Supplementary Information

Blends of Neem Oil based Polyesteramide as Nanofiber Mats to Control Culicidae

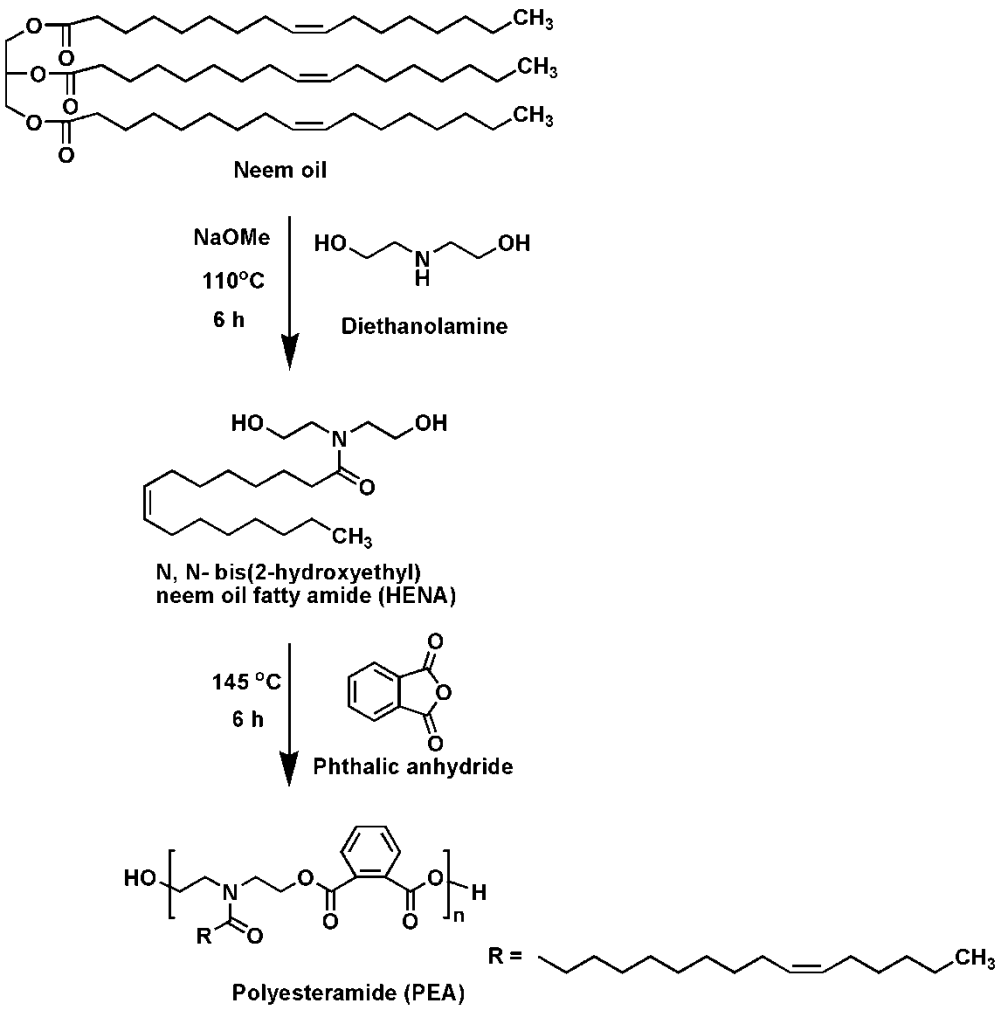
Sravanya Konchada[a], Naresh Killi[a,c], Shahebaz Sayyad[b], Ganesh B. Gathalkar[b,c] and Rathna VN Gundloori*[a,c]

[a] Polymer Science and Engineering Division, CSIR–National Chemical Laboratory, Dr. Homi Bhabha Road, Pune-411008, Maharashtra, India.

[b]Laboratory of Entomology, Division of Organic Chemistry, CSIR-National Chemical Laboratory, Dr. Homi Bhabha Road, Pune-411008, Maharashtra, India

[c] Academy of Scientific and Innovative Research (AcSIR), Ghaziabad-201002, Uttar Pradesh, India.

