The impact of e-cigarettes and tobacco heating products on indoor air quality

Recent years have seen the development and adoption of next generation products (NGP) for aerosol based nicotine delivery. This study measures the potential impact of NGP products in these categories relative to cigarette smoke (CS) with respect to indoor air quality and residual tobacco smoke odour, often described as indicators of ‘second-hand’ or ‘third-hand’ smoke respectively. Measurements were conducted for selected chemicals, physical aerosol properties, and residual odour on Fabric, Hair and Skin.

EXPERIMENTAL — ODOUR

- Fabric, Hair exposed to mainstream and sidestream aerosol; 4 puffs cigarette; 8 puffs new products; then 60 mins exposure
- Trained panel scoring of residual tobacco smoke odour using Magnitude Estimation; paired v 3R4F ref. cigarette scored as 50
- Skin exposure: hands cleaned, then one hand using product; other as control (scored on 0–10 Visual Analogue scale)

EXPERIMENTAL — IAQ

- 4 volunteers, 4 hour exposures in a 378m² room @1.2ACH to represent home exposure, (BS EN 15251)
- Morning control, afternoon test
- 20 sticks or minimum of 160 e-cigarette puffs
- Central sampling bar
- Cambustion DMS-500 & pumps outside room

MEASURED SPECIES — METHODS

- Aerosol mass, number diameter:
  - Combustion DMS-500
- Chemical measurements
  - VOCs: Tenax TA, TD-GC-MS
  - Carbonyls: Waters 2,4, DNPH cartridge, HPLC
  - 4 TSNAs: bisulphate filter, HPLC-MS
  - 16 USEPA PAH: XAD-2, GC-MS
  - Nicotine, 3-EP, Glycerol: XAD-4, XAD-7, GC-MS
  - CO, CO₂: TSI 7575 O-Trak
  - NO, NO₂: Thermo Environmental Systems 42C