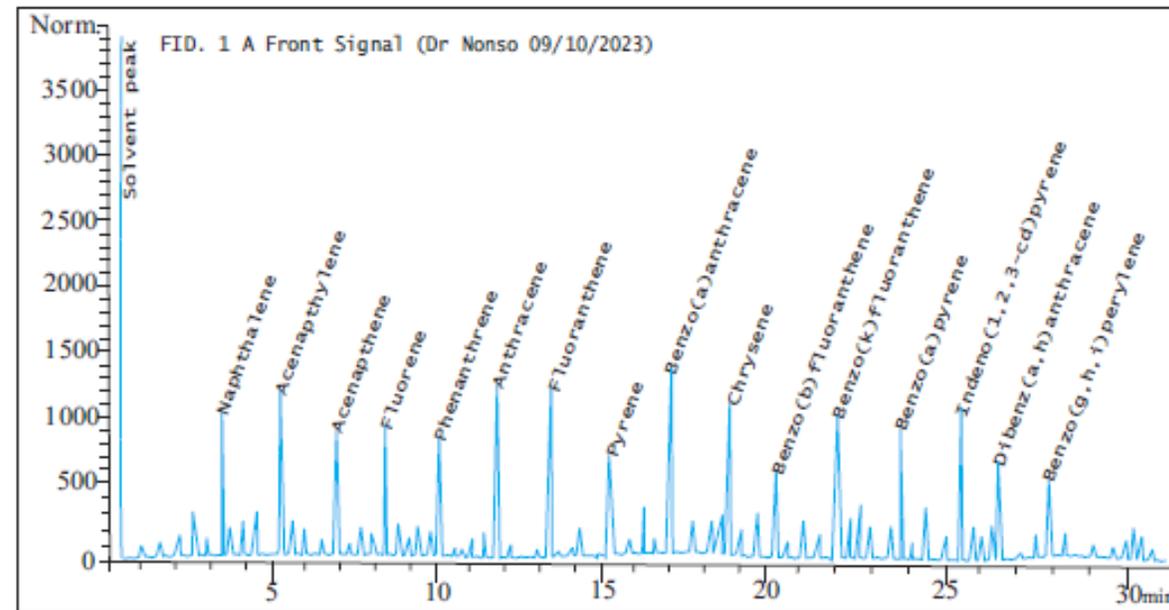
19.35 % TOTAL DEGRADATION ACHIEVED

Injection Date : 09/10/2023 10:46:37 AM
Sample Name : Control
Acq. operator : ARALS75

Location : Vial 2
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



PAH Concentration after 10 weeks with 0ml E-Safe 12346.83 ppm

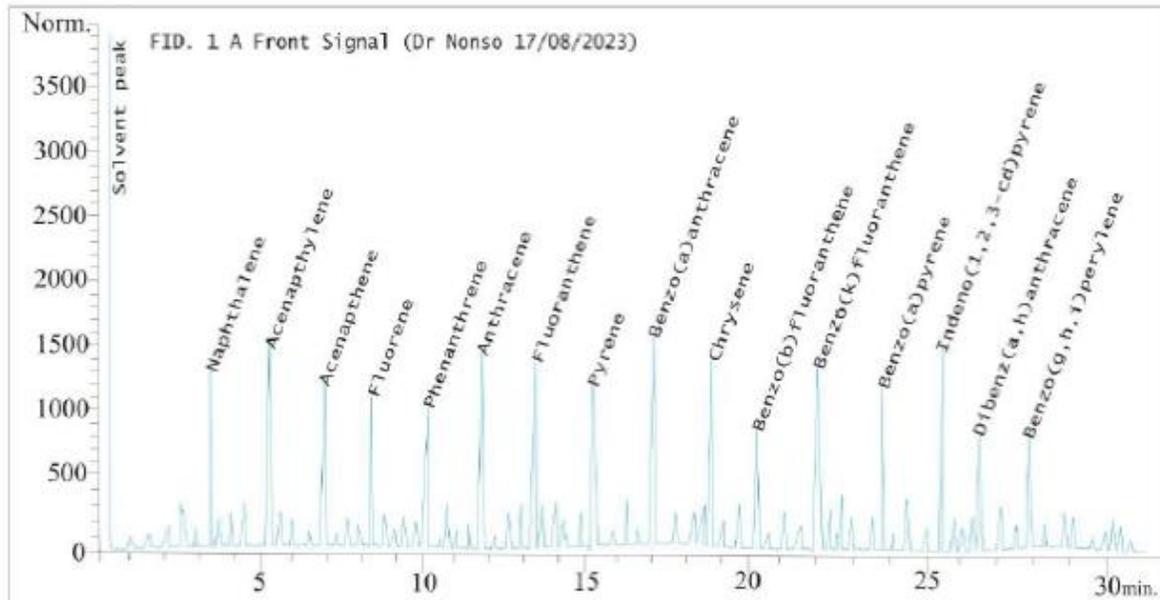
6ml E-SAFE IN 4KG CONTAMINATED SOIL TREATMENT

Injection Date : 17/08/2023 09:10:33 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARALS75

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



PAH Concentration of test soil 15,308 ppm

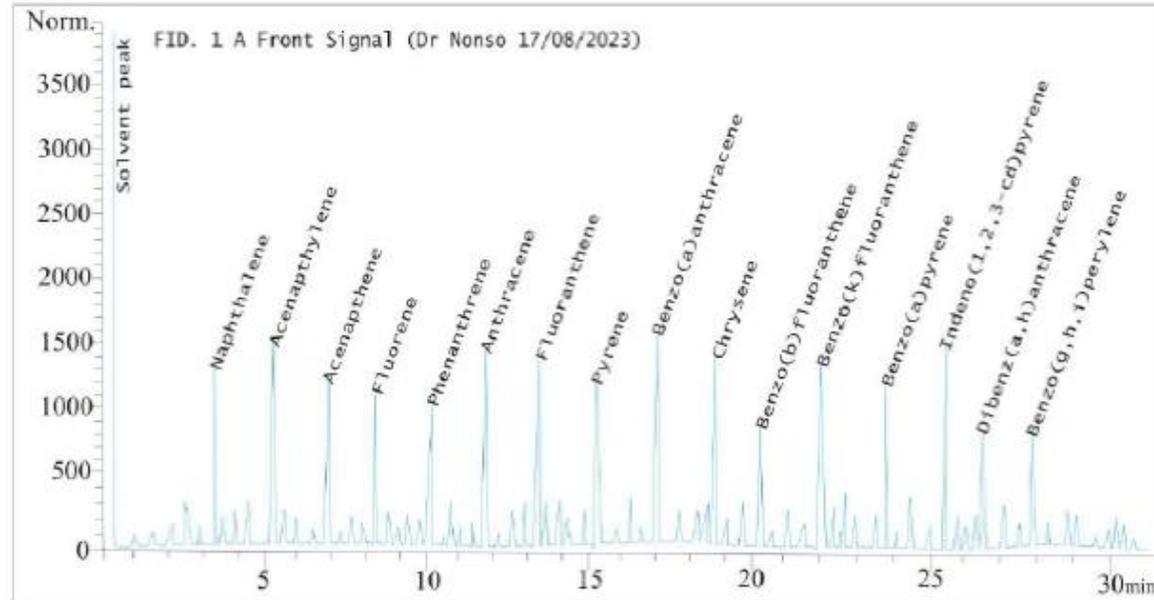
0.00 % TOTAL DEGRADATION ACHIEVED

Injection Date : 17/08/2023 09:10:33 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARALS75

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



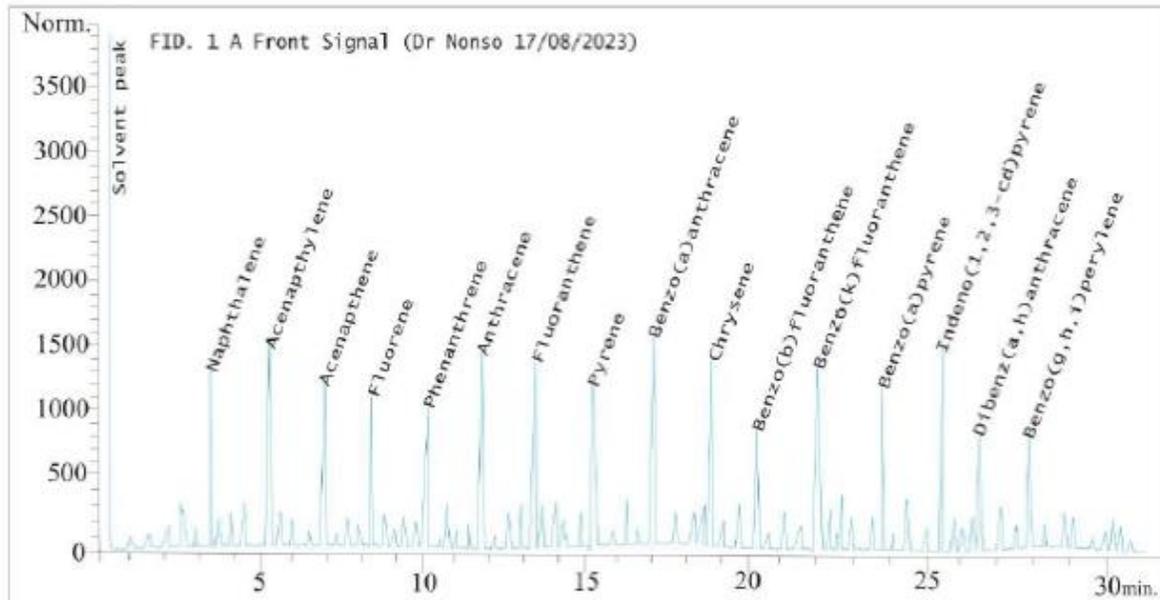
PAH Concentration after 0 weeks with 6ml E-Safe 15,308 ppm

Injection Date : 17/08/2023 09:10:33 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARALS75

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



PAH Concentration of test soil 15,308 ppm

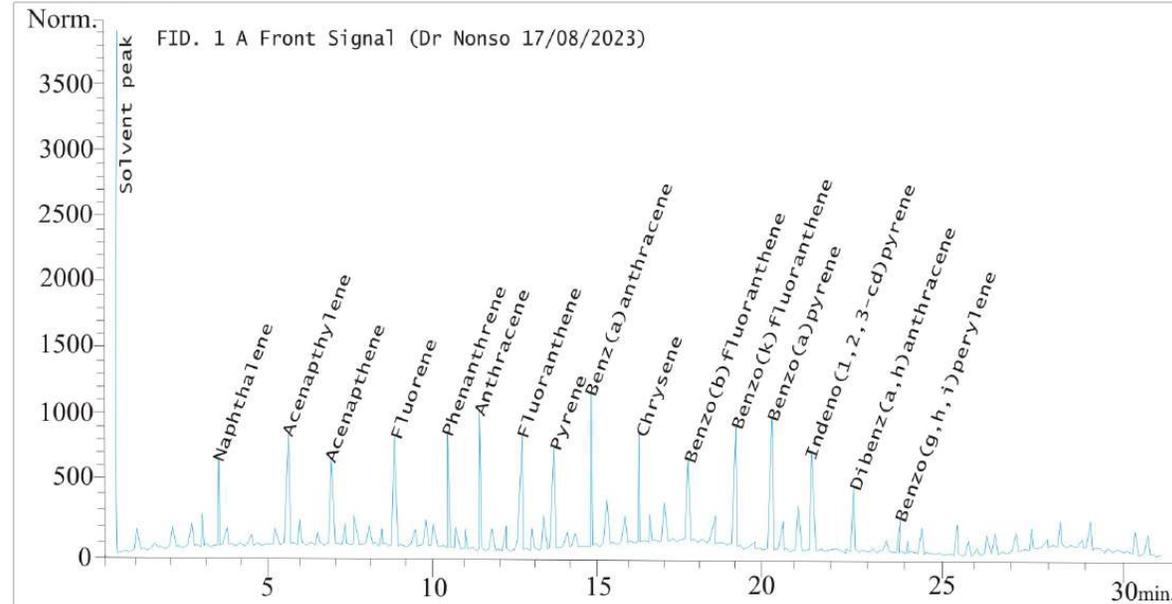
44.68 % TOTAL DEGRADATION ACHIEVED

Injection Date : 17/08/2023 09:45:30 AM
Sample Name : Sample 6
Acq. operator : ARALS75

Location : Vial 4
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



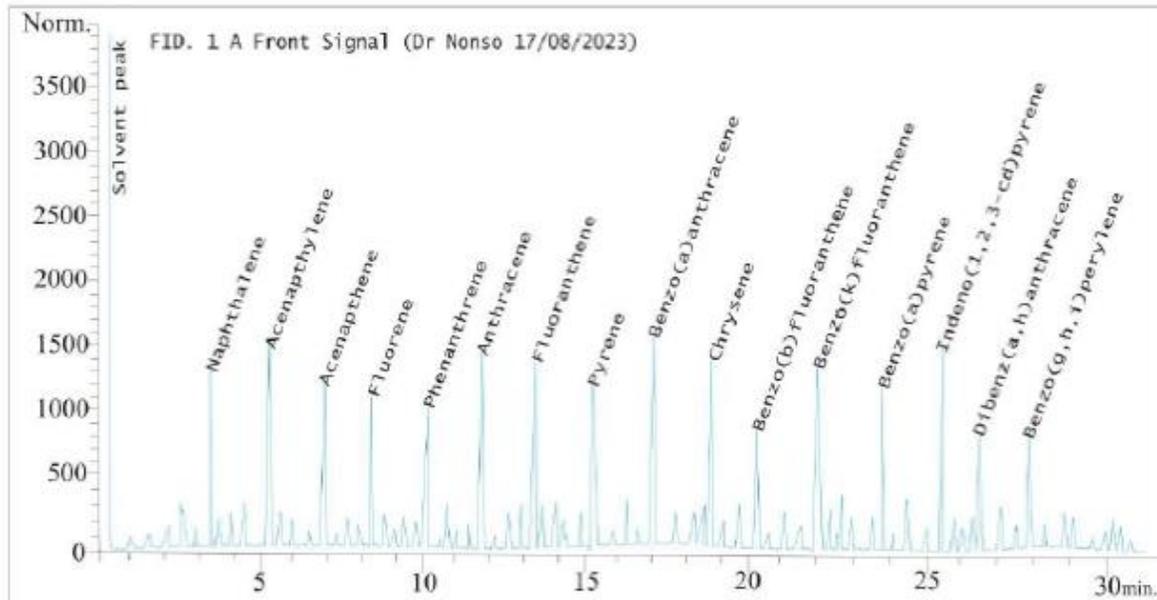
PAH Concentration after 4 weeks with 6ml E-Safe 8468.92 ppm

