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# The Challenges of Machine Smoking the Diverse Cigar Product Category

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## Introduction & Objectives

### Introduction

In August 2016, the U.S. Food and Drug Administration (FDA) issued a final rule to deem cigars to be subject to the Federal Food, Drug, and Cosmetic Act (the FD&C Act), as amended by the Family Smoking Prevention and Tobacco Control Act (Tobacco Control Act).<sup>1</sup> As part of this regulation, FDA will require manufacturers to report the quantities of Harmful and Potentially Harmful Constituents (HPHCs) in cigar filler and smoke. The ability to machine smoke cigars is critical for generating meaningful HPHC data. The CORESTA Cigar Smoking Methods Subgroup has been the main driver for the development of cigar smoking methods. This Subgroup has published several CORESTA Recommended Methods (CRMs) which enable the determination of nicotine-free dry particulate matter (NFDPM), nicotine, water, and carbon monoxide.<sup>2-3</sup> The diversity in shape and size of the cigar product category creates challenges for smoke collection and often requires product specific solutions to achieve acceptable analytical results.

### Objectives

The aim of this work was to design novel cigar holders that meet the requirements of CRM No. 64 that cover a range of cigar designs and compare nicotine-free dry particulate matter (NFDPM), nicotine, and carbon monoxide (CO) yields from a range of commercial cigar products smoked under three smoking regimes [CORESTA, ISO, and Health Canada Intense (HC)] using custom (Novel) cigar holders vs. CORESTA cigar holders.

## Materials

### Cigar Holders



### Cigar Products

Sample ID	Name	Product Picture	Diameter (mm)
1	Black & Mild Filter Tip*		8.9
2	Black & Mild* Wine Plastic Tip		9.57
3	Black & Mild* Wood Tip		9.57
4	Black & Mild* Rhythm Wood Tip		9.57
5	Black & Mild* Estate Blend		10.4
6	Black and Mild Straight		10.4
7	CASA DEL SOL* Tropical		10.5
8	Royal Comfort* Black		10.4
9	CASA DEL SOL* Clásico		17.0

ALCS cigar holders were used for sample ID 1-8. Enthlapy cigar holders were used for sample ID 9.

