CORESTA
Report to ISO/TC126/SC3

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CORESTA is a non-profit organisation. Its purpose is to promote cooperation in scientific research relative to tobacco and its derived products.

Electronic Cigarettes: CORESTA Working Groups

- **Several working groups conduct scientific projects relative to electronic cigarettes**
  - **PUB / Product Use Behaviour**
  - **CROM / Consumer Reported Outcome Measures**
  - **BMK / Biomarkers**
  - **NGTX / 21st Century Toxicology for Next Generation Tobacco and Nicotine Products**
  - **EVAP / E-Vapour** **Focus today**

Activity Reports publicly available on CORESTA 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, ……

Last publications

❖ 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.**
- **Nov 20: Technical Guide for Setting Method LOD and LOQ Values for the Determination of Metals in E-Liquid and E-Vapour Aerosol by ICP-MS**

Current Work

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

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
- Agreement to recommend this device as a reference product
- Technical Report to be published end 2020

Carbonyls 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 µg/ml) immediately before analysis
- Aerosol samples collected using 55/3/30 CORESTA CRM 81 puffing regime
- 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

Metals LOD/LOQ

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

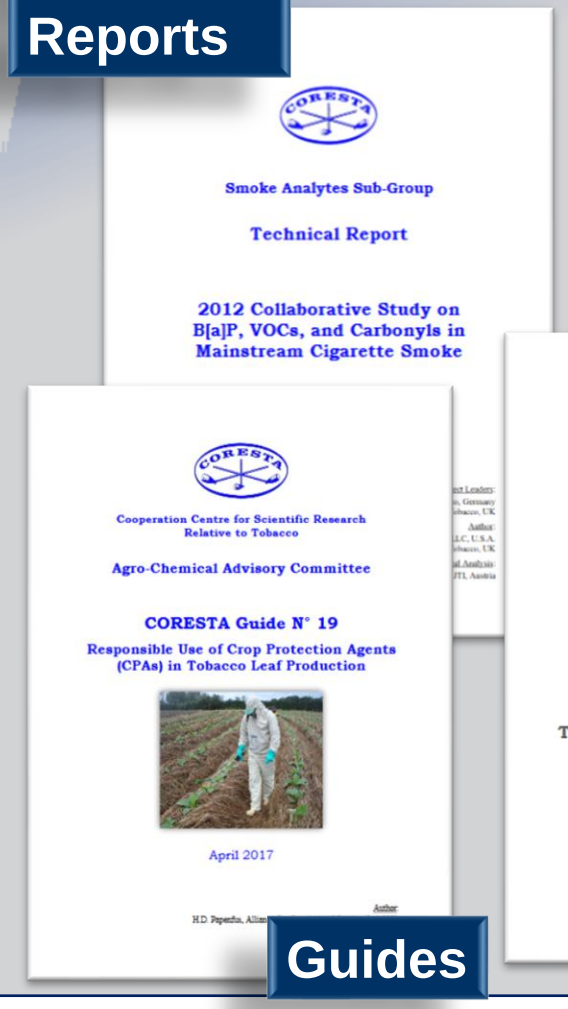
*Anabasine, Anatabine, β-Nicotyrine, Cotinine, Myosmine, NicotineN'-Oxide, Nornicotine

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**

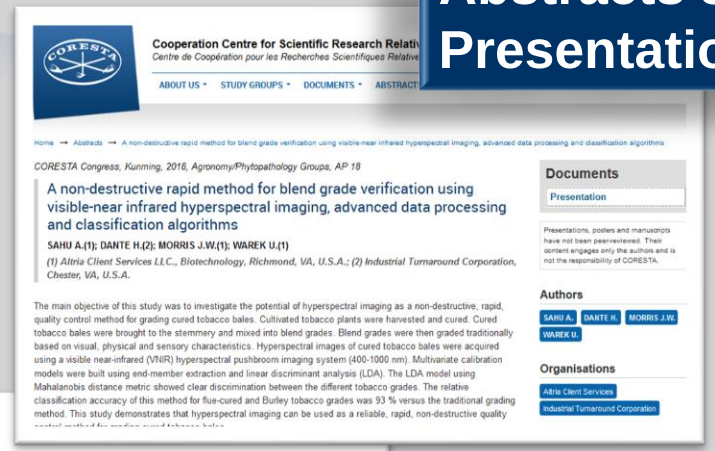
Projects, reports, documents, … are publicly available