Injection Date : 17/08/2023 09:10:33 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARALS75

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



PAH Concentration of test soil 15,308 ppm

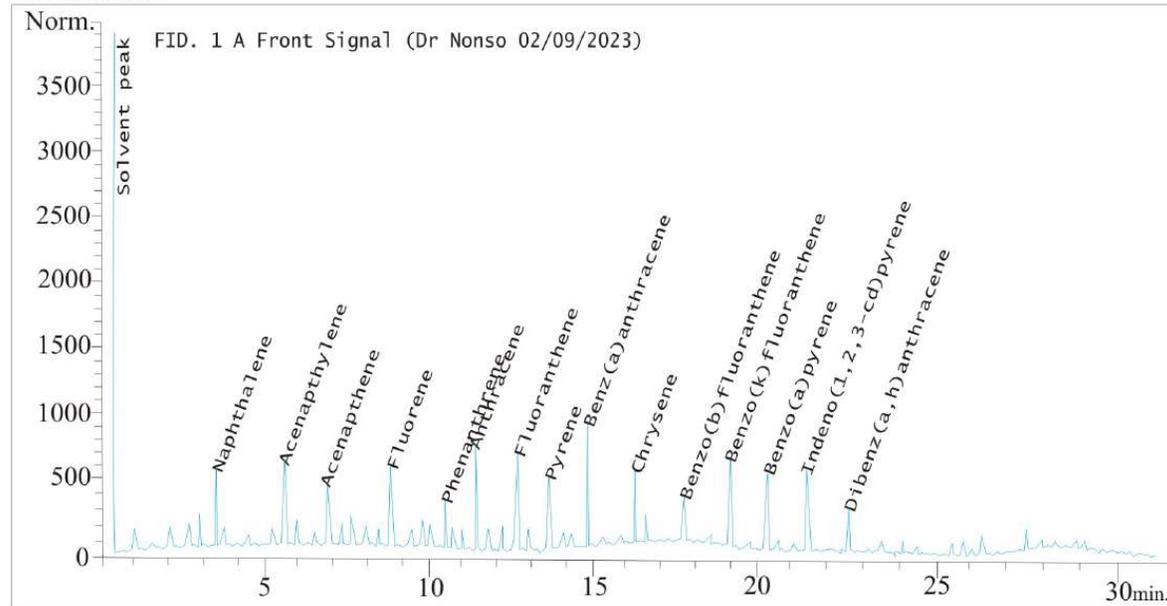
58.68 % TOTAL DEGRADATION ACHIEVED

Injection Date : 02/09/2023 11:56:38 AM
Sample Name : Sample 6
Acq. operator : ARALS75

Location : Vial 3
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



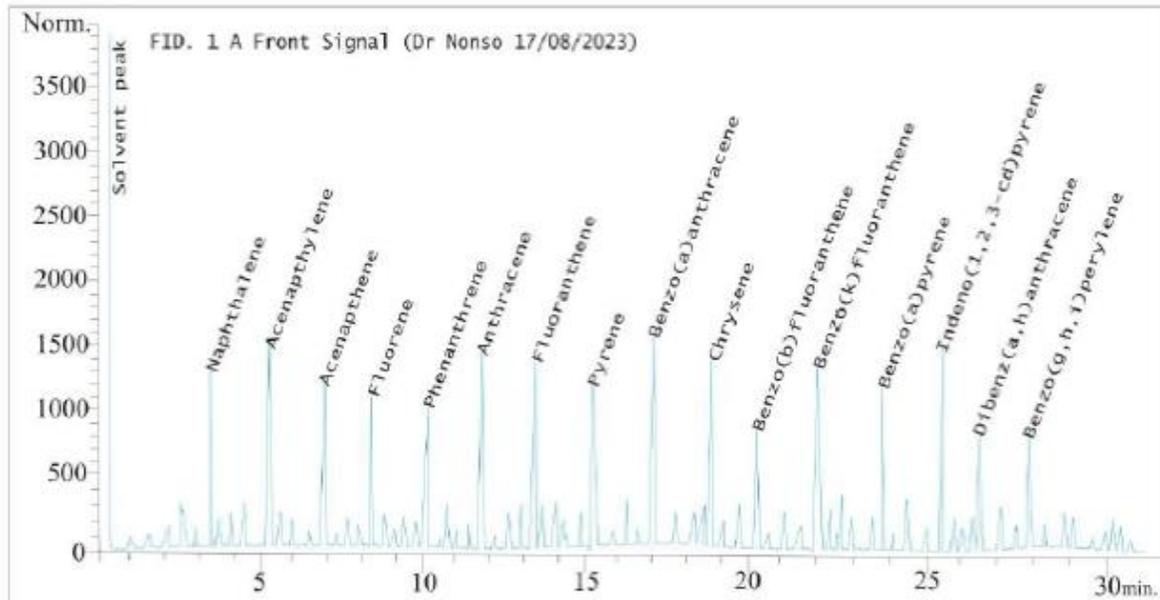
PAH Concentration after 6 weeks with 6ml E-Safe 6324.91 ppm

Injection Date : 17/08/2023 09:10:33 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARALS75

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



PAH Concentration of test soil 15,308 ppm

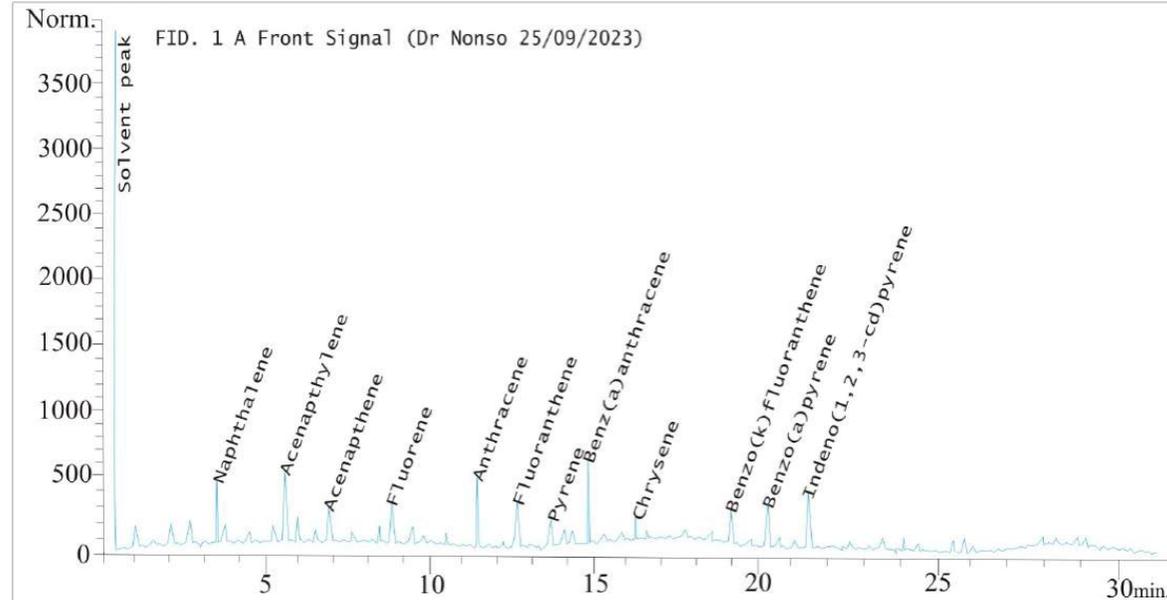
80.16 % TOTAL DEGRADATION ACHIEVED

Injection Date : 25/09/2023 01:58:42 AM
Sample Name : Sample 6
Acq. operator : ARALS75

Location : Vial 3
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



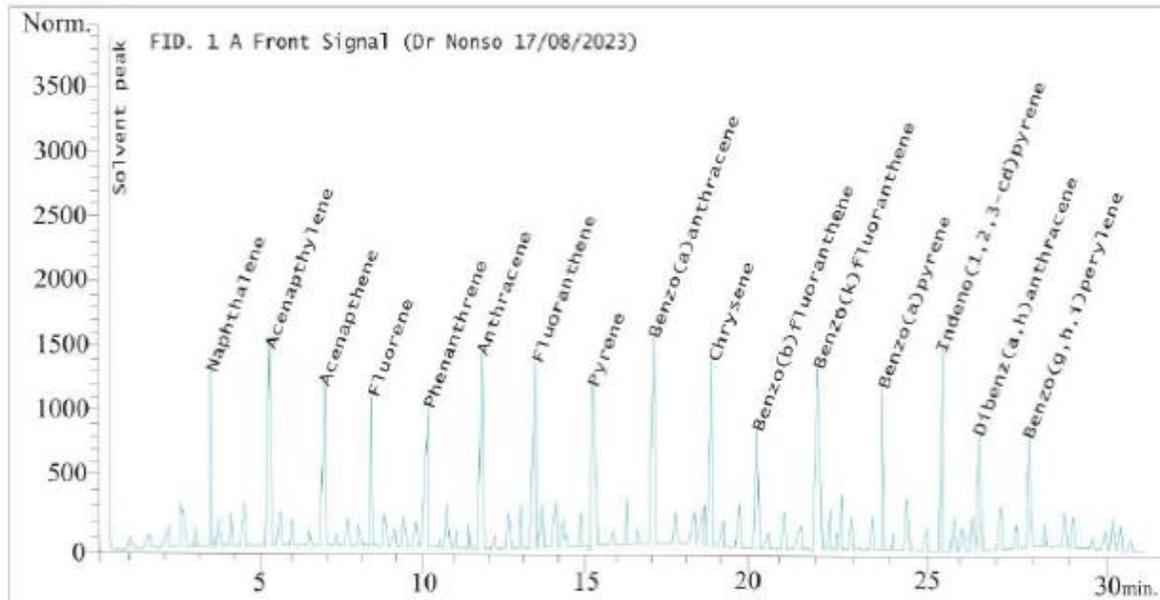
PAH Concentration after 8 weeks with 6ml E-Safe 3037.22 ppm

Injection Date : 17/08/2023 09:10:33 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARALS75

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



PAH Concentration of test soil 15,308 ppm

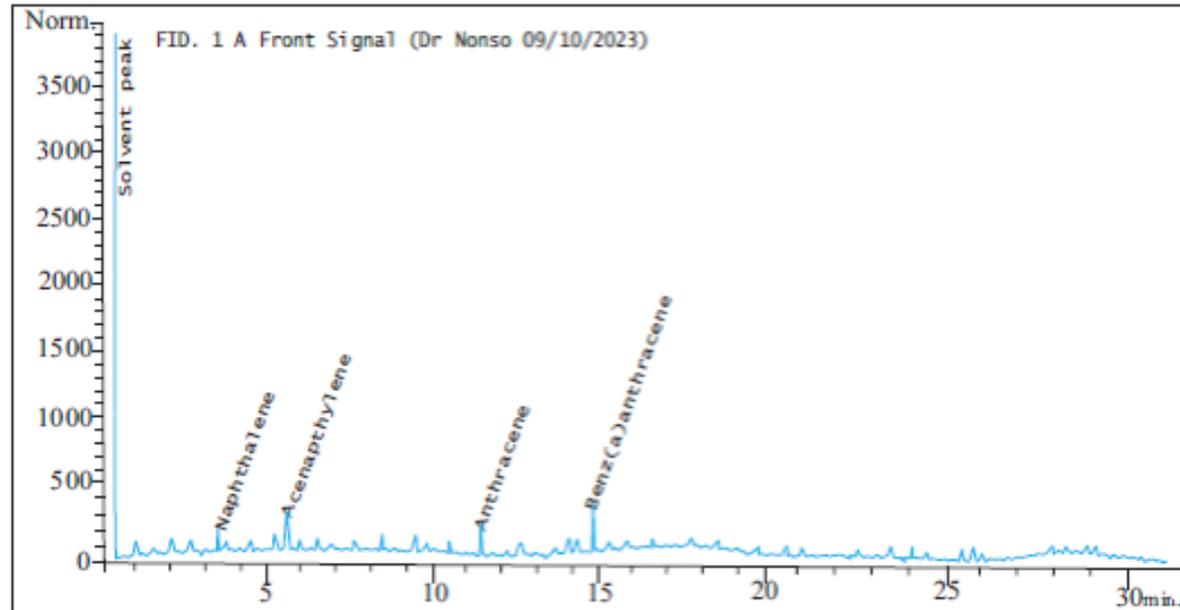
94.99 % TOTAL DEGRADATION ACHIEVED

Injection Date : 09/10/2023 11:21:17 AM
Sample Name : Sample 6
Acq. operator : ARALS75

