ABSTRACTS OF PRESENTATIONS MADE AT THE 2014 CORESTA CONGRESS IN QUEBEC, CANADA

PLENARY SESSION

Keynote Address

MARINER D.C.

CORESTA Congress, Québec, 2014, Plenary Session, Keynote Address

The many faces of CORESTA: past, present and future

CORESTA has been active since 1956. It has many different faces: for some, the most familiar face will be the annual meeting, in even years as a Congress, and in the odd years, as the separate Study Group meetings; for others, the activities of the Task Forces and Sub-Groups, will be most familiar; for yet more, CORESTA will be a less personal source of information, either from the CD-ROM or the website. For many however, there are unfamiliar faces, for example, the CORESTA Board and the Scientific Commission.

The purpose of CORESTA is the promotion of international cooperation in scientific research relative to tobacco. Above all, CORESTA should enable cooperation as well as promote it, by ensuring newcomers to tobacco science have access to the collective knowledge that underpins CORESTA, and access to the people who have generated that knowledge.

As an introduction to the 2014 Congress, this presentation will highlight the work of the Scientific Commission, reviewing the issues under current discussion and the pressures and priorities to which CORESTA should respond in order to meet the needs of its diverse membership.

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Intergroup Papers

MASSICOTTE E.

CORESTA Congress, Québec, 2014, Plenary Session, abstr. IG01

Determination of geographical origin of flue-cured tobacco leaves

Recent studies indicate that the tobacco contraband market in Canada could be as high as 20% which translates to billions of dollars in lost revenue for the Government and legitimate tobacco industry.

While it is known that the majority of the contraband cigarettes sold in Canada are manufactured within Canada and northern New York state, the provenance of the tobacco is unknown. This information could help reduce the supply of tobacco to the contraband cigarette producers. For this reason, a project was initiated to see if it was possible to determine the geographic origin of tobacco leaves.

Approximately 1000 samples of tobacco leaves from the top ten flue-cured producing countries including Canada were collected. Over 60 components including trace elements (metals), organic acids and isotopic ratios of nicotine were quantified using different analytical techniques. A Partial Least Square Discriminant Analysis (PLSDA) model and a Support Vector Machine-Classification (SVM-C) model were developed.

The PLSDA model was able to predict if leaves originated from Canada, USA or another country (international). The SVM-C model was able to predict if a leaf originated from Canada or USA but was also able to discriminate between the other countries.

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CORESTA Congress, Québec, 2014, Plenary Session, abstr. IG02

Adult and youth smoking rates, a measure of the effectiveness of tobacco product regulation?

The primary focus of tobacco regulatory policy is to reduce smoking rates. The European Tobacco Product Directive was introduced this year with the goal of reducing prevalence across Europe by 2% over five years; Australia has made reduction of its smoking rate to 10% by 2018 a key target within its National Strategy; and Ireland and New Zealand have each pledged to reduce smoking rates to under 5% by 2025.

This paper will evaluate the extent to which these goals are realistic, and will investigate the facts behind the hype to consider what impact initiatives such as smoking bans, taxation, and the recent introduction of plain packaging in Australia have really had on smoking rates. All our interpretations use statistical models and visual representations based on publically available data.

The decline in smoking rates has been levelling off for the last ten years in most developed countries, including Ireland, Australia, Canada and the UK which are all held to be leaders of tobacco regulation. According to a 2013 survey from the Organisation for Economic Co-operation and Development (OECD), Greece and Ireland have the highest smoking rates in the European Union, whereas Sweden has the lowest – at just 12.5% for men and 14.3% for women in 2011. A new OECD survey is expected later in 2014 and it will be interesting to see whether these trends have continued.

This study will also consider whether there is a relationship between youth smoking and adult smoking rates. The data appears to suggest that these factors are independent of each other, which would have a number of implications for tobacco control. For example, different approaches may be needed for regulating smoking in young people and adults, and this also serves to contradict any notion that tobacco companies rely on youth smoking for future sustainability.

As far as adult smoking rates are concerned, there has been a consistent decline in smoking in countries such as Sweden and Norway where snus is widely available. Not only are the current smoking rates already low, but these rates of decline in smoking look set to continue. The Swedish and Norwegian experiences may indicate the potential of alternative products for tobacco consumers, including the e-vapour sector in the US and Europe.

