**BACKGROUND**

- Little cigars (small sheet-wrapped, weight ≤ 1.36g) are a subcategory of cigars, an FDA regulated tobacco product that can have appealing flavors.  
- Little cigars have similar dimensions, filters, and appearance to cigarettes, and appeal to consumers, including youth, due to characterizing flavors, lower costs, and the perception of reduced risk.  
- Youth and young adults commonly initiated smoking with a flavored little cigar.  
- In addition, appealing flavored products increase the chances of continued tobacco product use.  
- Flavored cigars comprised more than half of the U.S. cigar market in 2015.  
- Cigar mainstream smoke (MSS) delivery of harmful and potentially harmful constituents (PHHCs), such as benzo[a]pyrene (B[a]P), has not been as extensively investigated as cigarette B[a]P yields.  
- B[a]P is the most potent carcinogen among the Polycyclic Aromatic Hydrocarbons (PAHs).  
- It is listed as a Group 1 carcinogen by the IARC and is an upper respiratory tract and lung carcinogen.  
- Little cigar specific characteristics and B[a]P smoke yields were compared to those of 50 commercial American Blend cigarettes, as shown in Table 1 and Figure 2.

**OBJECTIVE**

The potential harm of little cigars was investigated by comparing their specific characteristics to cigarettes in terms of the MSS yields of B[a]P, a human carcinogen, and related physical properties.

**METHODS**

- Sixty little cigars were purchased in the Atlanta area from retail and wholesale sources based on 2012-2013 Nielsen data.
- **Smoking Regimens**: The little cigars were tested using the non-intensive International Organization for Standardization (ISO) and Canadian Intense (CI) smoking regimens.
- **Validated GC/MS Method**: Extraction of Cambric filter pads spiked with 20 μL of freshly-isolated labeled B[a]P-14C, with 30 mL hexane followed by GC/MS. 3RF reference cigarette and CMM monitor used for validation and quality control.
- **A&T Tobacco Imports Action Full Flavor** has the highest B[a]P yield for both regimens: ISO: 44.0 ng/cig, CI: 65.7 ng/cig, and tobacco weight of 1261mg.
- **Scandinavian Tobacco Group Lane LTD, Captain Black 100s**, has the lowest B[a]P yield for both regimens: ISO: 14.5 ng/cig, CI: 20.0 ng/cig, and tobacco weight of 822mg.
- The average cigar B[a]P ISO yield and range are 25.5 (14.5 – 44.0) ng/cig and CI range and are 42.2 (24.0 – 92.0) ng/cig.
- **Prime Time International Sweet** has the lowest tobacco weight (767mg), 4th lowest ISO B[a]P yield, and 3rd lowest CI B[a]P yield, and A&T Tobacco Imports Action Gold Light has the highest tobacco weight (1367mg) and the 35th highest ISO B[a]P yield and 28th highest CI B[a]P yield.
- **Scandinavian Tobacco Group Cigar Lane, Captain Black 100s** has the lowest B[a]P yield for both regimens: ISO: 14.5 ng/cig, CI: 20.0 ng/cig, and tobacco weight of 822mg.
- **A&T Tobacco Imports Action Full Flavor** has the highest B[a]P yield for both regimens: ISO: 44.0 ng/cig, CI: 65.7 ng/cig, and tobacco weight of 1261mg.

**RESULTS**

**LITTLE CIGAR DATA**

**Figure 1. Mean smoke B[a]P yields of little cigars and cigarettes,** listed in ascending order for CI smoking regimen.

**Figure 2. Comparison of little cigar and cigarette Mean B[a]P yields and Normalized to tobacco weight**

**Figure 3. Ratio CI/ISO smoking regimen mainstream smoke yields of B[a]P** with increasing ventilation

**REFERENCES**

- B[a]P yields had a low correlation (ISO, R2=0.17) with filter ventilation, so the ratio of CI to non-intense ISO MSS yields with filter ventilation, an alternative analysis approach previously used in a cigarette study, was employed.  
- Ventilation does not appear to have a significant effect on little cigar B[a]P yields, so two other physical design parameters were further investigated.
- Although little cigars have lower packing density than cigarettes (0.305 mg/mm3 vs 0.221 mg/mm3), correlations to B[a]P yields are lower (ISO, R=0.20; CI, R=0.20) than tobacco weight correlations. Filter length was also investigated and exhibits low non-existent correlations with little cigar B[a]P yields (ISO, R = 0.06; CI, R = 0.002).

**CONCLUSION**

The study demonstrates that although little cigars have similar physical parameters to cigarettes, little cigars:
- Generate higher B[a]P yields for both ISO and CI smoking regimens.
- Have a low correlation between B[a]P yield and tobacco weight, and other design parameters such as filter length, ventilation and packing density have similarly individual weak or nonexistent correlations and cannot account for B[a]P yield differences.
- Also, reported tobacco blend differences between little cigars and cigarettes are expected to contribute to the B[a]P yield differences. Therefore, the cumulative effects of differences in design parameters and tobacco blend are likely responsible for the higher observed B[a]P yields and thus potential different impacts on public health.

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