Location : Vial 3
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



PAH Concentration after 10 weeks with 6ml E-Safe 766.66 ppm

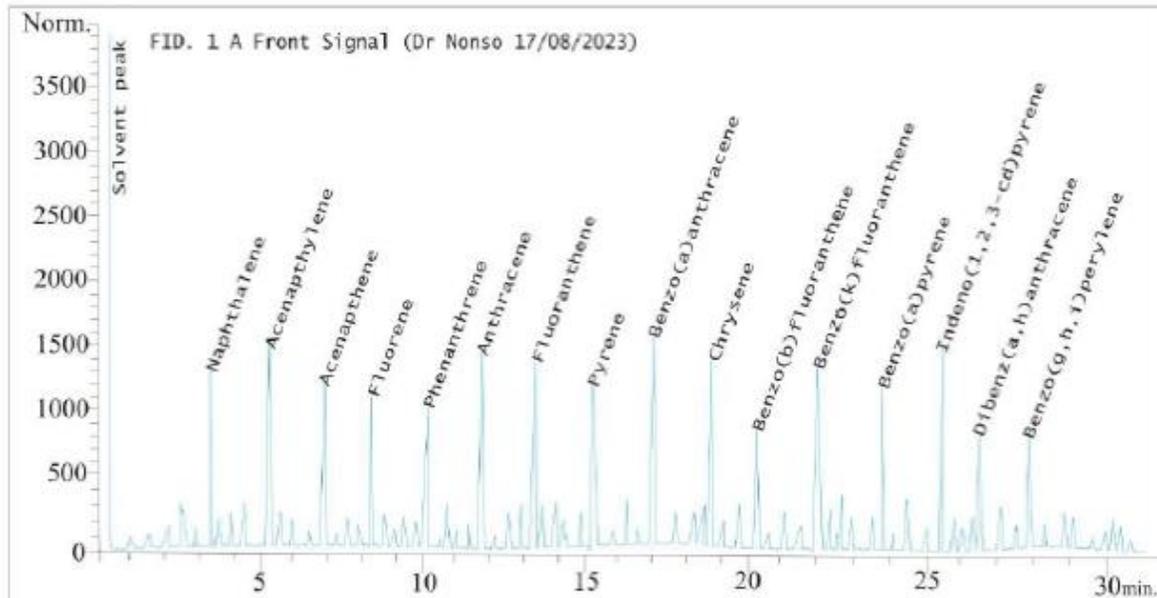
12ml E-SAFE IN 4KG CONTAMINATED SOIL TREATMENT

Injection Date : 17/08/2023 09:10:33 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARALS75

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



PAH Concentration of test soil 15,308 ppm

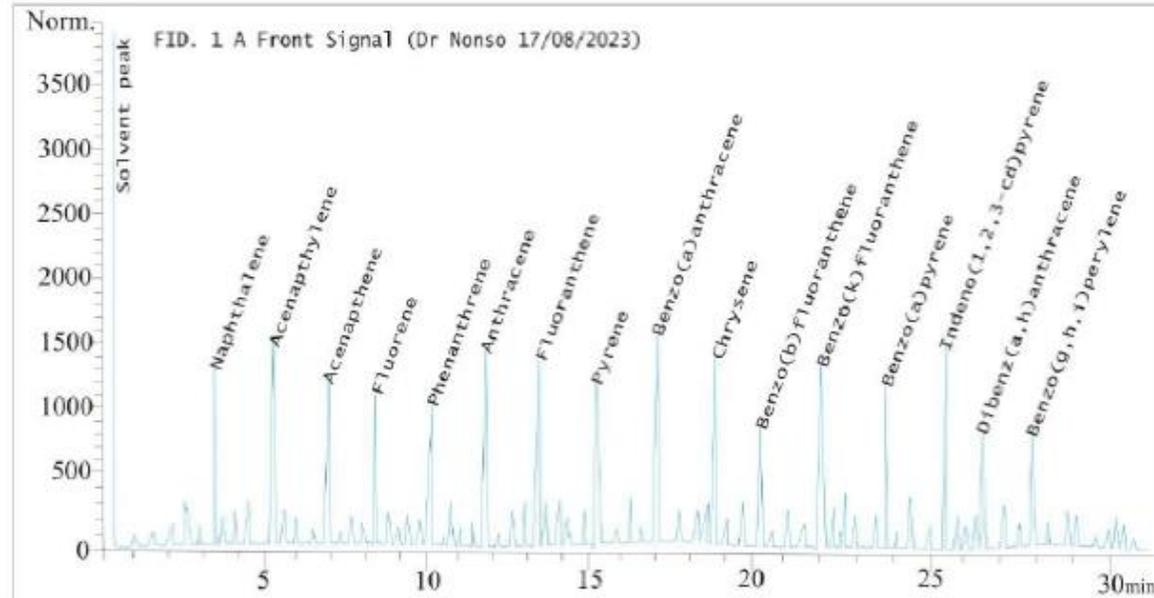
0.00 % TOTAL DEGRADATION ACHIEVED

Injection Date : 17/08/2023 09:10:33 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARALS75

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



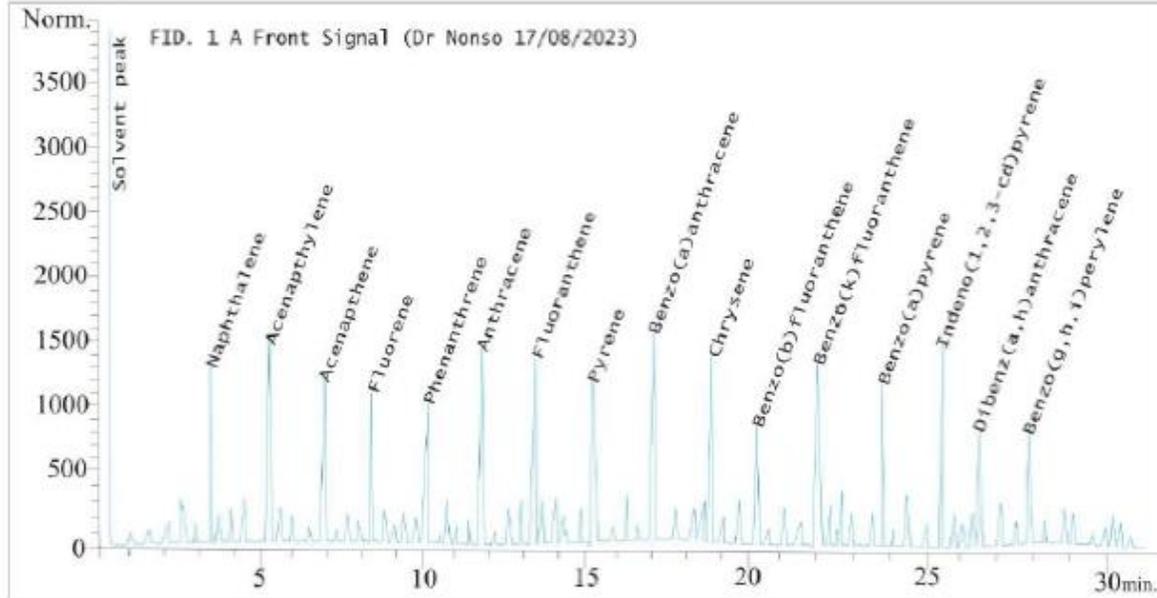
PAH Concentration after 0 weeks with 12ml E-Safe 15,308 ppm

Injection Date : 17/08/2023 09:10:33 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARALS75

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



PAH Concentration of test soil 15,308 ppm

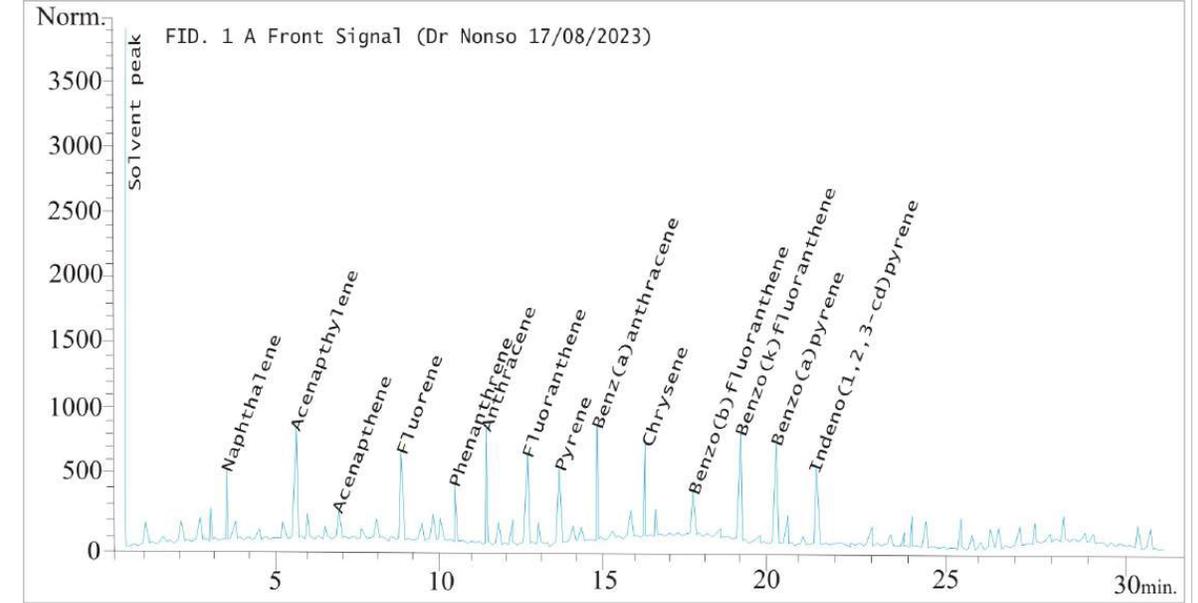
62.11% TOTAL DEGRADATION ACHIEVED

Injection Date : 17/08/2023 09:45:30 AM
Sample Name : Sample 12
Acq. operator : ARALS75

Location : Vial 5
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



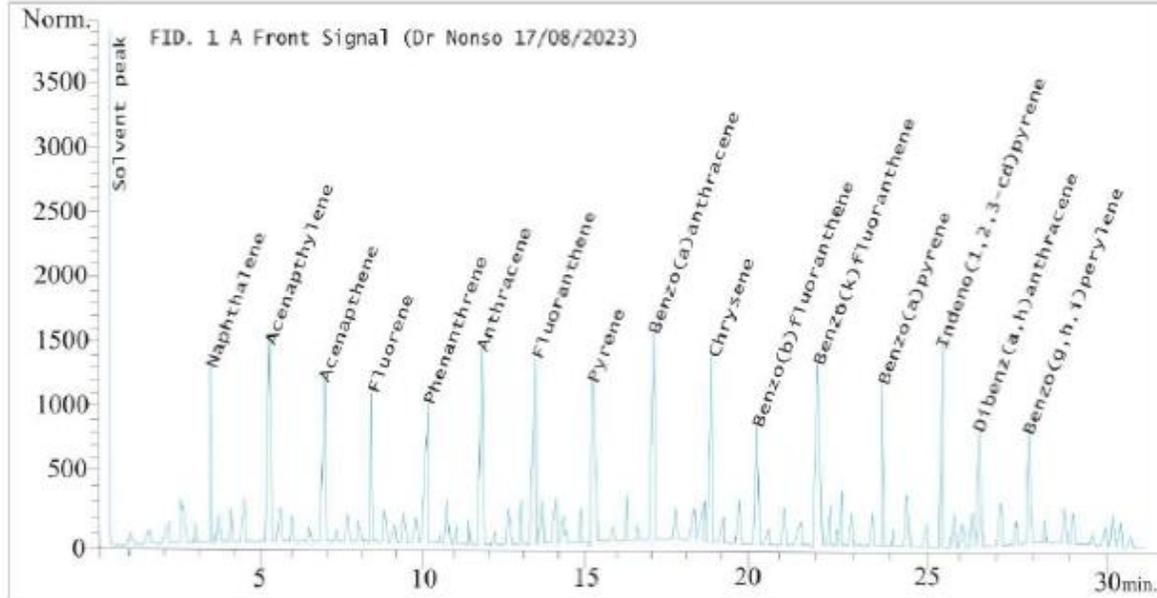
PAH Concentration after 4 weeks with 12ml E-Safe 5799.65 ppm

Injection Date : 17/08/2023 09:10:33 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARALS75

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



PAH Concentration of test soil 15,308 ppm

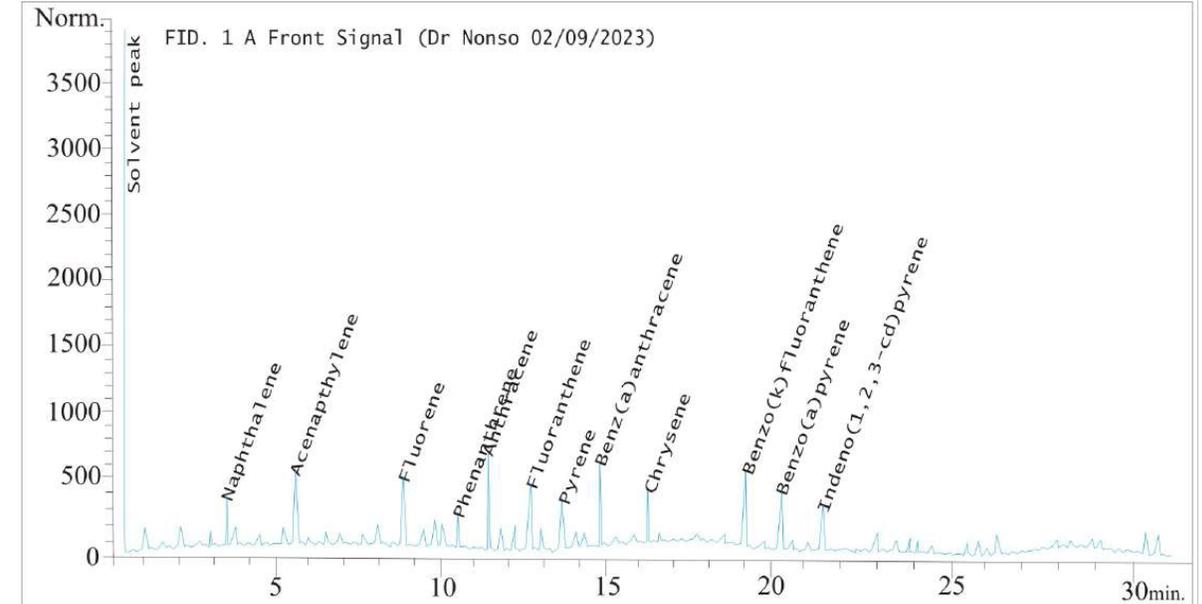
76.10% TOTAL DEGRADATION ACHIEVED

Injection Date : 02/09/2023 12:31:27 PM
Sample Name : Sample 12
Acq. operator : ARALS75

