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Effect of temperature and humidity on the gas–particle partitioning of nicotine in mainstream cigarette smoke: a diffusion denuder study

E. John^a, S. Coburn^a, C. Liu^a, J. McAughey^{a,*}, D. Mariner^a, K.G. McAdam^a, Z. Sebestyén^b, I. Bakos^b, S. Dóbe^b

^aBritish American Tobacco, R&D Centre, Regents Park Road, Southampton SO15 8TL, UK

^bResearch Centre for Natural Sciences of the Hungarian Academy of Sciences, Magyar tudósok körútja 2, H-1117 Budapest, Hungary

*Corresponding author: J. McAughey. john_mcaughey@bat.com; Tel.: +442380793451.

ABSTRACT

During cigarette smoking, nicotine deposition in the mouth, upper airways and deep lung can occur via rapid diffusion of gas-phase nicotine and via deposition of particle-bound nicotine, with changing proportions, dependent on physical and chemical equilibria. We have used a diffusion denuder approach to physical equilibria to evaluate comprehensively the percentage of nicotine that is initially in the gas phase of mainstream cigarette smoke under different temperature (T) and relative humidity (RH) conditions. Smoking experiments with University of Kentucky 3R4F research cigarettes were performed at six denuder T values (291–335 K) and three RH values (30%, 45% and 60%). G/P partitioning of nicotine increased significantly with

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