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 BAT products in these categories relative to cigarette smoke (CS) with respect to indoor air quality and residual tobacco smoke odour. Measurements were conducted for selected chemicals, physical aerosol properties, and residual odour on Fabric, Hair and Skin.

EXPERIMENTAL — ODOR

- 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 t 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)

Conclusion: Our development of new nicotine delivery products which do not burn tobacco show no evidence of combustion by-products. They demonstrate significantly reduced chemical and particle emissions and odour residue versus conventional cigarettes (Forster et al., 2017, Reg. Tox. Pharm, submitted)

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

Mean odour intensity score

Aerosol mass versus time: single runs uncorrected for air controls. Emissions activity observed on use but at 2 orders of magnitude lower than cigarette smoke and within indoor and outdoor air quality standards

Conclusion: Products which do not burn tobacco show no evidence and odour residue versus conventional cigarettes and odour residue versus conventional cigarettes (Forster et al., 2017, Reg. Tox. Pharm, submitted)

MEASURED SPECIES — METHODS

- Aerosol mass, number diameter:
  - Cambustion DMS-500
- Chemical measurements
  - VOCs: Tenax TA, TD-GC-MS
  - Carbonyls: Waters 2.4, DNPH cartridge, HPLC
  - 4 TSNA: bisulphate filter, HPLC-MS
  - 16 USEPA PAH: XAD-2, GC-MS
  - Nicotine, 3-EP, Glycerol: XAD-4, XAD-7, GC-MS
  - CO, CO₂: TSI 7675 Q-Trak
  - NO, NO₂: Thermo Environmental Systems 42C

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 BAT PRODUCTS IN THESE CATEGORIES RELATIVE TO CIGARETTE SMOKE (CS) WITH RESPECT TO INDOOR AIR QUALITY AND RESIDUAL TOBACCO SMOKE ODOR. MEASUREMENTS WERE CONDUCTED FOR SELECTED CHEMICALS, PHYSICAL AEROSOL PROPERTIES, AND RESIDUAL ODOR ON FABRIC, HAIR AND SKIN.