Location : Vial 4
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



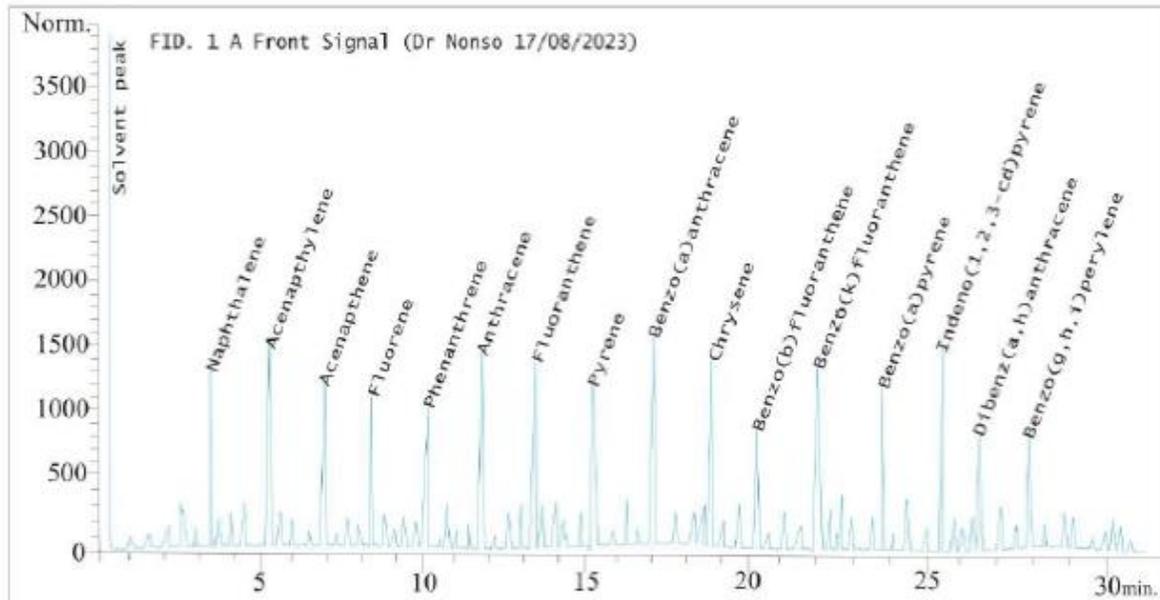
PAH Concentration after 6 weeks with 12ml E-Safe 3659.25 ppm

Injection Date : 17/08/2023 09:10:33 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARALS75

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



PAH Concentration of test soil 15,308 ppm

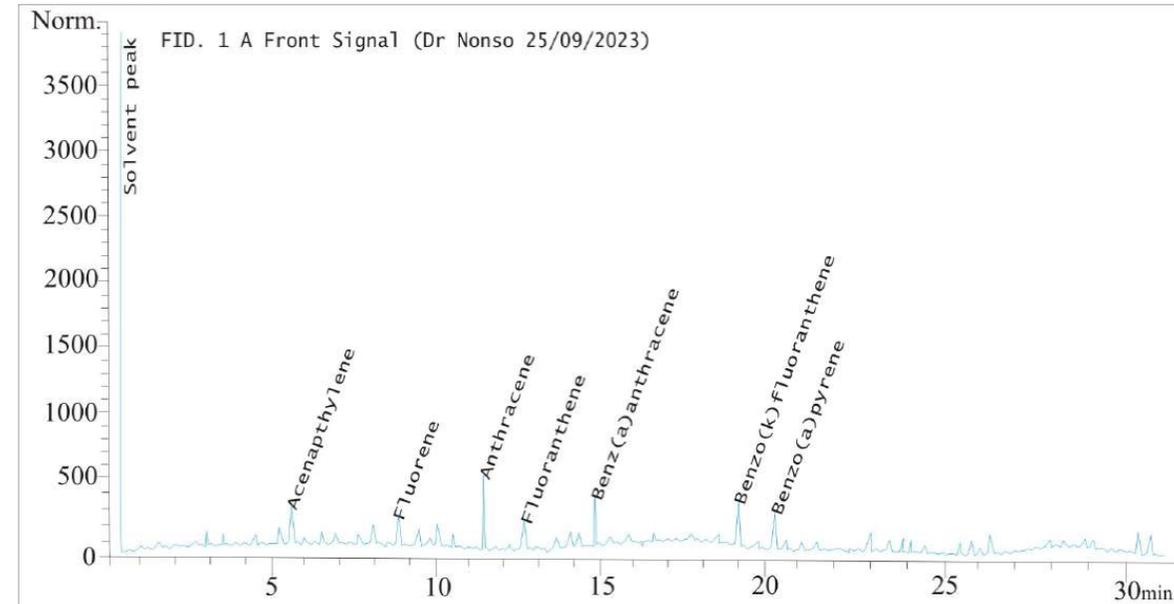
90.47% TOTAL DEGRADATION ACHIEVED

Injection Date : 25/09/2023 02:33:47 PM
Sample Name : Sample 12
Acq. operator : ARALS75

Location : Vial 4
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



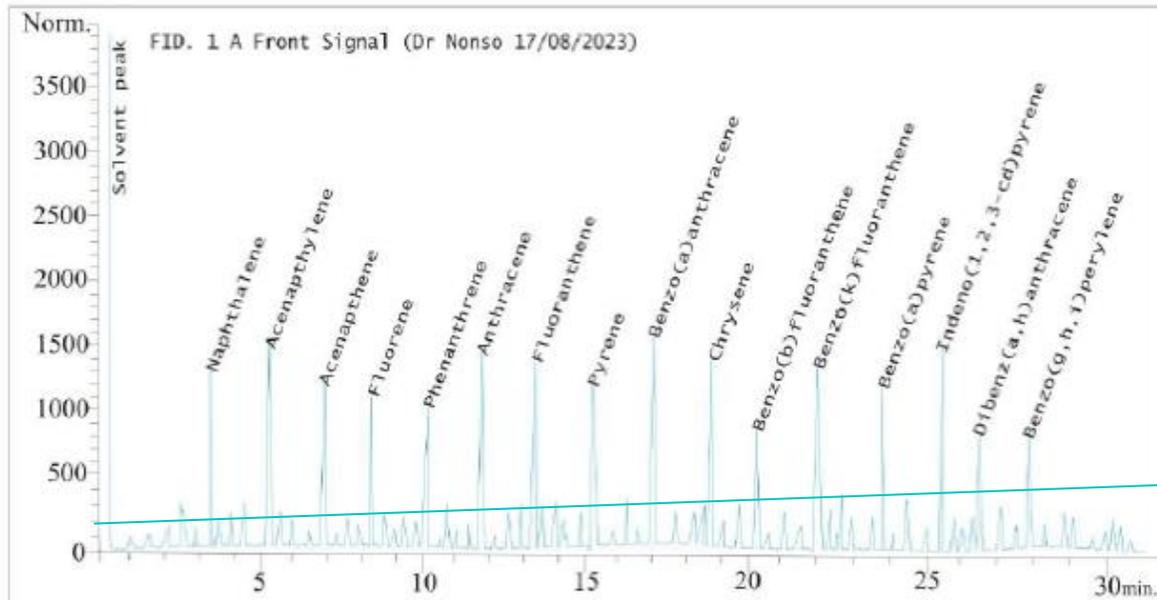
PAH Concentration after 8 weeks with 12ml E-Safe 1458.22 ppm

Injection Date : 17/08/2023 09:10:33 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARALS75

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



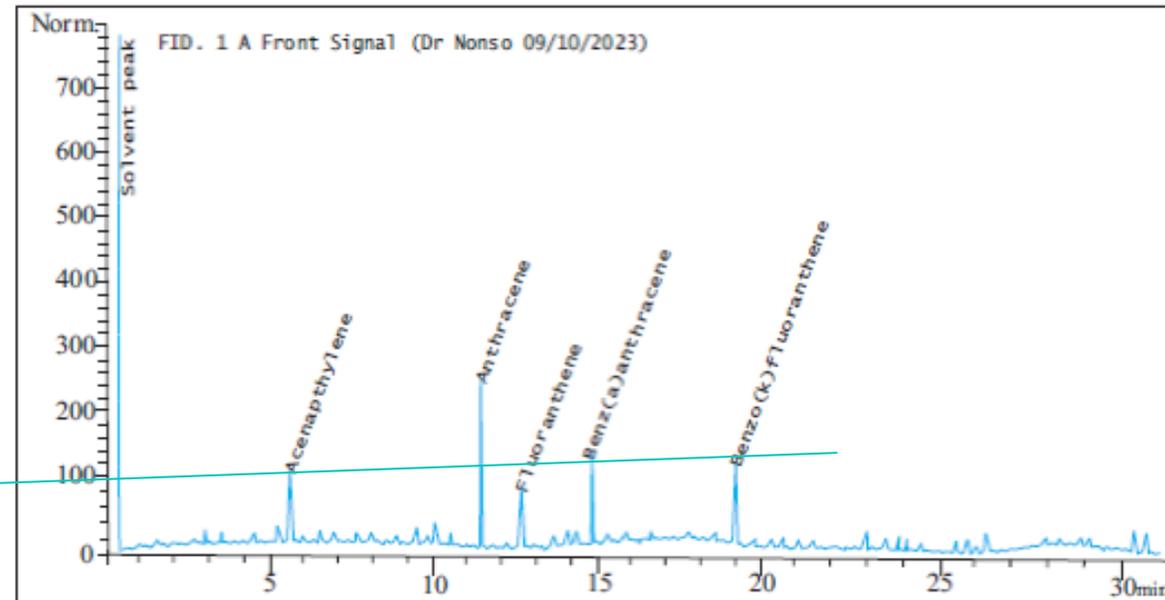
PAH Concentration of test soil 15,308 ppm

Injection Date : 09/10/2023 11:56:11 AM
Sample Name : Sample 12
Acq. operator : ARALS75

Location : Vial 3
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



PAH Concentration after 10 weeks with 12ml E-Safe 503.07 ppm

96.71 % TOTAL DEGRADATION ACHIEVED

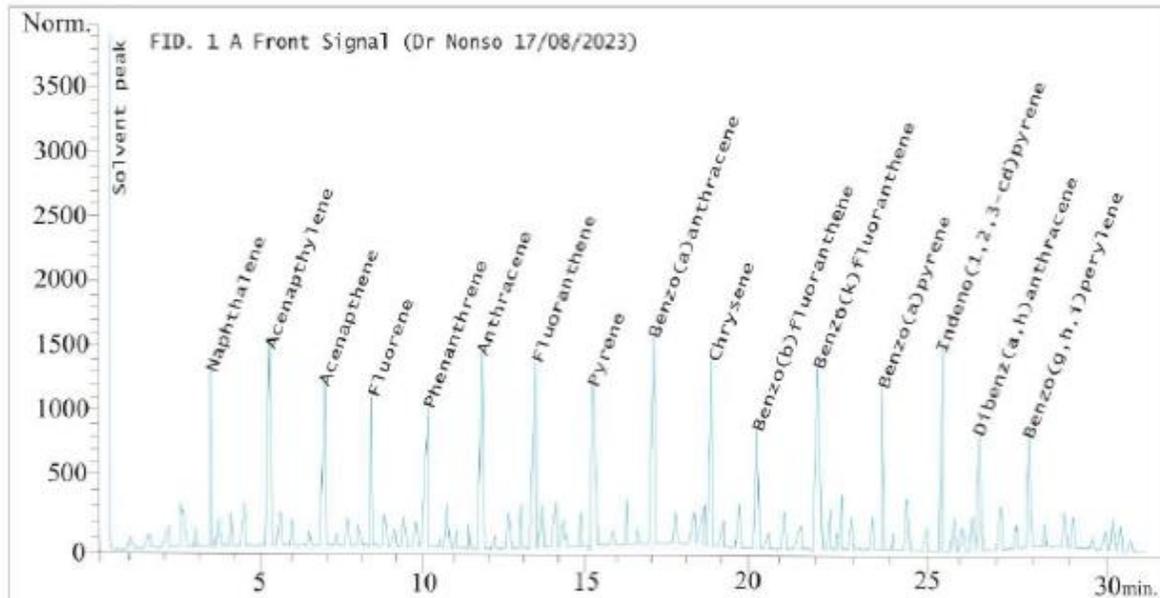
24ml E-SAFE IN 4KG CONTAMINATED SOIL TREATMENT

Injection Date : 17/08/2023 09:10:33 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARALS75

