



# **CORESTA**

## **Report to CEN/TC437**

**Dr Stéphane Colard, Secretary General**

**November 12, 2020**



STATUTES &  
RULES ARE  
PUBLICLY  
AVAILABLE

# CORESTA

Cooperation Centre for Scientific Research Relative to Tobacco

**A non-profit organisation created in 1956  
governed by French law**

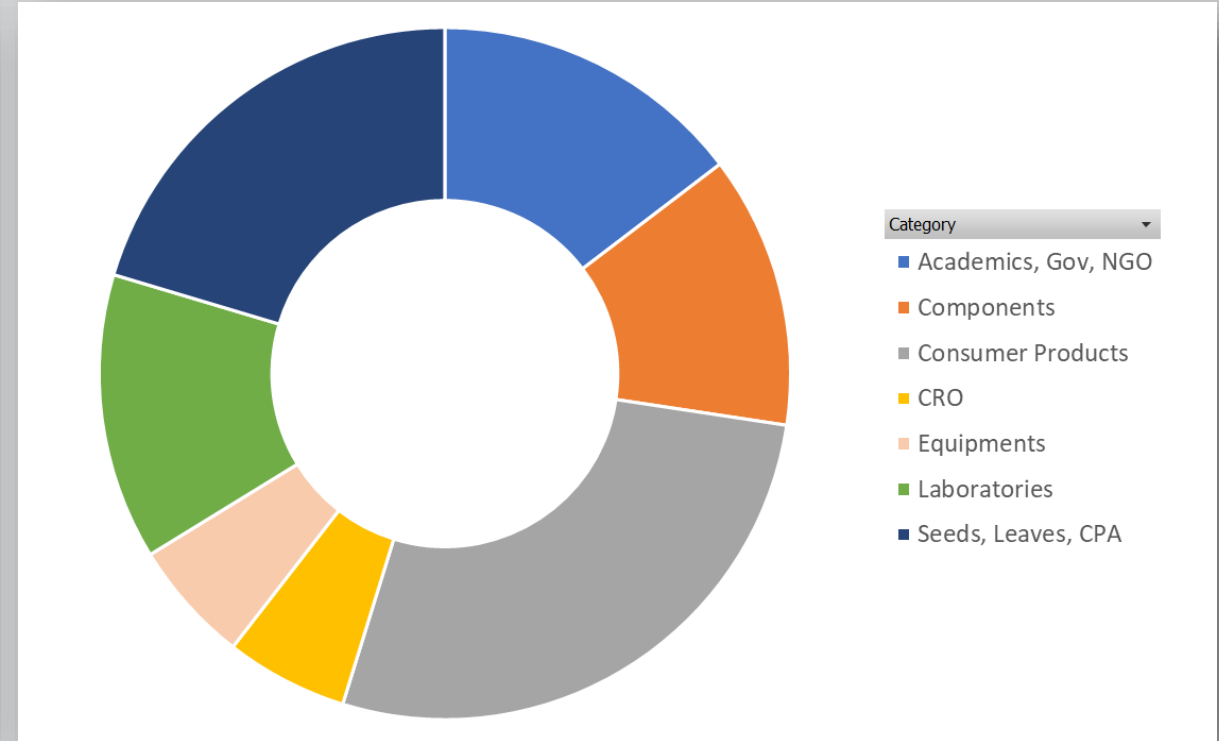
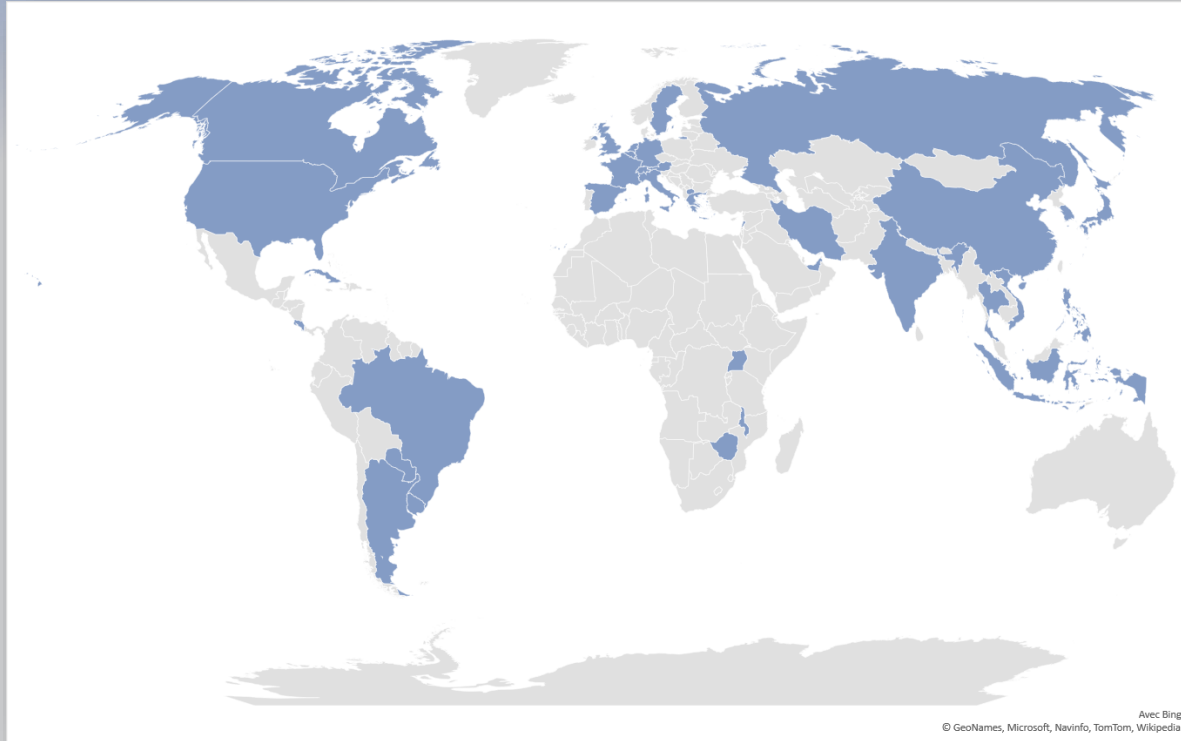
## **Purpose**