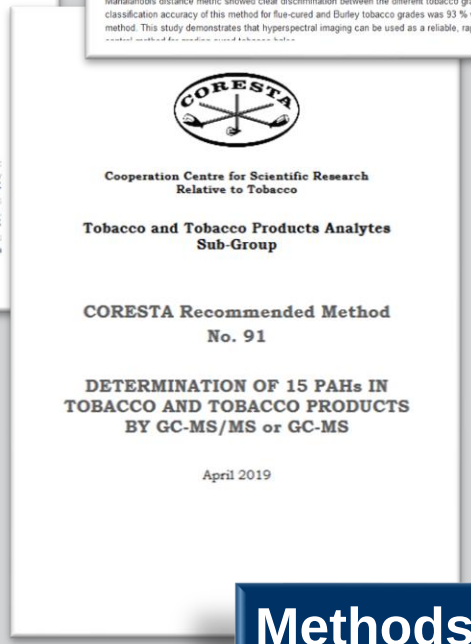
Technical Reports



Guides

Abstracts & Presentations

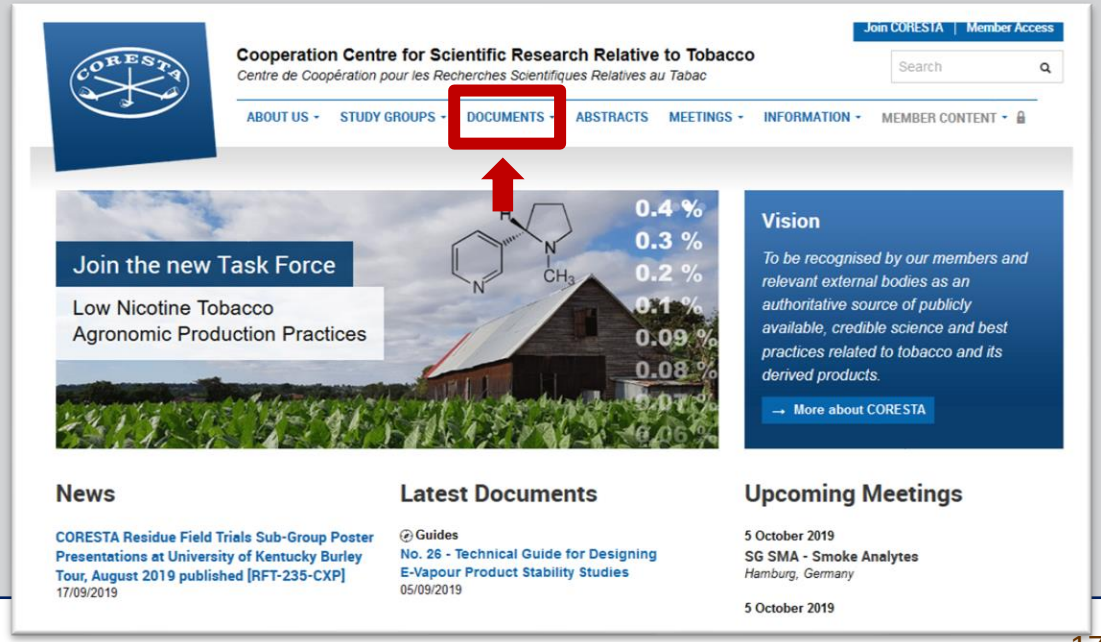




Methods

~ 9000 abstracts/presentations

www.coresta.org



2020 Online CORESTA Congress

Abstract No. *Abstract ID*	Oral Presentation
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. *Abstract ID*	Poster Presentation
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 α-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 on www.coresta.org

Thank you for your attention