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



PAH Concentration of test soil 15,308 ppm

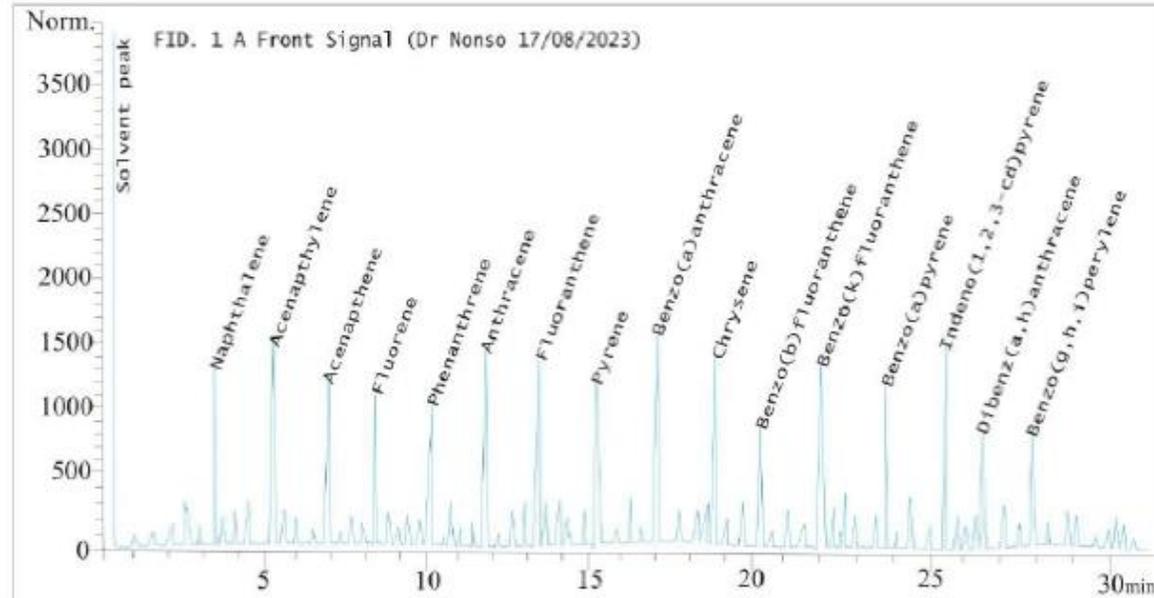
0.00 % TOTAL DEGRADATION ACHIEVED

Injection Date : 17/08/2023 09:10:33 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARALS75

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



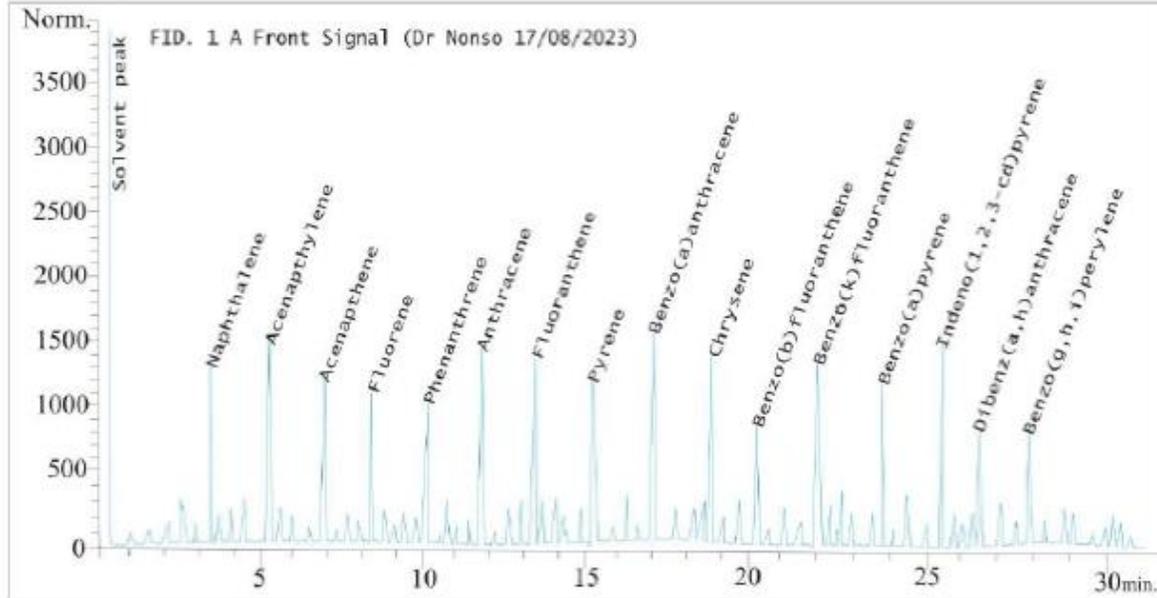
PAH Concentration after 0 weeks with 24ml E-Safe 15,308 ppm

Injection Date : 17/08/2023 09:10:33 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARALS75

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



TPH Concentration of test soil 15,308 ppm

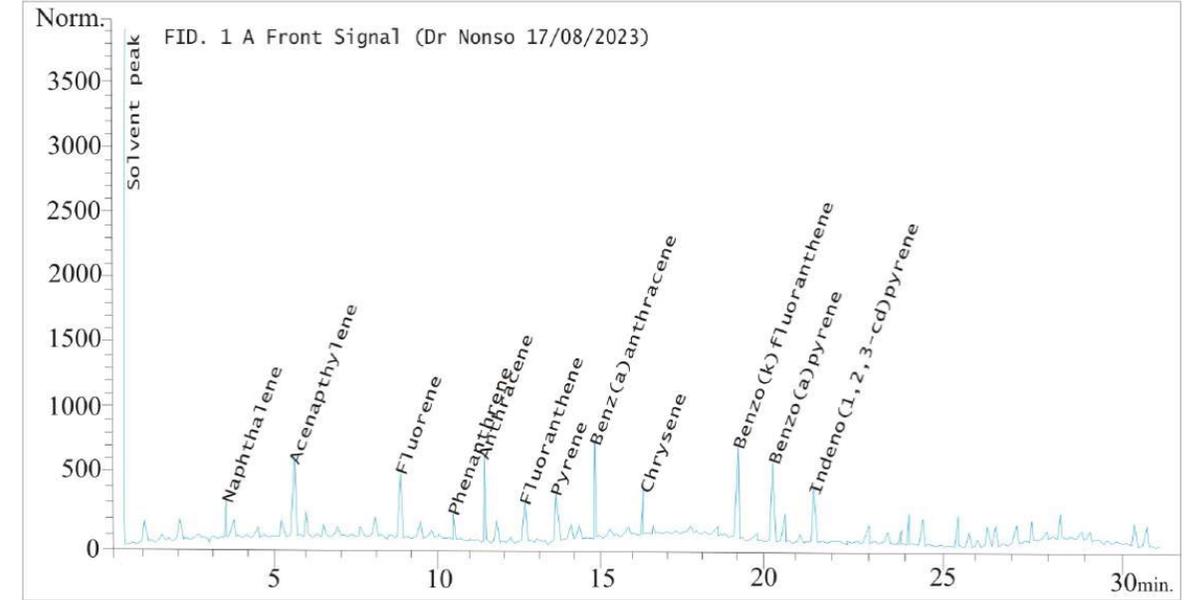
75.37 % TOTAL DEGRADATION ACHIEVED

Injection Date : 17/08/2023 03:03:57 PM
Sample Name : Sample 24
Acq. operator : ARALS75

Location : Vial 6
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



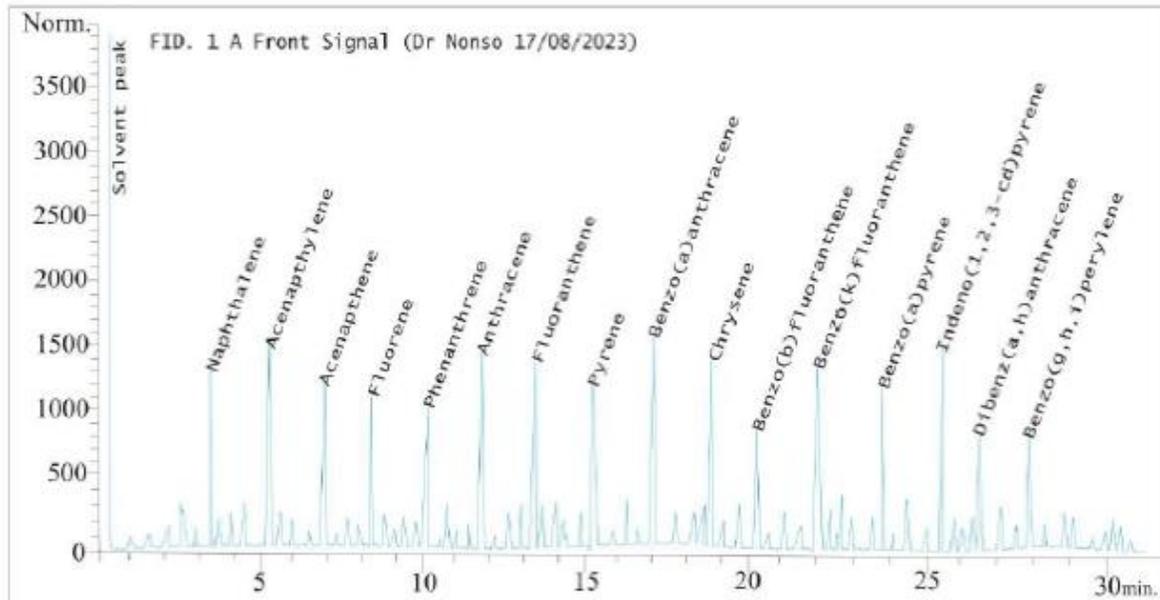
PAH Concentration after 4 weeks with 24ml E-Safe 3770.38 ppm

Injection Date : 17/08/2023 09:10:33 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARALS75

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



TPH Concentration of test soil 15,308 ppm

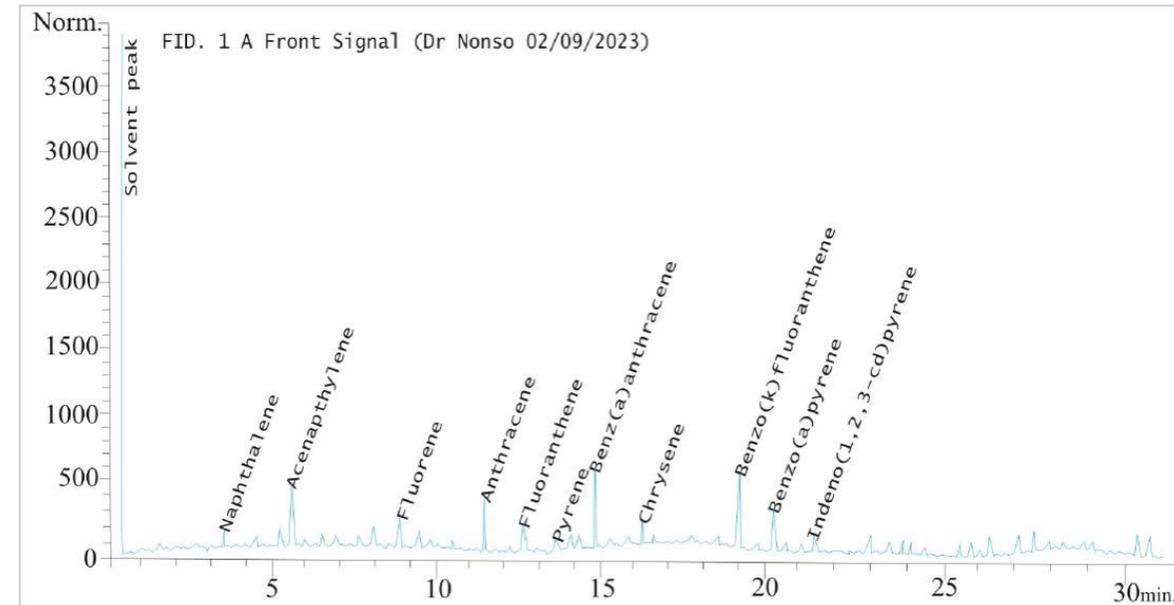
86.05 % TOTAL DEGRADATION ACHIEVED

Injection Date : 02/09/2023 01:06:48 PM
Sample Name : Sample 24
Acq. operator : ARALS75

Location : Vial 5
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



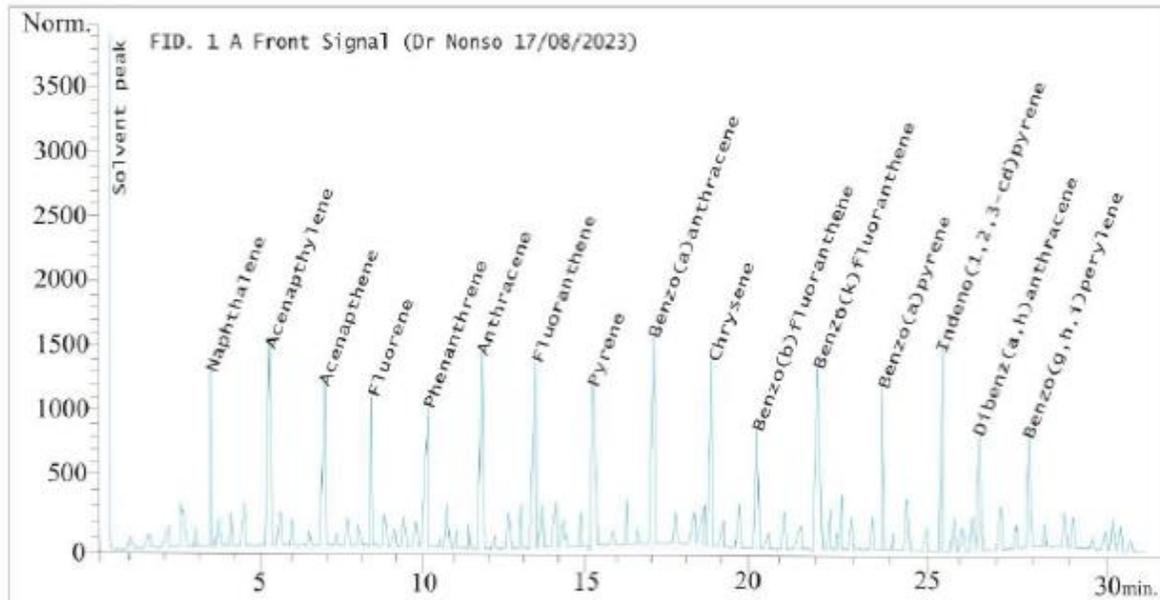
PAH Concentration after 6 weeks with 24ml E-Safe 2136.02 ppm

Injection Date : 17/08/2023 09:10:33 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARALS75

