Smoke Analysis of Fine-Cut Tobacco (Part 3)

Physical characterisation of fine cut smoking articles and their variability.

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Background

Smoke yields of Fine-Cut tobacco

Roll-Your-Own (RYO)
Make-Your-Own (MYO)

Making of Fine-Cut Smoking Article (FCSA)

Background

Methods for making FCSA

ISO15592-3:2008

4 Standard tubes

4 different FCSAs

HC CGSB-1761 1992

1 FCSA

Standard filter tube

900 mg tobacco

Project HC T-403 (2009)

different tube

110 mmWG pressure drop

Dutch proposal to EU

1 FCSA

1 Standard tube NL-A

paper market specific

750 mg tobacco

Introduction

Methods for making FCSA

Part 1: One ISO FCSA is enough because yields from other FCSA correlated.

B. Teillet et al., CORESTA 2014

Part 2: Very high pressure drop of FCSA for MYO, need to consider filling power (or PD).

B. Teillet et al., CORESTA 2015

Part 3: Investigate different options of making of FCSA and focus on its physical characteristics and its variability

Options of making investigated

2 tobacco blends with 2 different filling powers:

RYO (3.1cm^3/g) and MYO (5.0 cm^3/g)

For each blend

Tube

(diameter x length)

ISO A7.2 (7.2 x 70 mm)	750 ± 20 mg*
NL-A (7.2 x 70 mm)	750 ± 20 mg*
Filter tube (8.15 x 15+65 mm)	900 ± 10 mg

Limited Canadian availability tube – not done

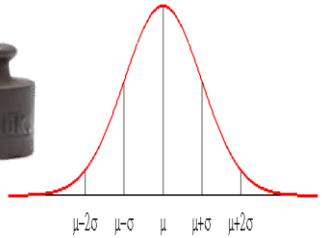
PD ± 5 mm WG [RYO]

22 FCSA per making for physical measurement

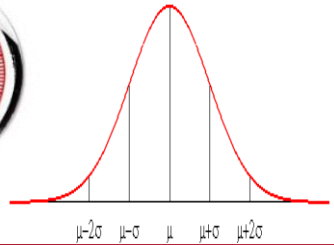
* For each FCSA

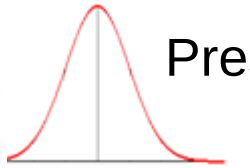
Physical measurements

Constant weight



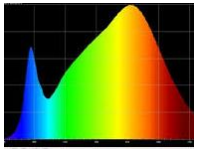
Constant Pressure Drop



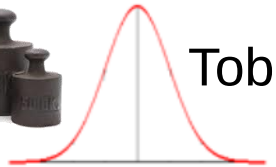


Pressure drop

Hardness



Tobacco density

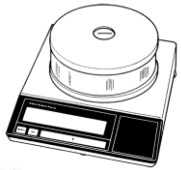


Tobacco weight

Physical measurements

Weight

Sartorius Balance L420P
Accuracy ± 0.001 g

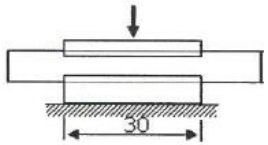


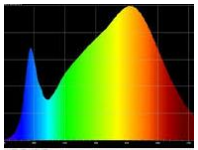
Pressure Drop

Sodim Sodimat D49/PD
Accuracy ± 0.1 mm WG

Hardness

Sodim Sodimat D49/H
Semi-cylindrical rods – 3.6 N



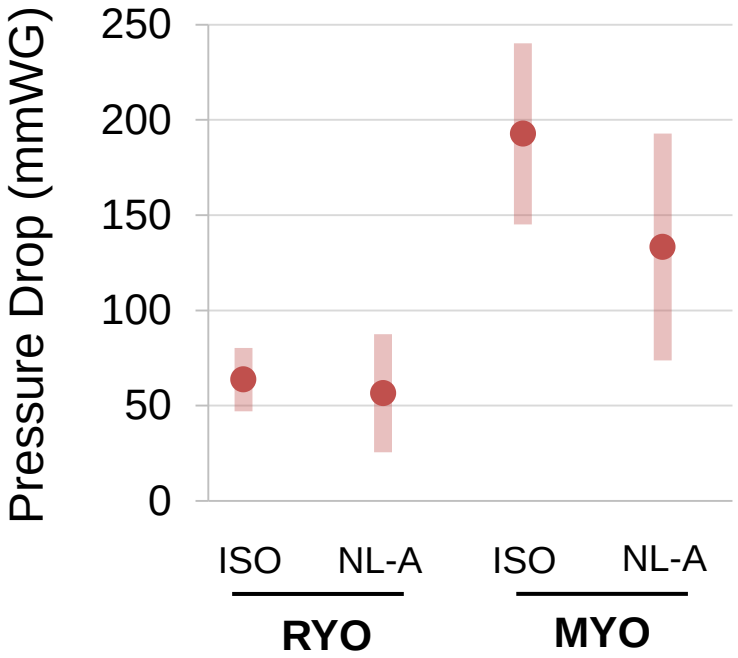


Tobacco density

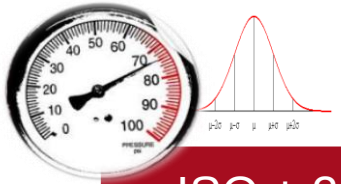
Sodim Sodiscan D73
Profil by microwave measurement

Results

Making at constant weight



750 ± 20 mg [± 2.7%]