**To promote cooperation in scientific research relative  
to tobacco and its derived products**



# Membership

**158 organisation members (October 2020)**



**> 600 participants across 25 Sub-Groups and Task Forces**



# Projects, reports, documents, ... are publicly available

## Abstracts & Presentations

~ 9000 abstracts/presentations

[www.coresta.org](http://www.coresta.org)

## Technical Reports

Cooperation Centre for Scientific Research Relative to Tobacco  
Centre de Coopération pour les Recherches Scientifiques Relatives au Tabac

Home → Abstracts → A non-destructive rapid method for blend grade verification using visible-near infrared hyperspectral imaging, advanced data processing and classification algorithms

CORESTA Congress, Kunming, 2016, Agronomy/Phytopathology Groups, AP 18

**A non-destructive rapid method for blend grade verification using visible-near infrared hyperspectral imaging, advanced data processing and classification algorithms**

SAHU A.(1); DANTE H.(2); MORRIS J.W.(1); WAREK U.(1)

(1) Altria Client Services LLC., Biotechnology, Richmond, VA, U.S.A.; (2) Industrial Turnaround Corporation, Chester, VA, U.S.A.

The main objective of this study was to investigate the potential of hyperspectral imaging as a non-destructive, rapid, quality control method for grading cured tobacco bales. Cultivated tobacco plants were harvested and cured. Cured tobacco bales were brought to the stemmy and mixed into blend grades. Blend grades were then graded traditionally based on visual, physical and sensory characteristics. Hyperspectral images of cured tobacco bales were acquired using a visible near-infrared (VNIR) hyperspectral pushbroom imaging system (400-1000 nm). Multivariate calibration models were built using end-member extraction and linear discriminant analysis (LDA). The LDA model using Mahalanobis distance metric showed clear discrimination between the different tobacco grades. The relative classification accuracy of this method for flue-cured and Burley tobacco grades was 93 % versus the traditional grading method. This study demonstrates that hyperspectral imaging can be used as a reliable, rapid, non-destructive quality control method for grading cured tobacco bales.

