Saturation of Cigarettes with Menthol

Introduction

Menthol is often used as a cigarette ingredient by several manufacturers. Menthol itself is not considered to be acutely toxic. In the concentrations applied in commercial brands, it does not seem to modify the biological activity of cigarette smoke (Risk Assessment for Menthol, PI, PM). Further testing requires cigarettes containing defined, high levels of menthol. In this context the question arose, how fast menthol is taken up by cigarettes exposed to a saturated menthol atmosphere at room temperature.

Materials and Methods

Menthol is a crystalline, colorless substance (at room temperature) with a molecular weight of 156,27 g/Mol. Its melting point is 41 to 44°C, its boiling point is 212 to 216°C, and its vapor pressure is 1 mm Hg at 86°C.

Three reference cigarettes (1R4F) each were placed in a closed glass desiccator together with approximately 1 g of menthol at room temperature for different time periods. The cigarettes within the desiccator were placed on a stainless steel screen without direct contact to the menthol crystals. For appropriate mixing of the menthol vapor within the desiccator, a small fan was placed below the screen blowing across the menthol crystals.

After 1, 2, 3, 7, and 14 days the menthol concentrations each in the cigarette rods and filters were determined gaschromatographically.

Results and Discussion

As can be seen from Figure 1, loading of cigarettes with menthol by saturation of the surrounding atmosphere within a closed system is possible with time. Equilibrium has not jet been reached after 14 days of exposure. Equilibrium content of menthol can be estimated to be approximately 20 mg/cigarette.