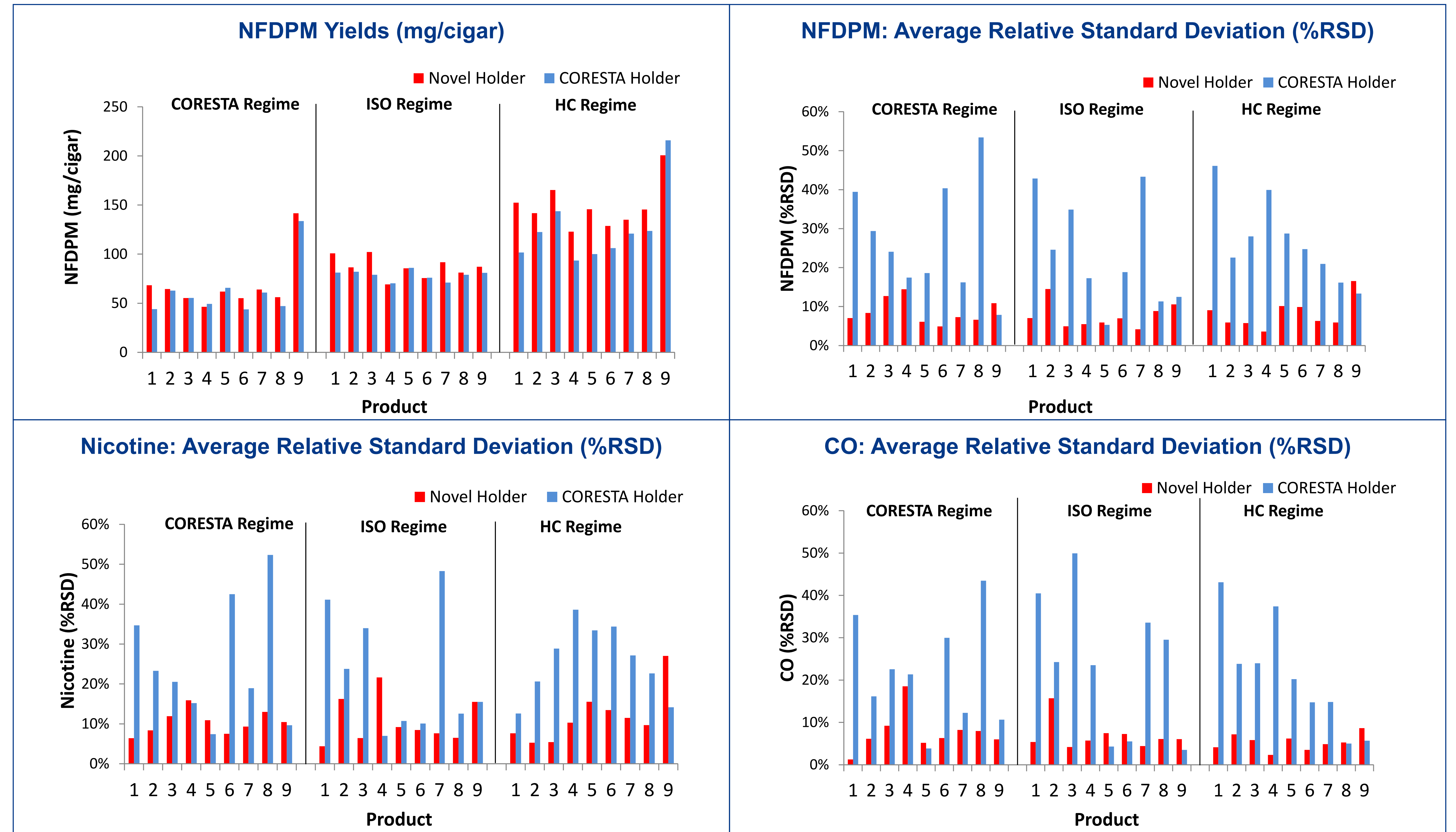
## Methods

### Smoke Collection Test Plan

- All cigars used for testing were selected based on a predetermined resistance to draw (RTD) range in order to reduce variability.
- Each smoke run consisted of one cigar product in Novel cigar holders (n=7) and CORESTA cigar holders (n=7), which were alternated over 14 ports.
- Cambridge filter pads (CFP) were analyzed for nicotine and water for the determination of NFDPM.
- Collections were performed with the CORESTA cigar holders as well as the Novel cigar holders utilizing the CORESTA, ISO, and HC smoking regimes.

## Results

### Comparison of Novel vs. CORESTA Cigar Holders for Nine Cigar Products (n = 7) Smoked Under Three Smoking Regimes



## Conclusions

- The Novel cigar holders provided increased yields with reduced variability as compared to the CORESTA holders for NFDPM, nicotine, and CO for a wide range of cigar products.
- The Novel cigar holder allow for improved ease of use and significantly increased laboratory throughput.
- The CORESTA, ISO, and HC smoking regimes showed similar variability for NFDPM, TPM, and CO.

## References

- Deeming Tobacco Products To Be Subject to the Federal Food, Drug, and Cosmetic Act, as Amended by the Family Smoking Prevention Tobacco Control Act; Restrictions on the Sale and Distribution of Tobacco Products and Required Warning Statements for Tobacco Products. Federal Register 2016 May 10; 81(90), 28974-29106.
- CORESTA Recommended Method No. 64 "Routine Analytical Cigar-Smoking Machine Specifications, Definitions and Standard Conditions," November 2005.
- CORESTA Recommended Method No. 65 "Determination of Total and Nicotine-Free Dry Particulate Matter Using a Routine Analytical Cigar-Smoking Machine – Determination of Total Particulate Matter and Preparation for Water and Nicotine Measurements," June 2010.
- Melvin, M., U.S. Patent Application No. 15/647,945.2017.
- Cigar holder developed by Enthlapy Analytical, Inc.