**Documents**  
Presentation

Presentations, posters and manuscripts have not been peer-reviewed. Their content engages only the authors and is not the responsibility of CORESTA.

**Authors**  
SAHU A. DANTE H. MORRIS J.W. WAREK U.

**Organisations**  
Altria Client Services  
Industrial Turnaround Corporation

Cooperation Centre for Scientific Research Relative to Tobacco

Agro-Chemical Advisory Committee

**CORESTA Guide N° 19**  
Responsible Use of Crop Protection Agents (CPAs) in Tobacco Leaf Production

April 2017

Author: H.D. Papadimitrakis, A. L...

## Guides

Cooperation Centre for Scientific Research Relative to Tobacco

Tobacco and Tobacco Products Analytes Sub-Group

**CORESTA Recommended Method No. 91**

**DETERMINATION OF 15 PAHs IN TOBACCO AND TOBACCO PRODUCTS BY GC-MS/MS or GC-MS**

April 2019

## Methods

Cooperation Centre for Scientific Research Relative to Tobacco  
Centre de Coopération pour les Recherches Scientifiques Relatives au Tabac

Join CORESTA | Member Access

Search

ABOUT US - STUDY GROUPS - **DOCUMENTS** - ABSTRACTS - MEETINGS - INFORMATION - MEMBER CONTENT

**Join the new Task Force**  
Low Nicotine Tobacco  
Agronomic Production Practices

0.4 %  
0.3 %  
0.2 %  
0.1 %  
0.09 %  
0.08 %

**Vision**  
To be recognised by our members and relevant external bodies as an authoritative source of publicly available, credible science and best practices related to tobacco and its derived products.

→ More about CORESTA

**News**  
CORESTA Residue Field Trials Sub-Group Poster Presentations at University of Kentucky Burley Tour, August 2019 published [RFT-235-CXP] 17/09/2019

**Latest Documents**  
Guides  
No. 26 - Technical Guide for Designing E-Vapour Product Stability Studies 05/09/2019

**Upcoming Meetings**  
5 October 2019  
SG SMA - Smoke Analytes  
Hamburg, Germany  
5 October 2019



# Spectrum of Scientific Cooperation Topics

- Integrated Pest Management
- Virus Diseases
- Extended Diagnostic Expert System
- Efficacy of Biological & Eco-Friendly Crop Protection Agents
- Collaborative Study Black Shank
- Tobacco Alkaloid Genetics
- Tobacco Biotechnology and Omics

- Physical Test Methods
- Cigar Smoking Methods
- Tobacco and Tobacco Products Analysis
- Cigarette Variability
- E-Vapour **Created in 2013**
- Heated Tobacco Products

**25  
Current  
Working  
Groups**

**Agronomy & Leaf Integrity**  
**Phytopathology & Genetics**  
**Technology**  
**Product Science**  
**Smoke**

- Agrochemicals Analysis
- Pest and Sanitation Management in Stored Tobacco
- Proficiency Testing for Detection of Transgenic Tobacco
- TSNA in Air-cured and Fire-cured Tobacco
- Agrochemical Residue Field Trials
- Collaborative Study of Low Nicotine Tobacco Agronomic Production Practices

- Product Use Behaviour
- Smoke Analysis
- *In Vitro* Toxicity Testing
- Biomarkers
- Consumer Reported Outcome Measures Consortium
- 21st Century Toxicology for Next Generation Tobacco and Nicotine Products



# Electronic Cigarettes: CORESTA Working Groups

- ❖ Several working groups conduct scientific projects relative to electronic cigarettes