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2

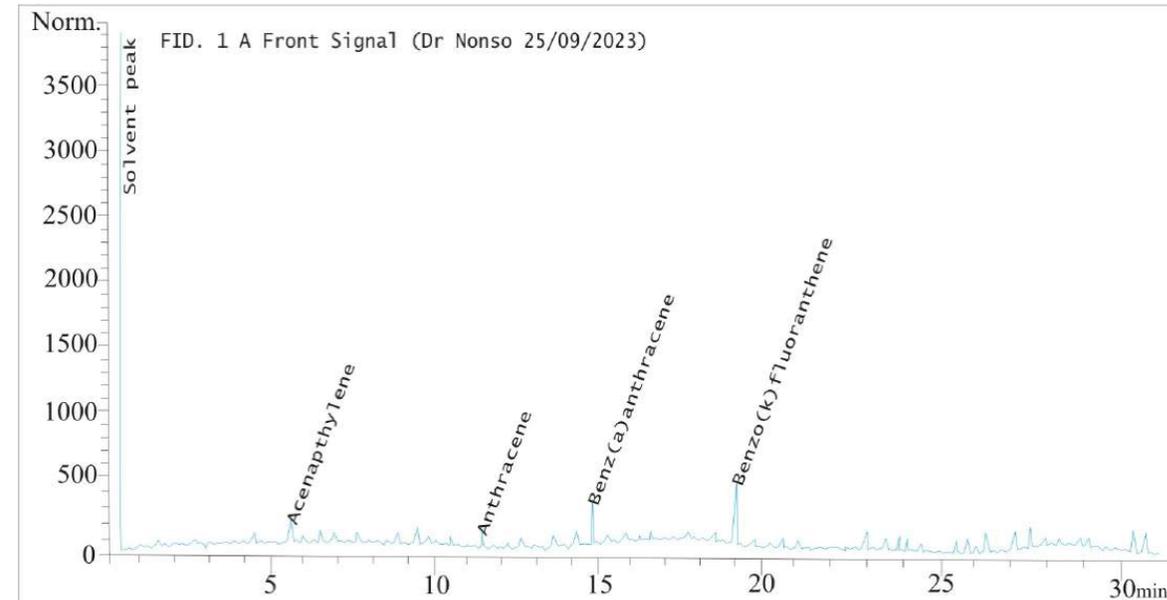


Injection Date : 25/09/2023 03:08:36 PM
Sample Name : Sample 24
Acq. operator : ARALS75

Location : Vial 5
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



TPH Concentration of test soil 15,308 ppm

94.93 % TOTAL DEGRADATION ACHIEVED

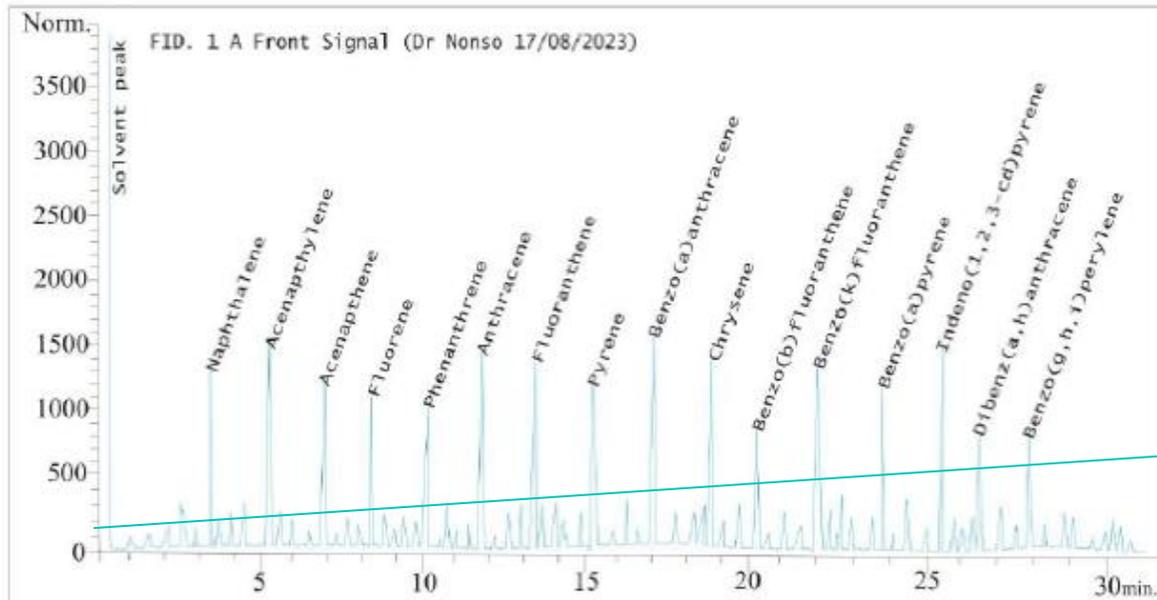
PAH Concentration after 8 weeks with 24ml E-Safe 776.68 ppm

Injection Date : 17/08/2023 09:10:33 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARALS75

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



TPH Concentration of test soil 15,308 ppm

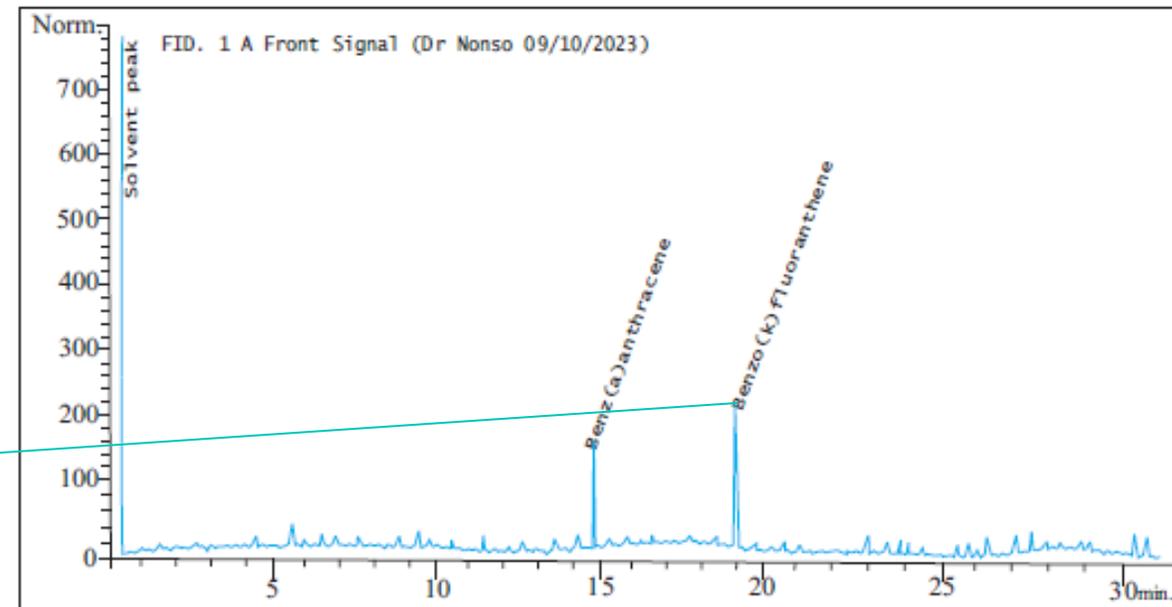
98.26% TOTAL DEGRADATION ACHIEVED

Injection Date : 09/10/2023 12:31:54 PM
Sample Name : Sample 24
Acq. operator : ARALS75

Location : Vial 4
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



PAH Concentration after 10 weeks with 24ml E-Safe 266.58 ppm

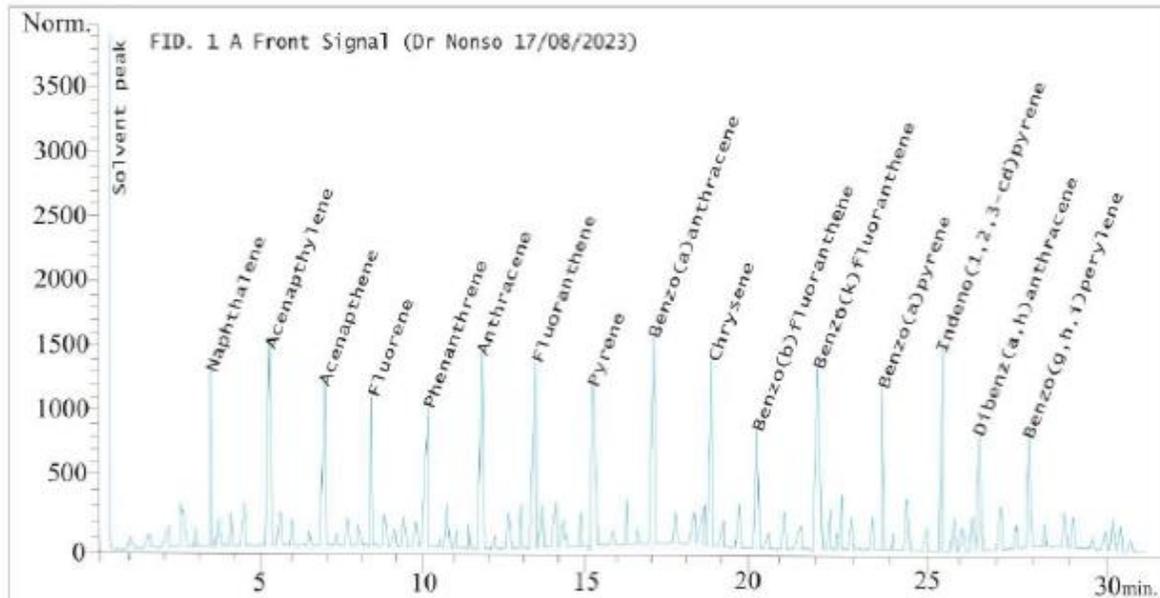
48ml E-SAFE IN 4KG CONTAMINATED SOIL TREATMENT

Injection Date : 17/08/2023 09:10:33 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARALS75

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



PAH Concentration of test soil 15,308 ppm

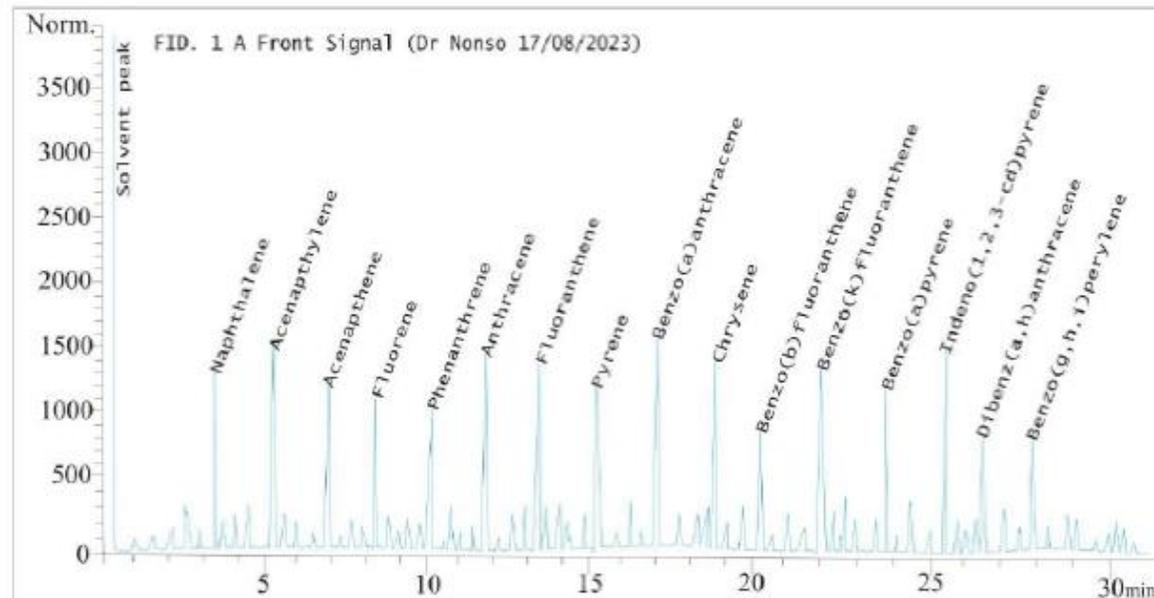
0.00 % TOTAL DEGRADATION ACHIEVED

Injection Date : 17/08/2023 09:10:33 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARALS75

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



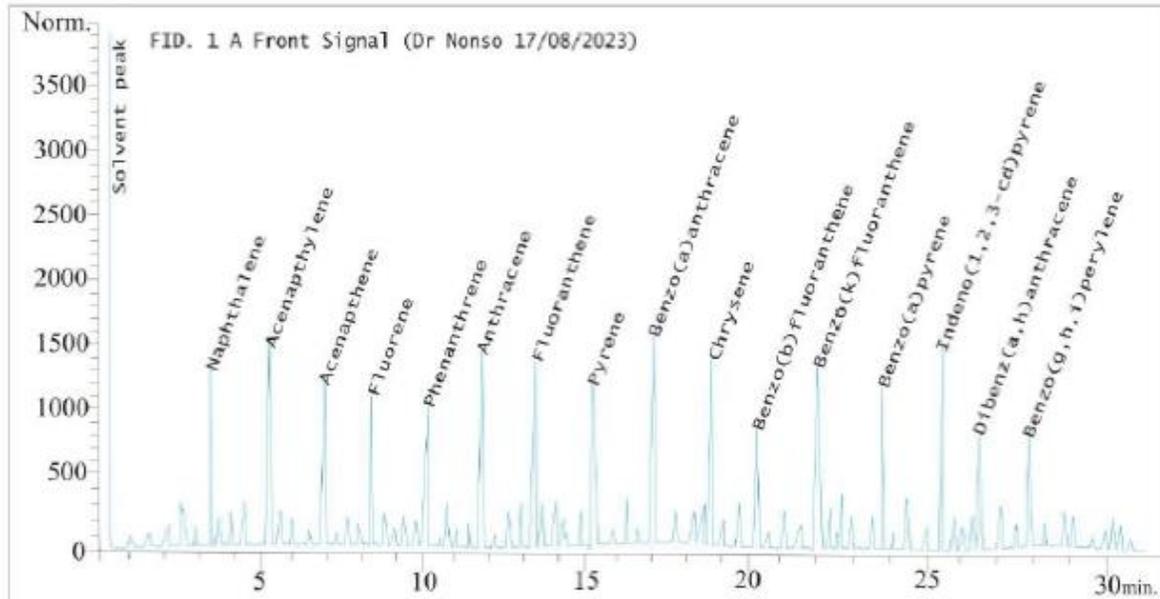
PAH Concentration after 0 weeks with 48ml E-Safe 15,308 ppm

