



[ISO/TC 126/WG 10](#)

Intense smoking regime

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Effects of filter ventilation and activated carbon filters on cig. smoke constituent uptake - Presentation W Röper

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Expected action

Info

Effects of filter ventilation and activated carbon filters on cigarette smoke constituent uptake in UK smokers – some biomarker data

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Imperial Tobacco Group**

ISO TC 126 WG10 meeting, Madrid 11 May 2009

What is claimed...

- **“Surrogate exposure indicators suggest that filter ventilation does not lead to any reduction in exposure...”**

W E Stephens 2007, Tobacco Control 16

- **“The use of charcoal in cigarette filters is an example of a design change with an impact that is not well characterized by normalization to nicotine.” [using ISO smoking data]**

WHO 2008, Technical Report Series 951

Study objectives

- **To evaluate the smoke uptake by UK regular smokers of factory manufactured cigarettes (FMCs) with 8~10 mg & 5~7 mg ISO 'tar', resp.**
- **To study the effects of switching to carbon filtered test cigarettes with comparable tar yields on smoke uptake in a sub set of these smokers.**

The biomarker study...

Imperial work from 2006/07, in collaboration with COVANCE, UK

- **Clinical out-patient study in two parts**
- **Part 1: cross-sectional, males & females**
 - 581 UK smokers of FMCs 8~10 mg ISO tar
 - 207 UK smokers of FMCs 5~7 mg ISO tar
 - 'Smoking diary', self-reported daily consumption
 - One 24-hour-urine and blood collected
 - Urinary biomarkers corrected for creatinine excr.
 - Biomarker data **not** corrected for daily cigarette consumption

The biomarker study...

- **Part 2: brand-switching for three weeks to carbon filtered test cigarettes (10 & 6 mg ISO tar, resp.)**
 - 54 & 51, resp., smokers recruited from part 1 groups, ad libitum smoking, free cigarette supply
 - Recruitment independent of part 1 results (first come, first served), target number 50, minimum
 - 24-hour-urine and blood collected after three weeks of switching
 - Smoking diary and data evaluation as in part 1

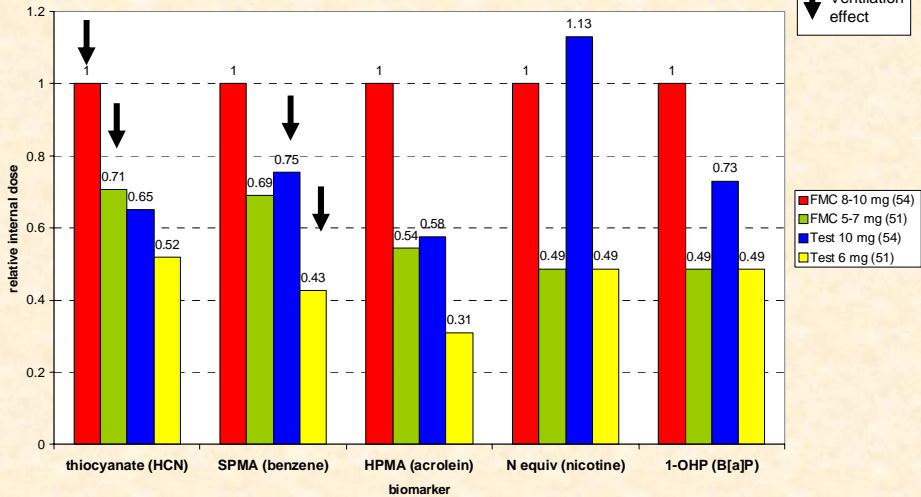
Biomarkers analysed...