Corresponding author e-mail: rv.gundloori@ncl.res.in



Scheme 1S: synthesis of neem oil based PEA

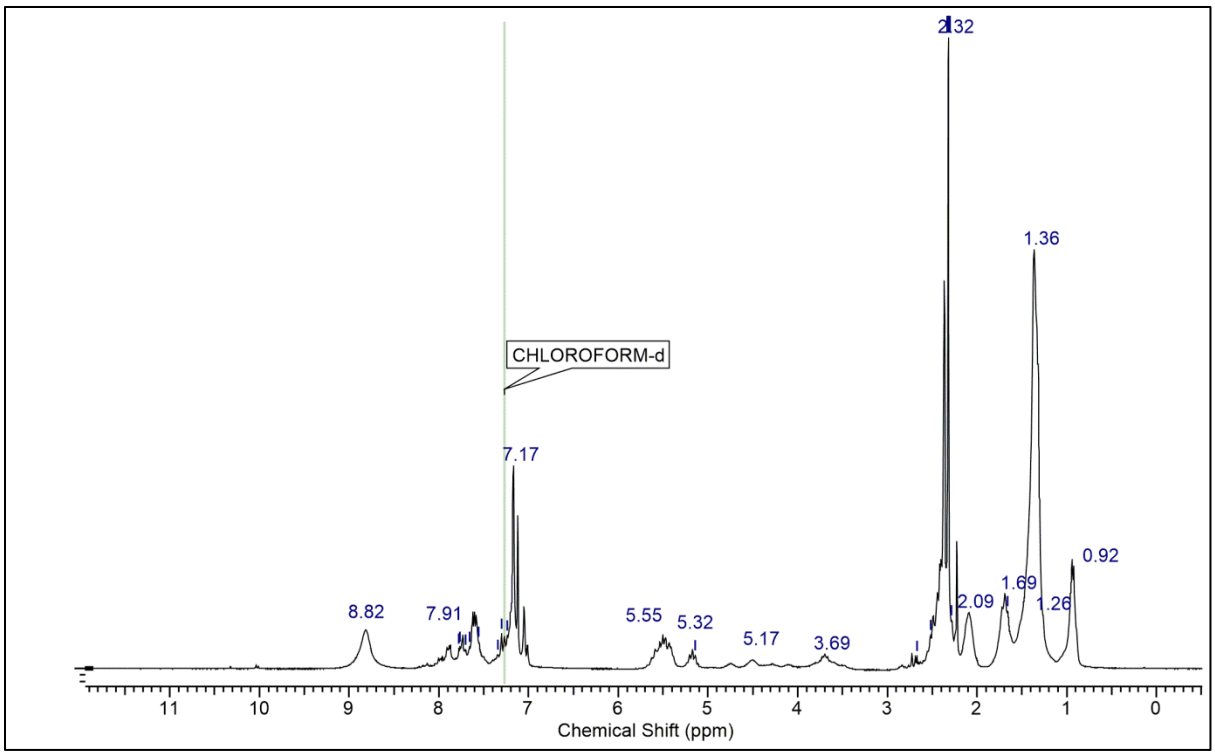


Figure 1S: ^{1}H NMR spectra of PEA.