Injection Date : 17/08/2023 09:10:33 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARALS75

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



TPH Concentration of test soil 15,308 ppm

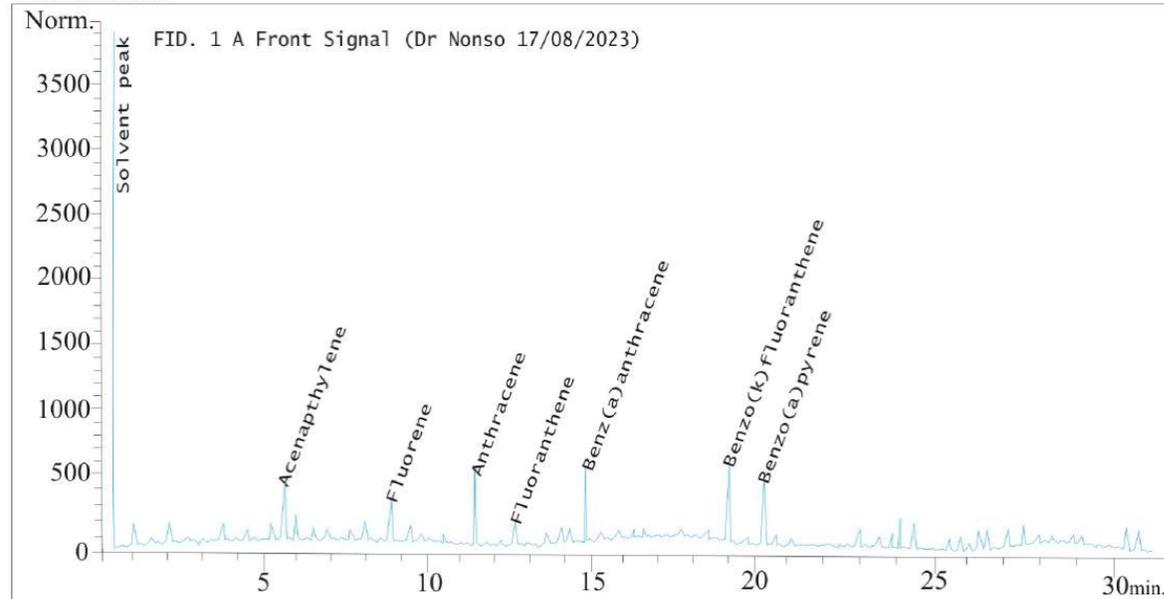
88.43 % TOTAL DEGRADATION ACHIEVED

Injection Date : 17/08/2023 12:35:15 PM
Sample Name : Sample 48
Acq. operator : ARALS75

Location : Vial 7
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



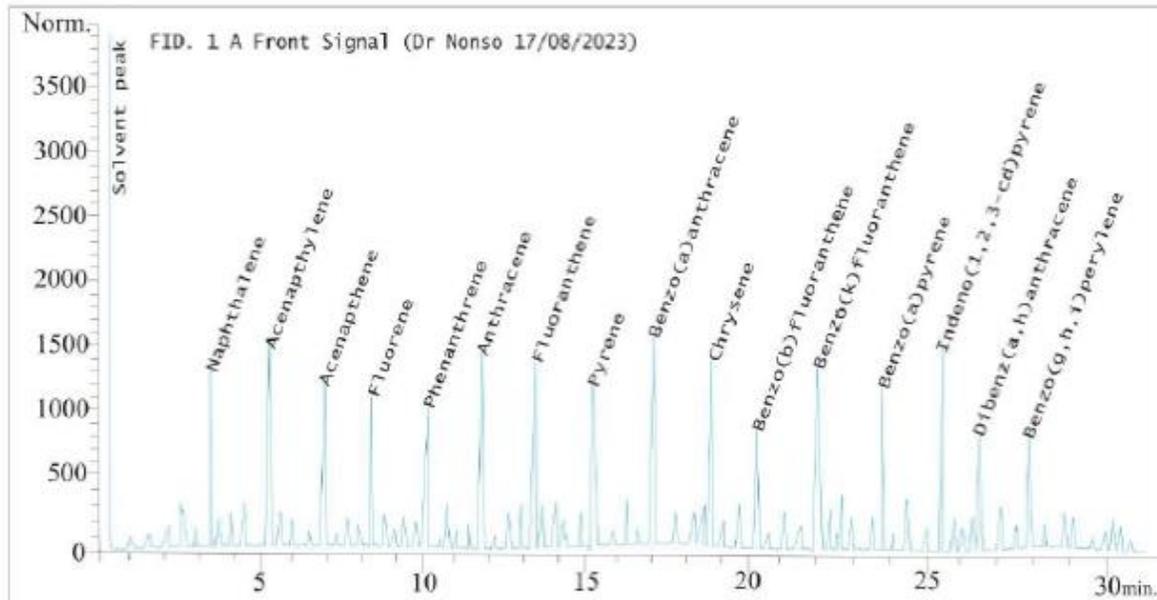
PAH Concentration after 4 weeks with 48ml E-Safe 2077.20 ppm

Injection Date : 17/08/2023 09:10:33 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARALS75

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



TPH Concentration of test soil 15,308 ppm

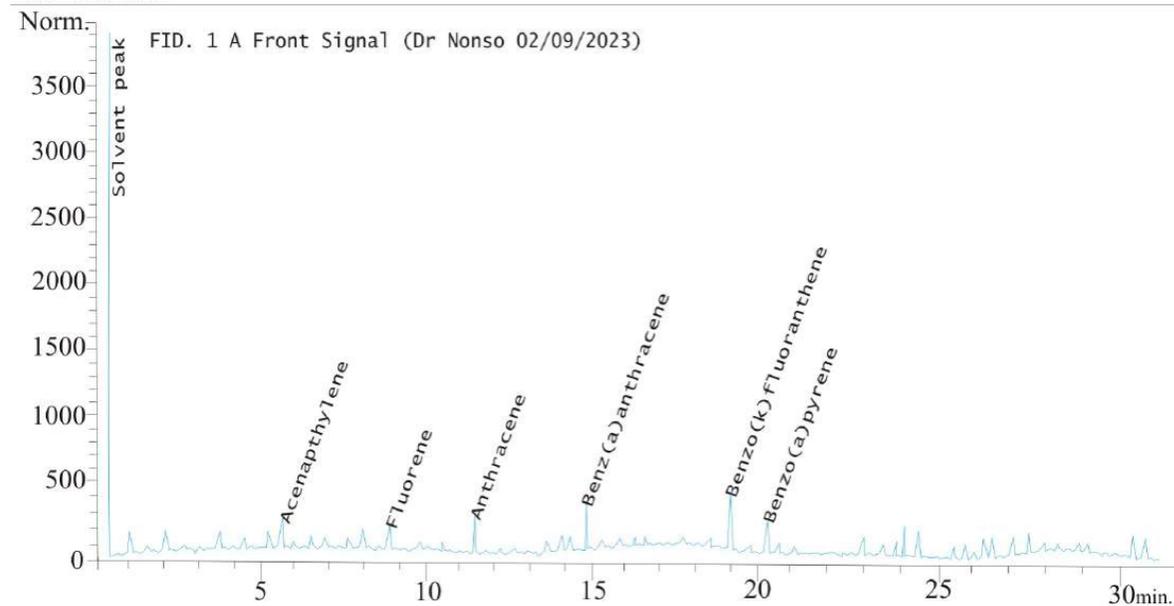
92.94 % TOTAL DEGRADATION ACHIEVED

Injection Date : 02/09/2023 01:41:22 PM
Sample Name : Sample 48
Acq. operator : ARALS75

Location : Vial 6
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



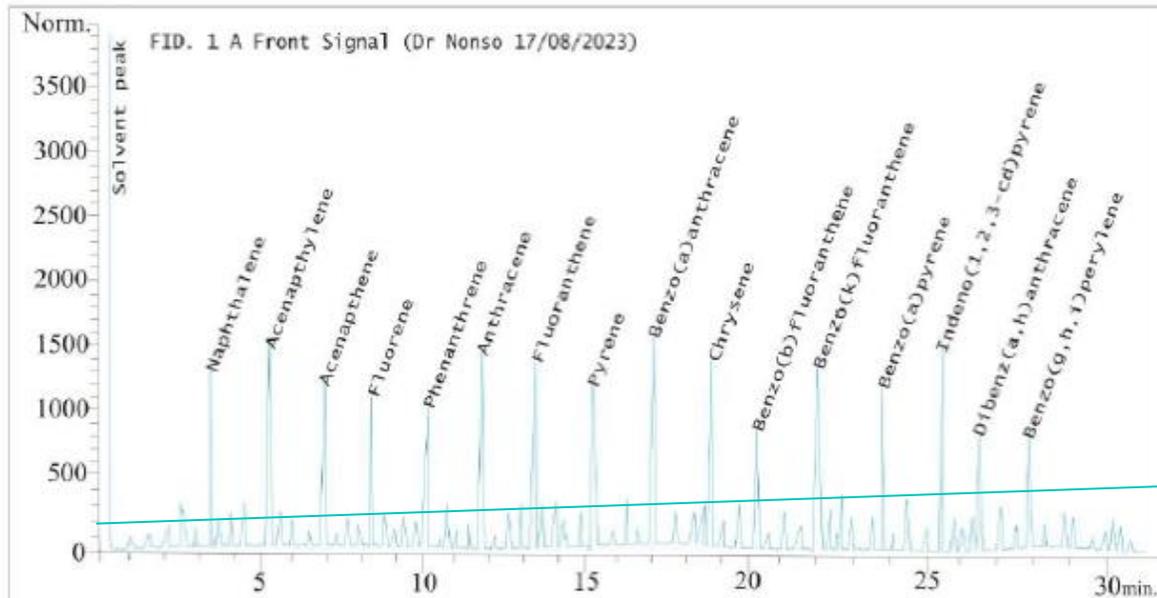
PAH Concentration after 6 weeks with 48ml E-Safe 1080.86 ppm

Injection Date : 17/08/2023 09:10:33 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARALS75

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2

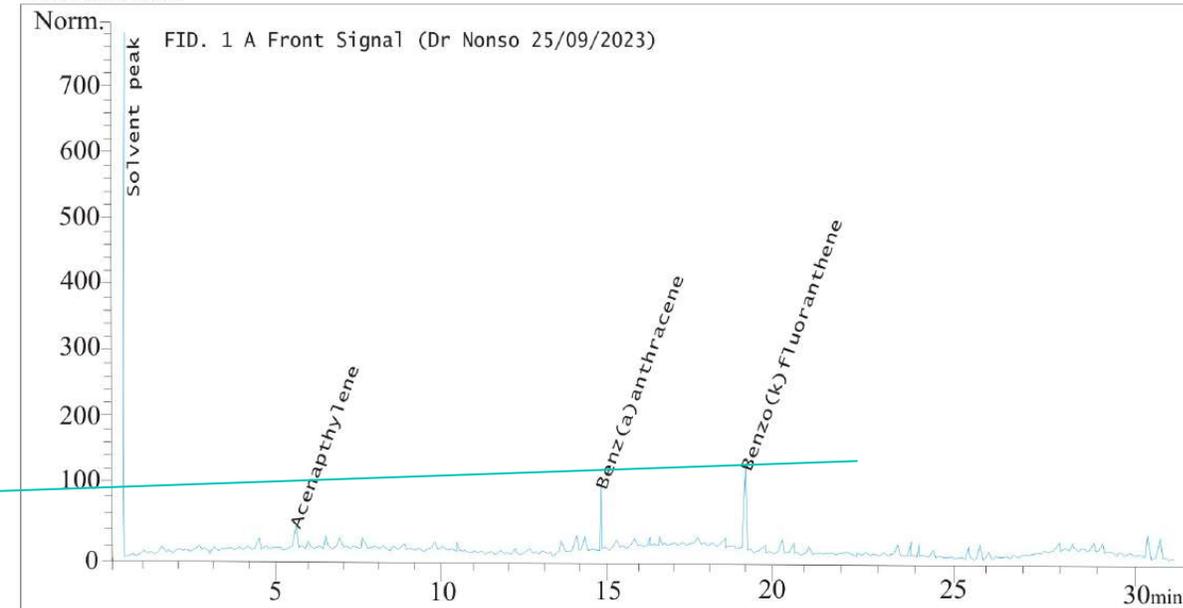


Injection Date : 25/09/2023 03:43:19 PM
Sample Name : Sample 48
Acq. operator : ARALS75