- **Nicotine + 5 in urine (→ nicotine uptake)**
- **COHb in blood (→ CO uptake)**
- **NNAL in urine (→ NNK uptake)**
- **1-OHP in urine (→ PAH, B[a]P uptake)**
- **Thiocyanate in blood (→ HCN uptake)**
- **Acetonitrile in blood**
- **SPMA in urine (→ benzene uptake)**
- **HPMA in urine (→ acrolein uptake)**
- **MHBMA & DHBMA in urine (→ 1,3 butadiene uptake).**

- **All biomarker levels normalised (FMC 8~10 mg = 1) for the purpose of this presentation**

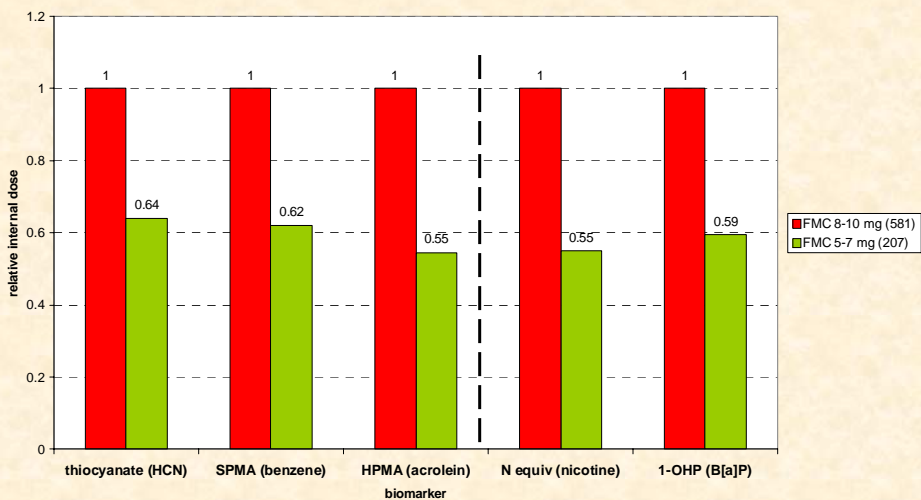
Effects of filter ventilation & carbon filters (FMCs & test cigarettes) – Full data set

Biomarkers of exposure to selected GVP and particulate compounds



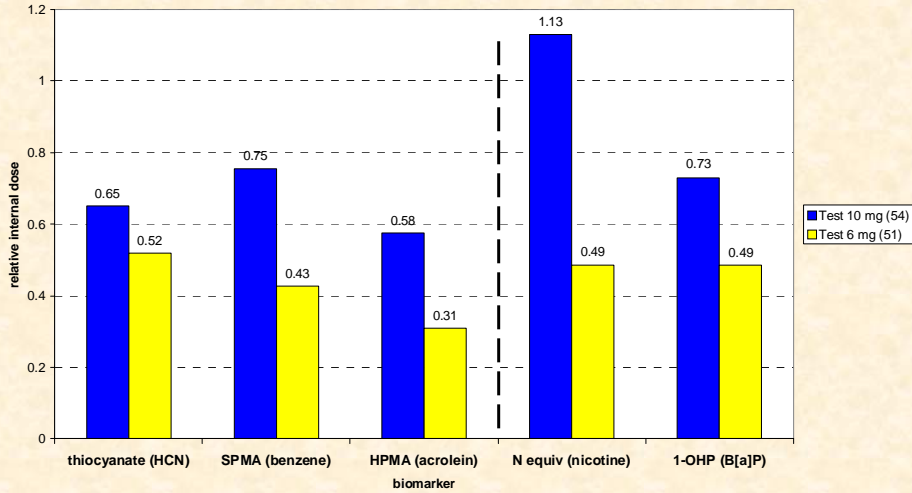
Effect of filter ventilation – FMC products

Biomarkers of exposure to selected GVP and particulate compounds (all subjects)



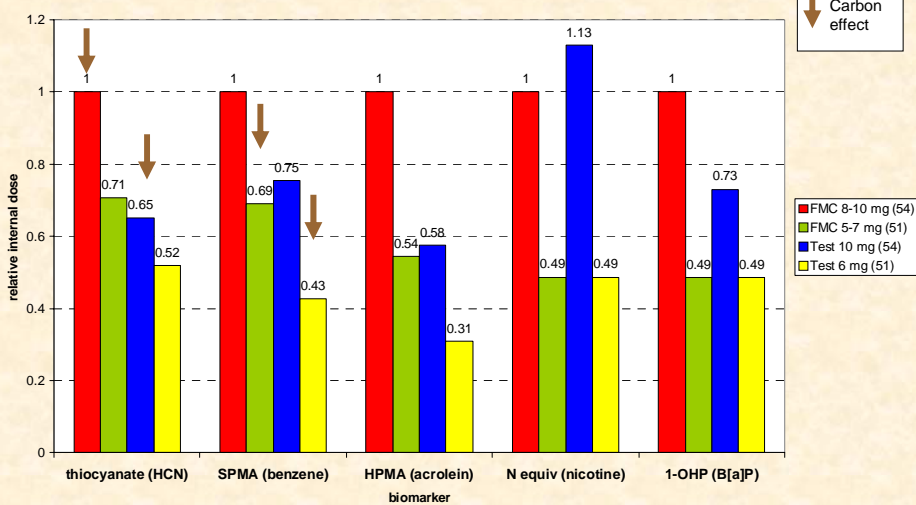
Effects of filter ventilation – carbon filters