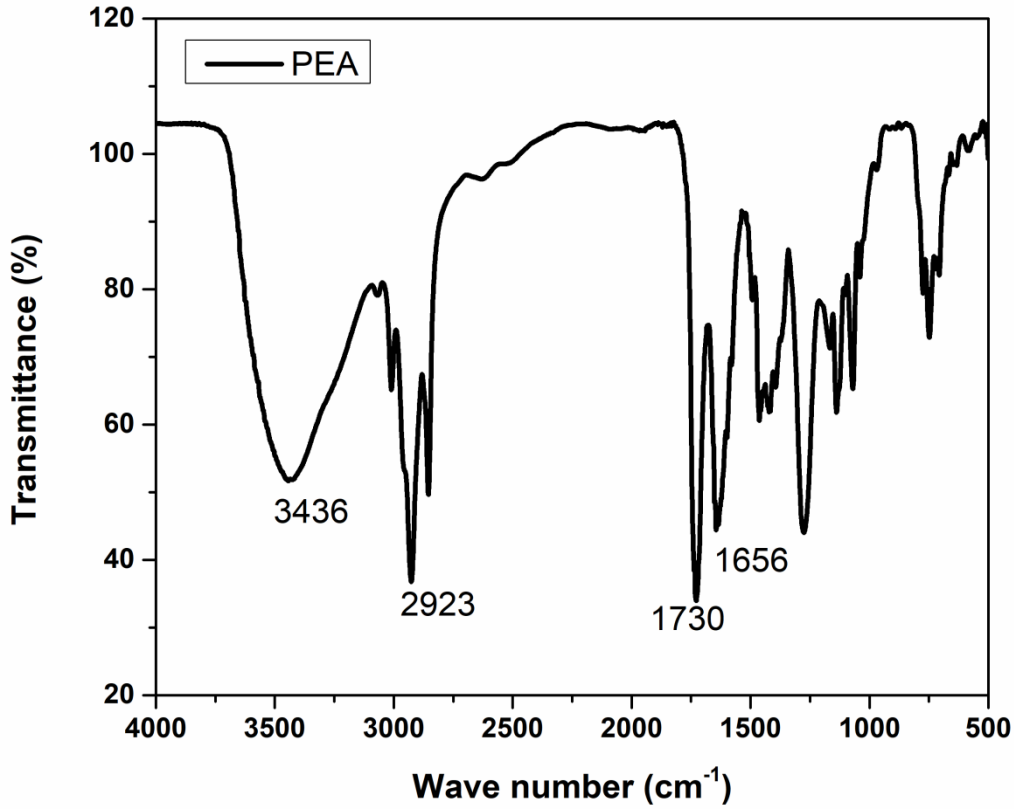


Figure 2S: FT-IR spectra of PEA.

Gas Chromatography-Mass Spectrometry (GC-MS) analysis:

Preparation of standard samples: 5 mg of transfluthrin was taken in 5 mL of volumetric flask and dissolved in 5 mL of hexane. From this stock solution the serial dilutions, 1, 0.5, 0.25, 0.125, 0.065 mg/mL were prepared by diluting with hexane. The prepared standard samples were analyzed by GC-MS. The standard curve (Figure 2) was prepared using the peak abundance vs. concentration of the sample. Figure 1 shows the GC-MS graph of transfluthrin.

Method: The GC-MS was performed by using a 7890A gas chromatography unit with a 5975C inert XL, EI mass spectrometer detector (MSD) (Agilent Technologies, Agilent Technologies USA) operated in electron ionization (EI) mode with a kinetic energy of impacting electrons of 70 eV. The Restek Rtx®-5MS fused silica capillary column (30m ×250µm×0.25µm) with the low polarity stationary phase (5% diphenyl / 95% dimethyl polysiloxane) was used for GC-MS. The GC-MS data were analyzed with the ChemStation software and National Institute of Standards and Technology (NIST) mass spectral library (Agilent Technologies). The oven temperature was programmed was initiated with 70°C withhold of 0 min then raised with the ramp of 10 °C/min up to 300 °C with 5 min hold. Helium (99.9% pure) was used as a carrier gas with a constant flow rate of 1mL/min. The inlet temperature was kept at 290°C in spitless mode. The auxillary temperature was kept at 270°C. The EI (MS source) and MS quad temperature were kept at 230°C and 150°C, respectively. Mass spectra and reconstructed total ion chromatograms (TIC) were obtained after 4 min solvent delay by automatic scanning in the unified mass range of 50-600 u. The sample (Transfluthrin) was identified by comparing the retention time and mass fragmentation pattern with a standard compound (Transfluthrin standard).