Location : Vial 6
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



TPH Concentration of test soil 15,308 ppm

99.01 % TOTAL DEGRADATION ACHIEVED

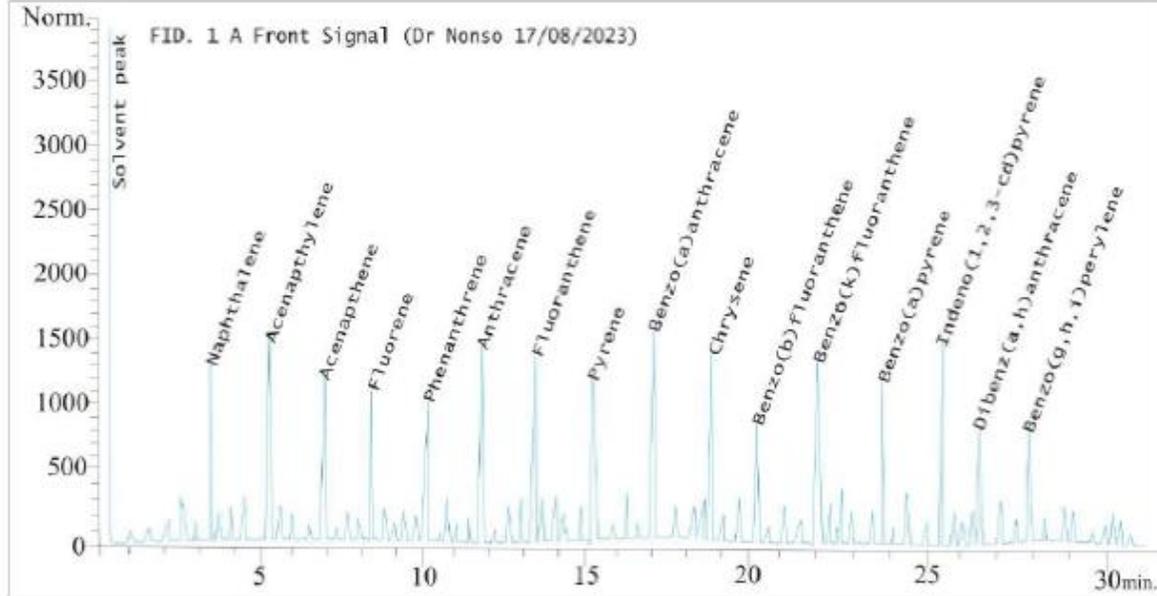
PAH Concentration after 8 weeks with 48ml E-Safe 151.33 ppm

Injection Date : 17/08/2023 09:10:33 AM
Sample Name : Sandy+Clay soil
Acq. operator : ARALS75

Location : Vial 1
Inj : 1
Inj Volume : 1 µl

Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



TPH Concentration of test soil 15,308 ppm

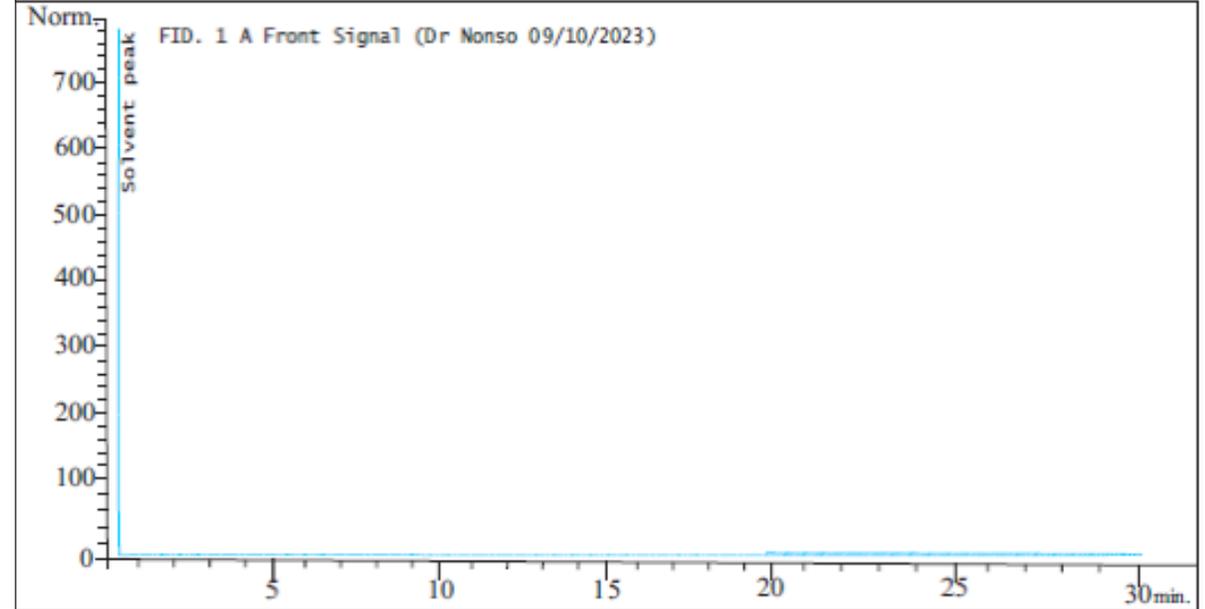
100 % TOTAL DEGRADATION ACHIEVED

Injection Date : 09/10/2023 01:06:19 PM
Sample Name : Sample 48
Acq. operator : ARALS75

Location : Vial 5
Inj : 1
Inj Volume : 1 µl

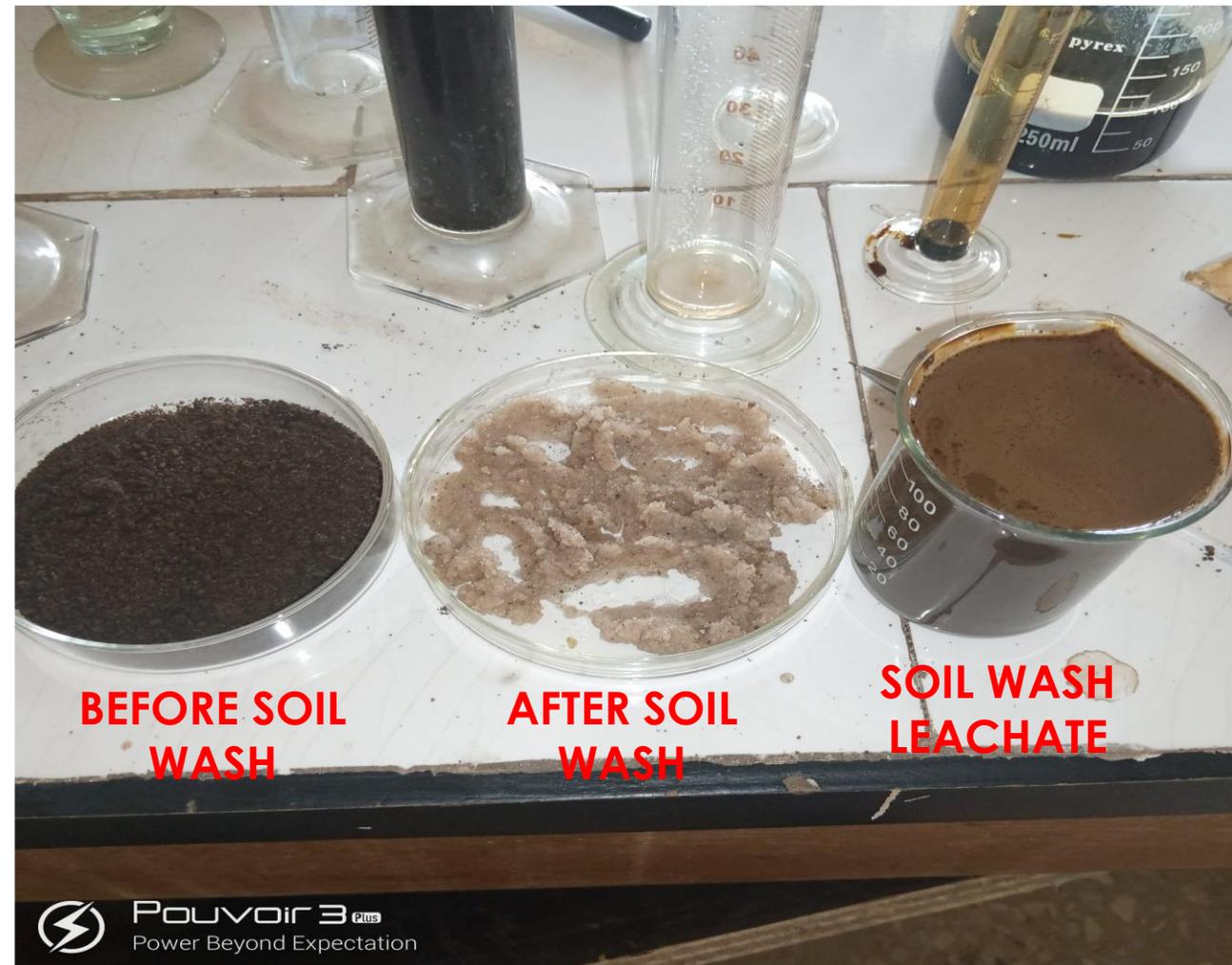
Method : C:/HPCHEM/1/METHODS/PAH-2.M
Last Changed : 23/04/2023 08:36:51 AM by ARALS75

PAH Method 2



PAH Concentration after 10 weeks with 48ml E-Safe 0.0000 ppm

E-SAFE ALSO PROVED TO BE A VERY EFFECTIVE SOIL WASH SOLUTION





NOSDRA

NATIONAL OIL SPILL DETECTION AND RESPONSE AGENCY (NOSDRA)

The Managing Director
BARCOPET LIMITED
5 Nyeche Street N/A Road,
Mgbuaba, Port-Harcourt

Date 23rd Aug, 2022

PRODUCT REGISTRATION PERMIT

Pursuant to the provision of relevant international legally binding convention on sound chemical management of which Nigeria is a signatory, and in exercise of the powers conferred on the Agency by the provisions of the National Oil Spill Detection and Response Agency (Establishment) Act No. 15 of 2006 and of all other powers enabling the Agency in that behalf, the Agency hereby permits the use and sale of:

ESAFE @ ENVIRONMENTALLY SAFE CLEANER

for the purpose of oil spill clean-up and oil impacted site remediation in the Nigerian Environment subject to the following conditions:

- a. The PERMIT is only applicable to the authorized range of products.
- b. That the PERMIT is for your use ONLY and not transferable to any other company.
- c. That the Agency reserves the right to monitor the use and application of oil clean-up/remedial range of products at all times.
- d. That the Agency reserves the right to revoke this PERMIT if you contravene the rules guiding safe use of chemicals and conditions attached thereto.
- e. The PERMIT is issued subject to payment of prescribed fees of FIFTY THOUSAND Naira (N50,000) only renewable every two (2) years from the date of issue.

Date of issue 23rd Aug, 2022

Date of Expire 22nd Aug, 2024

Director Planning, Policy Analysis and Research (PPAR) Department



NOSDRA

NATIONAL OIL SPILL DETECTION AND RESPONSE AGENCY (NOSDRA)

The Managing Director
BARCOPET LIMITED
5 Nyeche Street N/A Road,
Mgbuaba, Port-Harcourt

Date 23rd Aug, 2022

PRODUCT REGISTRATION PERMIT

Pursuant to the provision of relevant international legally binding convention on sound chemical management of which Nigeria is a signatory, and in exercise of the powers conferred on the Agency by the provisions of the National Oil Spill Detection and Response Agency (Establishment) Act No. 15 of 2006 and of all other powers enabling the Agency in that behalf, the Agency hereby permits the use and sale of:

SHEEN MAGIC

for the purpose of oil spill clean-up and oil impacted site remediation in the Nigerian Environment subject to the following conditions:

- a. The PERMIT is only applicable to the authorized range of products.
- b. That the PERMIT is for your use ONLY and not transferable to any other company.
- c. That the Agency reserves the right to monitor the use and application of oil clean-up/remedial range of products at all times.
- d. That the Agency reserves the right to revoke this PERMIT if you contravene the rules guiding safe use of chemicals and conditions attached thereto.
- e. The PERMIT is issued subject to payment of prescribed fees of FIFTY THOUSAND Naira (N50,000) only renewable every two (2) years from the date of issue.

Date of issue 23rd Aug, 2022

Date of Expire 20nd Aug, 2024

Director Planning, Policy Analysis and Research (PPAR) Department

MINISTRY OF PETROLEUM RESOURCES

DEPARTMENT OF PETROLEUM RESOURCES

7, SYLVESTER UGO CRESCENT, OFF AWOLOWO WAY, JABI DISTRICT, ABUJA

P.M.B. No:.....399 Garki Abuja

Telephone:.....09-9032000.....

Website: www.dpr.gov.ng



Ref. No DPR/HQ/HSE.04/003.700/2021/002.....

Date:.....14TH September 2021.....

The Managing Director
Barcopet Limited
5, Nyeche Street, NTA Road,
Mgbuoba,
Port Harcourt.
Dear Sir,

RECERTIFICATION OF FOUR (4) PRODUCTS/BIOREMEDIATION PRODUCTS FOR USE IN THE NIGERIA OIL AND GAS INDUSTRY

Reference made to your letter dated September 3, 2021, on the above subject.

2. Following the review of the technical data and Safety Data Sheets (SDS) submitted for the product and the attestation letter from the manufacturer confirming that the product has neither been reformulated nor reconstituted, we hereby re-certify the **PRODUCTS** listed below for deployment in the Oil and Gas industry in Nigeria.

PLUTUS PRA	Wax Inhibitor
PLUTUS OIL & WATER SEPERATOR	Demulsifier
E-SAFE	Bioremediation Agent
SHEEN MAGIC	Bioremediation Agent

3. This re-certification is issued with the following conditions:

- I. The use of these products shall comply with the provisions of section 25 of the Petroleum (Drilling and Production) Regulations, 1969 as well as Environmental Guidelines and Standards for the Petroleum Industry in Nigeria (EGASPIN 2018).
- II. Any changes made to the composition of these products or reformulation of same either wholly or partially without the consent of the DPR, automatically renders this re-certification invalid.
- III. User (s) of the products shall seek the approval of the DPR for its use under specified terms and conditions and shall remain fully responsible for any damage(s) done to the local environment on account of the use of the products.
- IV. Validity of these re-certifications is for a period of three (3) years from the date of this letter and is subject to periodic review(s) by the Department as deemed necessary.

4. Finally, you are to ensure that under no condition shall these products be sold outside the validity period of its approval.

Yours faithfully,

Balogun, A.A.

For: Director – CEO, Department of Petroleum Resources.

Plutus Product Delivery Options

Plutus product delivery options are either a 330 US Gallon IBC

\$42,000/IBC

EX-WORKS



Or a 55 US Gallon Drum



\$7000/DRUM

EX-WORKS



THANKS

www.plutus-environmental.com