Focus on

➤ **EVAP / E-Vapour**

- **PUB / Product Use Behaviour**
- **CROM / Consumer Reported Outcome Measures**
- **BMK / Biomarkers**
- **NGTX / 21st Century Toxicology for Next Generation Tobacco and Nicotine Products**

Activity Reports publicly available on our website





# E-Vapour SG Scope and Membership

## ❖ Objectives:

- To identify areas of scientific research and conduct studies that will characterize liquids, e-vapour product emissions, and device properties and performance
- To develop and publish methods and guides
- To organize and conduct periodic proficiency/collaborative studies of identified constituents in liquids and/or e-vapour product aerosol

## ❖ SG membership

- ≈ 50 people from US, EU, Asia
- E-Vapour Product Companies, Suppliers, Contract Labs, Regulatory Agencies, Academia, Others, .....

## ❖ Recent accomplishments

- May 20: Technical Report on Metals Analysis Method for E-liquids published on the CORESTA website
- Nov 20: Collaborative Study for the Determination of Formaldehyde & Acetaldehyde in E-Vapour Prod.

## ❖ Current work on: carbonyls in aerosol, reference device, metals LOD/LOQ and degradants in e-liquid



- ❖ **Carbonyls in aerosol**
- ❖ **Reference device**
- ❖ **Metals LOD/LOQ**
- ❖ **Degradants in e-liquid**





# **Carbonyl in Aerosol - Method**



# Carbonyls in Aerosol

Method Selection: **HPLC with DNPH**

## Study Protocol

- Harmonized Device: **Aspire Tank and Evolv DNA power supply**
- Compounds included: **formaldehyde and acetaldehyde**
- Three e-liquids, **unflavored, tobacco and menthol**
- Samples **fortified at three levels** (0, 15, 25 and 35  $\mu\text{g}/\text{ml}$ ) immediately before analysis
- Aerosol samples collected using **55/3/30 CORESTA CRM 81 puffing**
- Collected **~300 mg** of aerosol per liquid and spiking level, in triplicate



# Carbonyls in Aerosol

## Why use fortified e-liquids?

- The native production of formaldehyde and acetaldehyde is expected to be both low and variable in the un-spiked aerosol, based on pre-study work.
- Formaldehyde and acetaldehyde added to e-liquids will transfer into the aerosol, based on pre-study work.
- Assumption: Adding a known amount of formaldehyde and acetaldehyde to the native amount produced by each device should improve the consistency of measurements and correct for device to device differences.



# Carbonyls in Aerosol - Results

- **Fortified e-liquids reduced the Repeatability (r) and Reproducibility (R) Limits for the study**
- **Average %R for formaldehyde was 52 %, at 35 µg/g fortification level**
- **Average %R for acetaldehyde was 111 %, at 25 µg/g fortification level**
- **Draft CRM is in preparation; publication early 2021**



# Reference Device Study



# Reference Device

## ❖ Method Selection

- CRM 81 and CRM 84

## ❖ Study Protocol

- **Harmonized Device: Aspire Tank and Evolv DNA power supply**
- **Compounds included: nicotine, propylene glycol, glycerin and water**
- **Three e-liquids: unflavored, tobacco and menthol**
- **Study extended to allow maximum participation: 11 Labs**



# Reference Device

- **Proposed reference device produced aerosol with an average Reproducibility (R) of 34 %**
- **Average %R for PG was 17.5 %, normalized to ACM**
- **Average %R for Glycerin was 16.2 %, normalized to ACM**
- **Average %R for Nicotine was 15.6 %, normalized to ACM**
- **SG agreed to recommend this device as a reference product**
- **Technical Report to be published end 2020**





# Metals LOD/LOQ



## ❖ Observations

- Filter pad-based trapping systems contain some analytes of interest
- Other trapping system may also contain some analytes of interest
- Reported values are impacted by trapping system

## ❖ Technical Guide publication expected by end of 2020

- Recommend best practice for determining method LOD/LOQ values
- Recommend best practice to handle contribution from trapping system