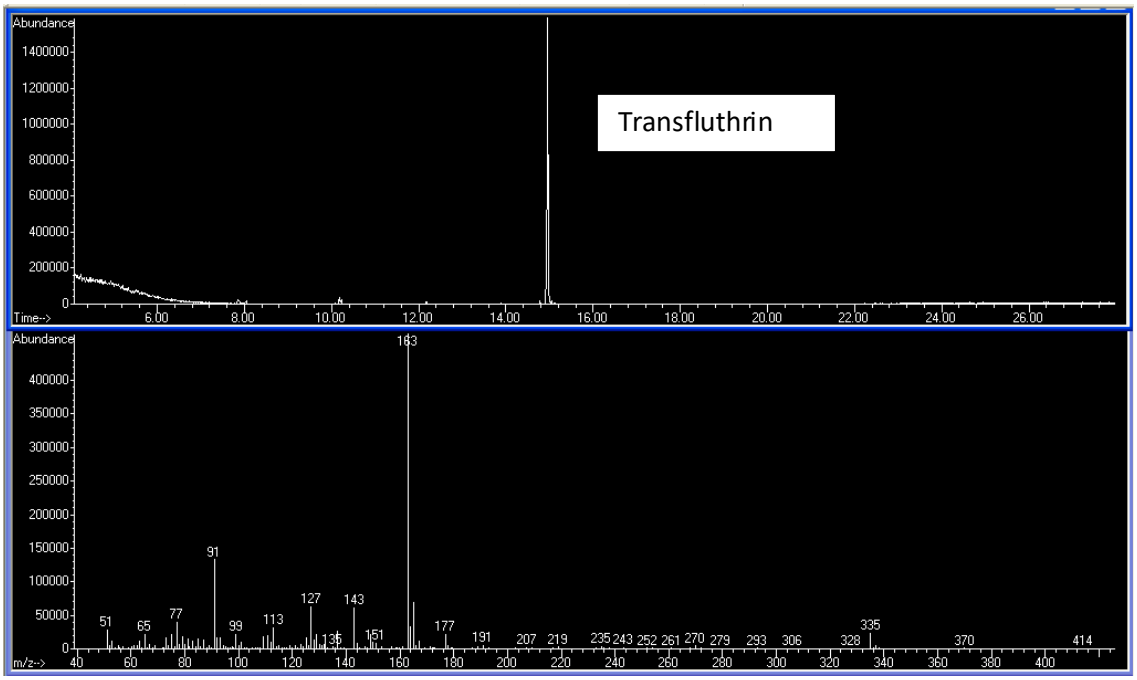


Figure 3S: GC-MS graph of standard transfluthrin.