Biomarkers of exposure to selected GVP and particulate compounds



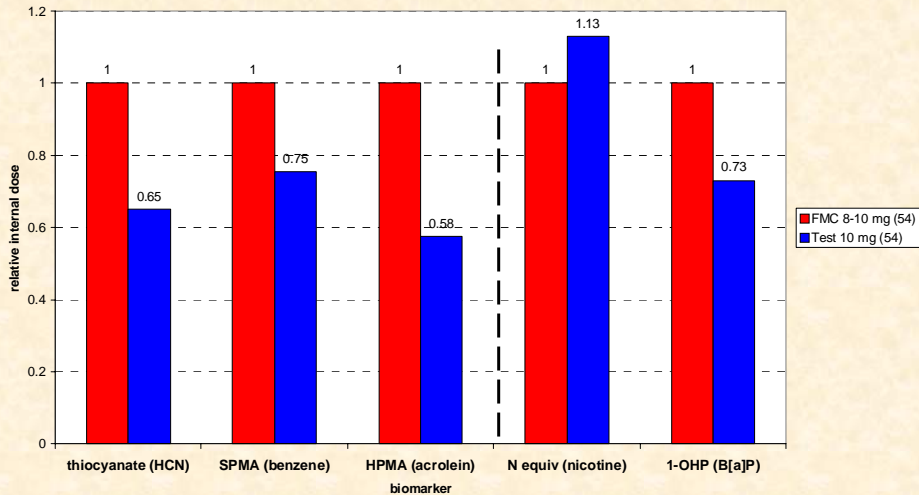
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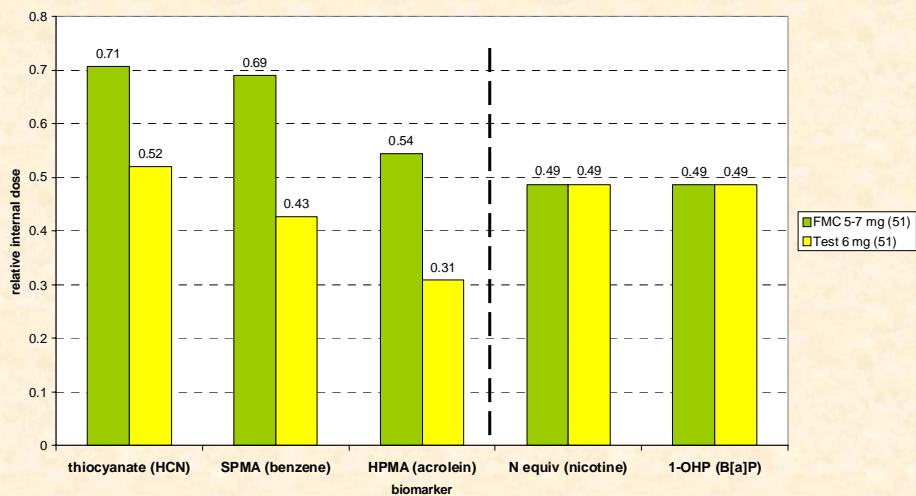
Effect of carbon - ~ 10 mg products

Biomarkers of exposure to selected GVP and particulate compounds



Effect of carbon – ~ 6 mg products

Biomarkers of exposure to selected GVP and particulate compounds



Conclusions

Data from this study suggest that, **under human smoking conditions,**

- Filter ventilation is the most effective tool to reduce smoke constituent uptake
- Carbon filters are an effective tool to even further reduce smokers' exposure to vapour phase compounds.