# **Nicotine Degradants\* in E-liquids: Proficiency Study**

**\*Anabasine Anatabine  $\beta$ -Nicotyrine Cotinine Myosmine NicotineN'-Oxide Nornicotine**



# Nicotine Degradants

- **Proficiency Study: laboratories use their in-house methods**
- **Samples: 9 total**
  - **4 e-liquids: aging or fortified with target compounds**
- **Report z-scores and method synopses**
- **Technical Report published in September 2020**



2020 Online  
**CORESTA** Congress





**Abstract No.**

**Oral Presentation**

*Abstract ID*

**ST 03**

1684

**Method development for the analysis of mono-carbonyl compounds in e-vapor products by LC-MS**

ZHU J.; HEREDIA A.; TWEEDY J.; TAYYARAH R.

*ITG Brands and Fontem USA, P.O. Box 21688, Greensboro, NC 27420, U.S.A.*

**ST 04**

1785

**Method optimization on analysis of TSNA in electronic cigarette liquids and N-nitrososarcosine (NSAR) in smokeless tobacco by UHPLC-MS/MS**

WU J.; QIN F.

*PerkinElmer Health Sciences Canada, Inc., 501 Rowntree Dairy Road, Unit 6, Woodbridge, Ontario L4L 8H1, Canada*

**ST 05**

1814

**Determination of glycidol in e-liquids and emissions from e-cigarettes**

WANG J.; RODRIGUEZ-LAFUENTE A.; JOZA P.

*Labstat International Inc., 262 Manitou Drive, Kitchener, Ontario N2C 1L3, Canada*

**Abstract No.**

**Poster Presentation**

*Abstract ID*

**STPOST 05**

1663

**A screening method by gas chromatography–mass spectrometry for the quantitation of 33 aerosol constituents from a heat-not-burn tobacco product**

HOFER I.; GAUTIER L.; CORTES SAUTEUR E.; DOBLER M.; PYTHON A.; O'REILLY C.; GISI D.; TINGUELY E.; WEHREN L.; GARCÍA FIDALGO E.; CUKURCAM L.; HENNEMANN M.; MATERA R.; ROTA D.; SANTOS CH.; SEQUEIRA C.; EPARS T.

*Philip Morris Products S.A., PMI R&D, Quai Jeanrenaud 5, CH-2000 Neuchatel, Switzerland*

**STPOST 06**

1711

**Assessment of filter pre-treatment for metal analysis in e-vapour aerosol**

IMAI R.; NAGAE H.; FUKAI Y.; SHIMAZU A.; TAKAYAMA H.

*Japan Tobacco Inc., Scientific Product Assessment Centre, 6-2, Umegaoka, Aoba-ku, Yokohama, Kanagawa 227-8512, Japan*

**STPOST 07**

1798

**New developments in vacuum photoionisation TOF-MS technique to analyse smoking products on-line and in real time**

EHLERT S.(1,2); HEIDE J.(2); WALTE A.(1); ZIMMERMANN R.(2)

(1) *Photonion GmbH, Hagenower Str. 73, 19061 Schwerin, Germany*

(2) *University of Rostock, Dept. of Analytical Chemistry, Dr.-Lorenz-Weg 2; 18059 Rostock, Germany*

**STPOST 08**

1815

**Determination of  $\alpha$ -tocopherol acetate (vitamin E acetate) in e-liquids and cannabis liquids samples - a comparison between HPLC-DAD and LC-MS/MS methods**

RODRIGUEZ-LAFUENTE A.; JOZA P.

*Labstat International Inc., 262 Manitou Drive, Kitchener, Ontario N2C 1L3, Canada*

**Publicly available soon.**





## CROM Symposium 2020

**Consumer Reported Outcome Measures**  
in Tobacco and Nicotine Research

A virtual event: **December 10, 2020 - 4 pm to 7 pm CET**

[Register now!](#)

## Vision

*To be recognised by our members and relevant external bodies as an authoritative source of publicly available, credible science and best practices related to tobacco and its derived products.*

[→ More about CORESTA](#)

News

Latest Documents

Upcoming Meetings

**Online open event but limited to 300 participants**





**Thank you for your attention**