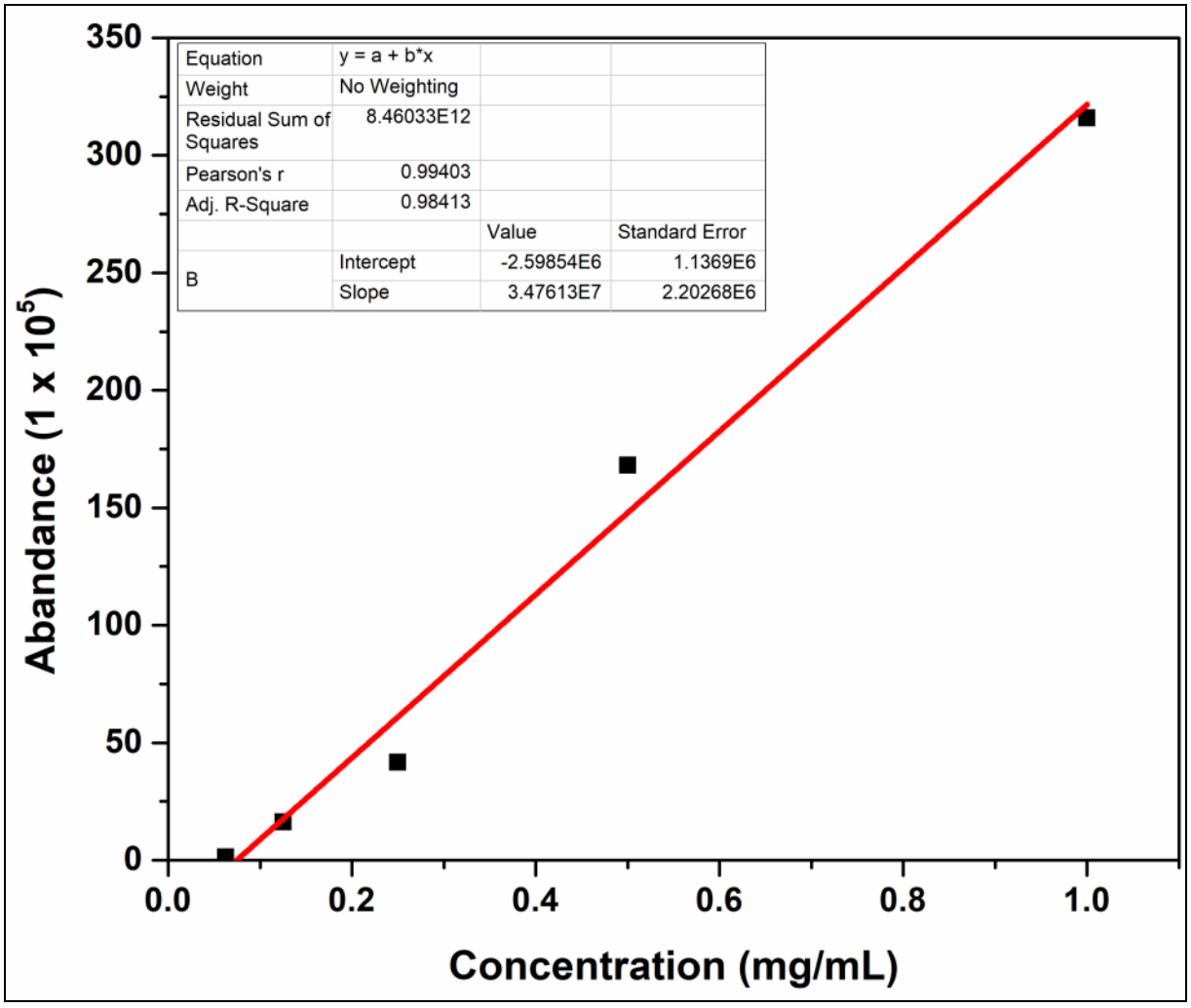


Figure 4S: Standard curve of transfluthrin.

Preparation of test samples: The concentration of the transfluthrin released from the blend compositions (PPT-1335 and PPTF-1335) was recorded for 12 h using the above standard curve. The blend compositions (PPT-1335 (10 mg) and PPTF-1335 (20 mg)) were taken in the closed glass vial. After 12 h, the vapors were collected in a glass vial containing 1 mL of hexane using a vacuum at 0˚C and closed with Teflon. The collected samples were used for estimating the concentration of transfluthrin by GC-MS. Figure 3S and 4S shows the GC-MS graph of the respective samples, PPT-1335 and PPTF-1335.