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CORESTA Congress, Québec, 2014, Plenary Session, abstr. IG03

Cadmium in tobacco leaves, and the potential for its reduction

Tobacco leaf cadmium (Cd) is an undesirable result of its agricultural production, being derived mainly from Cd-containing phosphate fertilizer. Cadmium is considered by many to be a high priority toxicant in tobacco smoke, and is a focus of regulation of tobacco products by the United States Food and Drug Administration (FDA) and other regulatory agencies. While this metal is found in probably all vegetable foods at low levels similar to those occurring in most green tobaccos, it is concentrated (perhaps 10 fold) in products made from dry, cured tobacco. Zinc is a geochemical sibling of cadmium. This element is an essential micronutrient to all animals and plants, including tobacco. Thus, it is generally thought that Cd enters and is transported throughout plants via transporters that provide essential Zn micronutrient to all cells. These two aspects of Cd – enrichment upon drying and similarity to micronutrient Zn – help to exacerbate the tobacco Cd toxicity problem/perception. Study of the literature indicates that there has been little effort or progress in breeding tobacco to reduce leaf Cd, though evidence does exist that genotypic variation in Cd-accumulation potential exists in certain subspecies. However, in recent years much effort has been made, with some success: to reduce Cd transport into roots from soil, to sequester in roots Cd taken up from soil, and to prevent root Cd from translocating to shoots. These efforts have been focused on genetically modifying, mainly tobacco and rice plants, to enhance or knockdown certain transporters that carry Cd and related divalent cations across membranes, or enhancing chelator proteins that have potential to sequester Cd in roots. Efforts in genetic modification to reduce tobacco leaf Cd that are described in the available literature will be the focus of this presentation.

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PLENARY SESSION

Prize Winner

RICKERT W.S.

CORESTA Congress, Québec, 2014, Plenary Session, Prize Winner

Analysis of tobacco products: lessons and challenges

From a testing perspective the science (knowledge) of tobacco product characteristics has evolved rapidly over the past 40 years driven, to a large extent, by health concerns and tobacco-related regulations. In the late '60s and early '70s cigarette analysis was focused on deliveries of 'tar' primarily as a result of the 1964 Report of the US Surgeon General. Since that time, the number of smoke chemicals and tobacco constituents that are determined routinely has expanded as a result of Health Canada reporting requirements promulgated in 2000 and the more recent publication of the United States Food and Drug Administration (FDA) list of hazardous or potentially hazardous compounds. Current and potential needs for regulatory reporting have resulted in the development of new methods or the modification of existing methods to improve characteristics, effect efficiencies and/or reduce cost. However, even the most advanced multi-component analytical techniques can not compensate for variability related to sample generation. For example, yields of a number of analytes on the Health Canada reporting list have been demonstrated to be dependent on smoking machine type particularly when cigarettes are smoked under more intensive conditions. This suggests that either smoking machines need to be harmonized over a range of smoking conditions or where differences are known, the type of smoking machine should be specified as part of the analytical methodology.

The analysis of aerosols from new generation products (Heat-Not-Burn and e-cigarettes) presents another set of challenges independent of potential issues related to sample generation. Presently, the tendency has been to utilize standard ISO/CORESTA/Health Canada methods under the assumption that if the method works for a complicated matrix such as tobacco smoke, it should work for less complicated nicotine containing aerosols. This may be true but the assumption needs to be verified. Or, current test methods will have to be validated independently for each 'new' nicotine containing matrix.

It is now possible to generate analytical results for potentially thousands of compounds in samples prepared using any number of smoking regimes and at least two smoking platforms. Unfortunately protocols for the evaluation of data from a quality control and/or interpretive standpoint have not kept up with our ability to generate data. So there is the very real danger that we find ourselves in the position of not seeing the forest for the trees. For example, assuming that 'trees' are analogous to background noise, does it make sense to push detection limits to the point where ambient conditions are likely to be significant contributors to the analytical result? These are some of the questions that will have to be addressed by the current generation of tobacco scientists.

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