A43   Analysis of Sweat Components Using Headspace Solid-Phase Microextraction (HSPME)

Mi-Jung Choi*, Chungnam National University, 305-764, Daejeon, KOREA; Chang Hwan Oh, PhD, Deptartment of Oriental Medical Food and Nutrition, Semyung University, Jecheon, 390-711, KOREA; and Sung-Woo Park, Chungnam National University, 305-764, Daejeon, KOREA

The goal of this presentation is to present the research results which suggest that the analysis based on individual characteristics of human sweat emanations could provide useful information for the forensic science investigation.

This research will impact the forensic community by proving that there are individual characteristics of human sweat emanations and this could provide useful information for the forensic science investigations.

Sweating is controlled from a center in the preoptic and anterior regions of the hypothalamus where thermosensitive neurons are located. The heat regulatory function of the hypothalamus is also affected by inputs from temperature receptors in the skin. Sweat is not pure water; it always contains a small amount (0.2 - 1%) of solute. When a person moves from a cold climate to a hot climate, adaptive changes occur in their sweating mechanisms. This research is observing the forensic application of human odor by sweat and grouping and identification of Korean male. Individual sweats of humans are determined by several factors. These factor divided of regardless of diet or environmental factor (primary factor), present because of diet and environmental factors (secondary odor), influenced of outside source(i.e., lotion, soaps, perfumes etc). We evaluated the components present in human sweat by headspace solid phase microextraction (HSPME) and 2nd dimensional gas chromatography (GC×GC) - time of flight mass spectrometry

(TOFMS). We collected sweat sample from three male donors. A total of 269 compounds were identified as components of human sweat. Compound classes present in human sweat, such as carboxylic acids, alcohols, aldehydes, aliphatics/aromatics, amides/amines, esters, halides, heterocyclics, ketones, thio/thioesters/sulfonyls, oxide, sulfides, nitro compounds. Common components such as alcohols (2-decen-1-ol, 2- phenoxy ethanol, 2,7-dimethyl-1-octanol, 2-butyl-1-octanol), aldehydes (nonanal, dodecanal, octanal), aliphatics/aromatics (tetradecane, 2,6- dimethyl-heptadecane, 2,3,5,8-tetramethyldecane, nonadecane, hexatriacontane, 1,3-bis(1,1,-dimethylethyl)- benzene, biphenyl, 2,6- dimethyl-naphthalene, phenanthrene) esters (4-methyl-benzoic acid, oxalic acid) heterocyclics (2,4,6-trimethyl pyridine, dibenzofuran, N-[4- bromo-n-butyl]-2-piperidinone, 1H-indole), ketones (4,6-dimethyl-2- heptanone),2-methyl-2-undecanethiol 7-Acetyl-6-ethyl-1,1,4,4- tetramethyltetralin, 2,4-bis(1,1-dimethyl ethyl)-phenol were found. Individually distinct components as 2-nonenal, 2-undecenal with age and identified the influence of outside sources (soaps, lotions, perfumes) as Lily aldehyde, 2,6-dimethyl-naphthane, etc and environmental factors(dibenzo thiophene, 9H-fluoren-9-one, fluorene, fluoranthene, 9H- Xanthene, 1H-Indene) were also found. The results suggest that the analysis based on individual characteristics of human sweat emanations could provide useful information for the forensic science investigation

Sweat, Individual Characteristic, HSPME/TOFMS