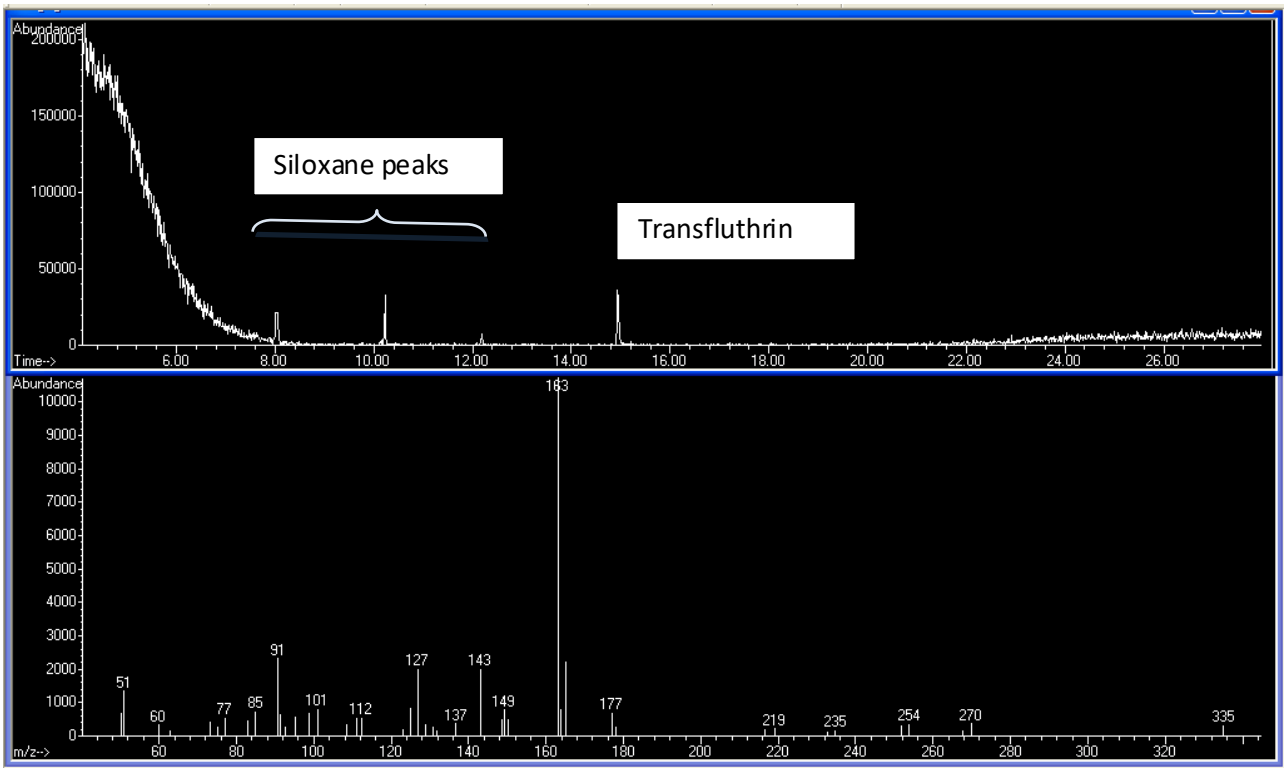


Figure 5S: GC-MS graph of transfluthrin, released from the nanofiber mat (PPT-1335) after 12 h.

Note: Siloxane peaks which are impurities from the column (HP-5)

