

Smoking habit and profile of urinary mercapturic acids: comparison between tobacco, electronic cigarette and non-smoking habits

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INTRODUCTION: Tobacco smoke contains about 4000 chemicals, several of which are carcinogens to humans. The content of electronic cigarette (e-cig) smoke is less known. Upon absorption, the inhaled compounds undergo biotransformation to electrophilic intermediates, believed to be active species, able to react with DNA, and are eliminated in urine as mercapturic acids (MA). Aim of this work was to assess exposure to toxicants in tobacco smokers, e-cig smokers and non-smokers using the MA profile.

METHODS: Sixty-seven individuals, of which 22 tobacco smokers (S), 7 e-cig smokers (e-S) and 38 non-smokers (NS) were studied. Eighteen urinary MA from acrolein (3-HPMA), acrylamide (AAMA, GAMA), acrylonitrile (CEMA, HEMA), benzene (SPMA), 1,3-butadiene (DHBMA, MHBMA), crotonaldehyde (CMEMA, HMPMA), 4-chloronitrobenzene (NANPC), N,N-dimethylformamide (AMCC), ethylene oxide (HEMA), propylene oxide (2-HPMA), styrene (PHEMA1 e 2), toluene (SBMA), methylating (MMA) and ethylating agents (EMA), were measured by LC-MS/MS.

RESULTS: Median MA levels ranged from <LOQ for NANPC to 1594 µg/L for 3-HPMA in S; from <LOQ for SPMA to 414 µg/L for 3-HPMA in e-cig; from <LOQ for EMA and SPMA to 342 µg/L for DHBMA in NS. Differences among groups were found: 2-HPMA, 3-HPMA, AAMA, AMCC, CEMA, DHBMA, HEMA, HMPMA, PHEMA, SPMA were higher in S than in NS, and CEMA was higher in e-cig than in NS.

CONCLUSIONS: The measurement of urinary MA in subjects with different smoking habits confirms that both tobacco and e-cig smoke are sources of exposure to electrophilic chemicals.