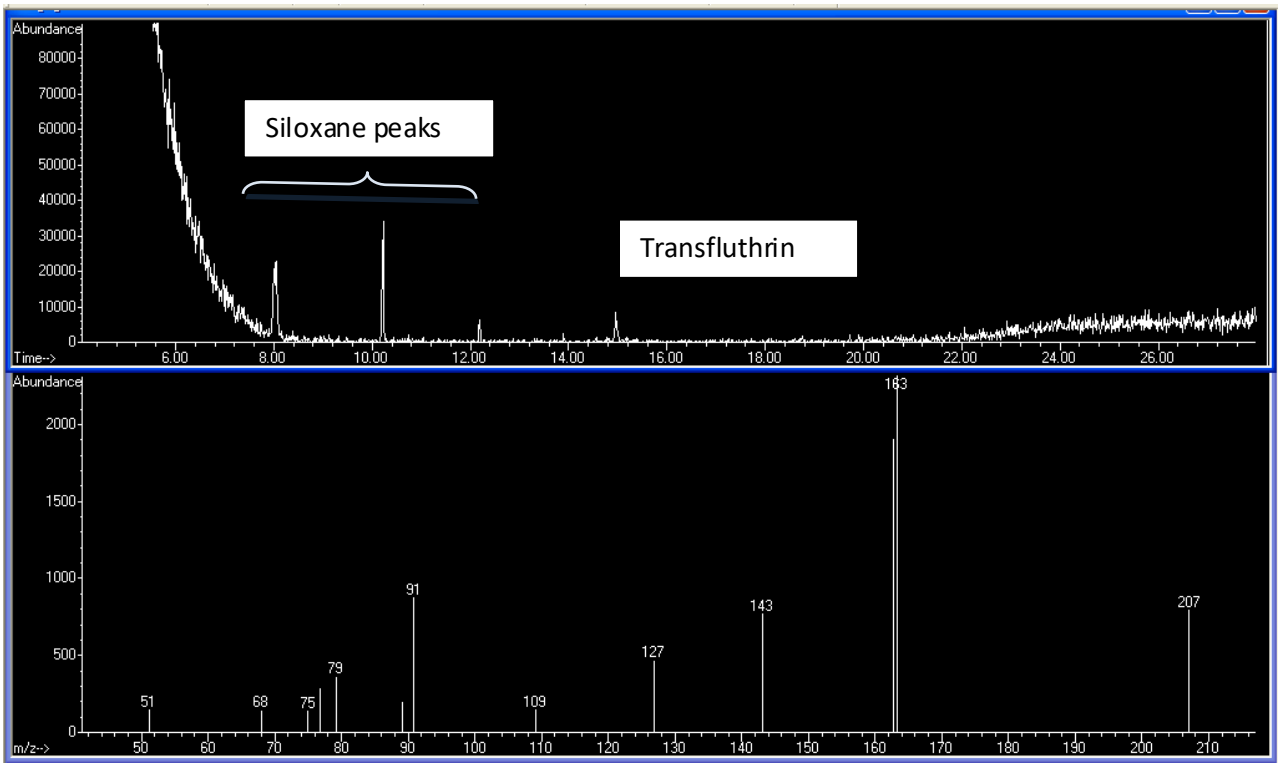


Figure 6S: GC-MS graph of transfluthrin, released from film (PPTF-1335) after 12 h.

Note: Siloxane peaks which are impurities from the column (HP-5)

The released transfluthrin after 12 h was 0.096 mg/mL and 0.08 mg/mL for the respective compositions, PPT-1335 and PPTF-1335. Moreover, we have performed the extraction studies of the transfluthrin by adding the nanofiber mat in the 1 mL of hexane for 12 h then filter the solution using 0.45 µ filter. The solution was analyzed by GC-MS.

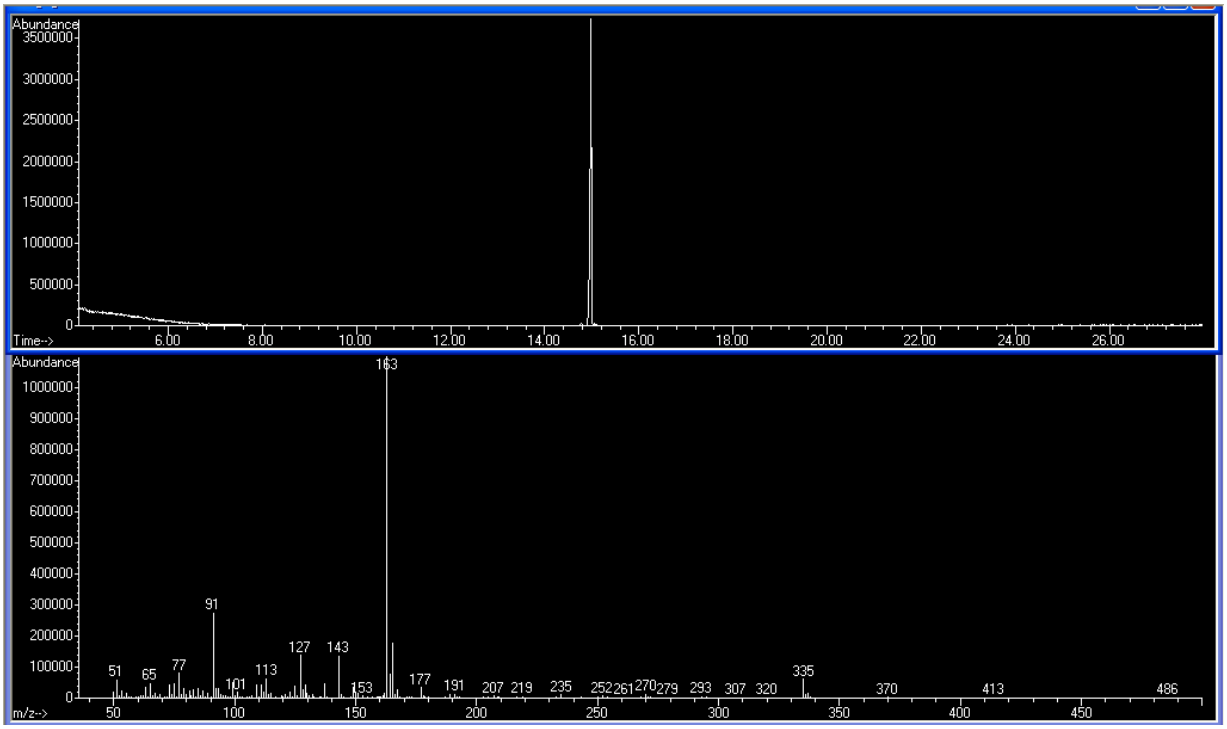


Figure 7S: GC-MS graph of transfluthrin extracted from nanofiber mat (PPT-1335) using hexane after 12 h.