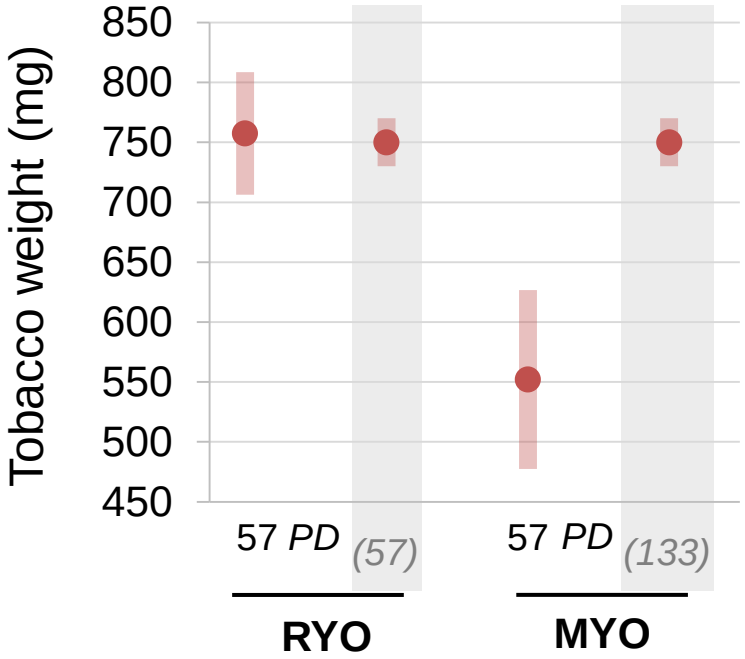
For RYO and MYO respectively,

ISO ± 20-50 mm WG [± 25%]
NL-A ± 30-60 mm WG [± 45-55%]

FCSA with NL-A tubes have a higher variation in PD

Results

Making at constant pressure drop



Tube NL-A

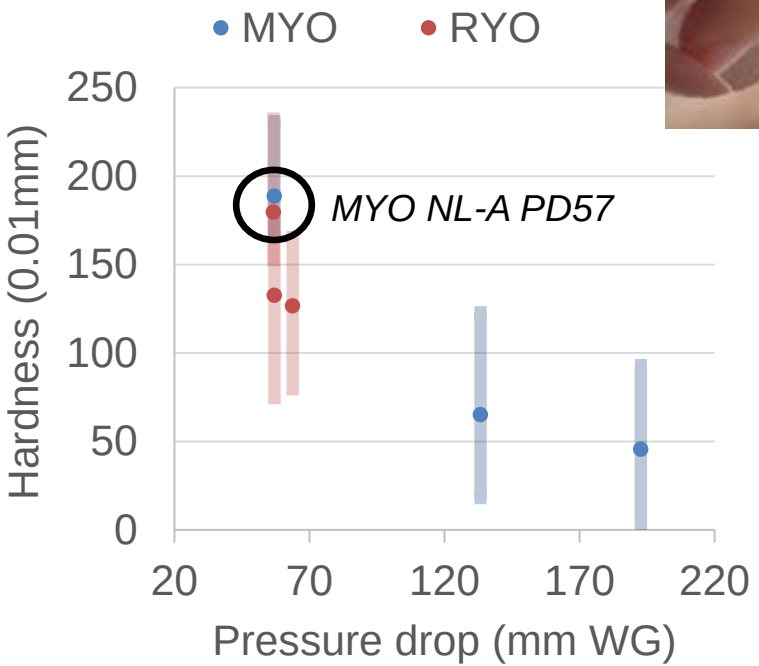
57 ± 5 mm WG [± 8.8%]

RYO ± 50 mg [± 6.7%]
MYO ± 75 mg [± 13.5%]

increase the variability of tobacco weight but solve the making with MYO blend

Results

Hardness

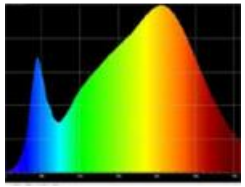


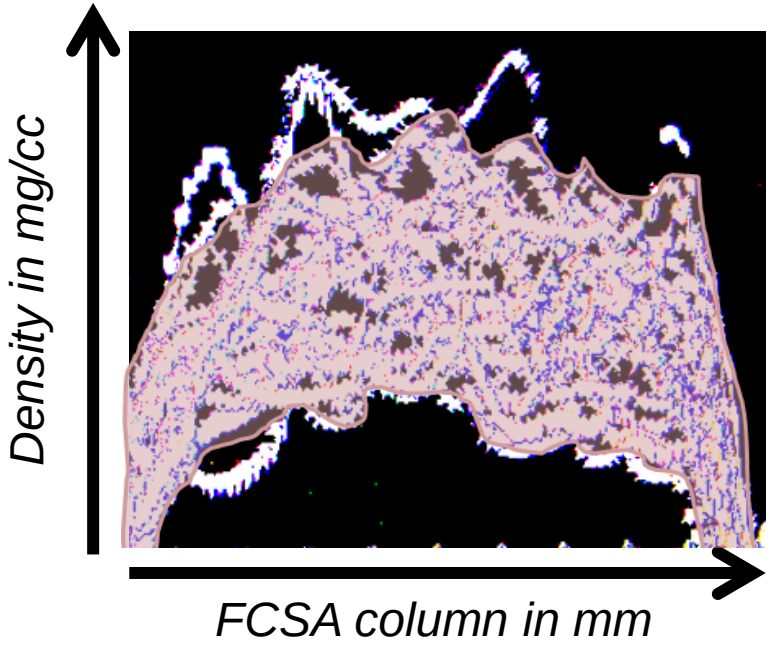
- *Large differences in hardness from one FCSA to another (hand made)*
- *Levels tend to decrease when pressure drop increases*

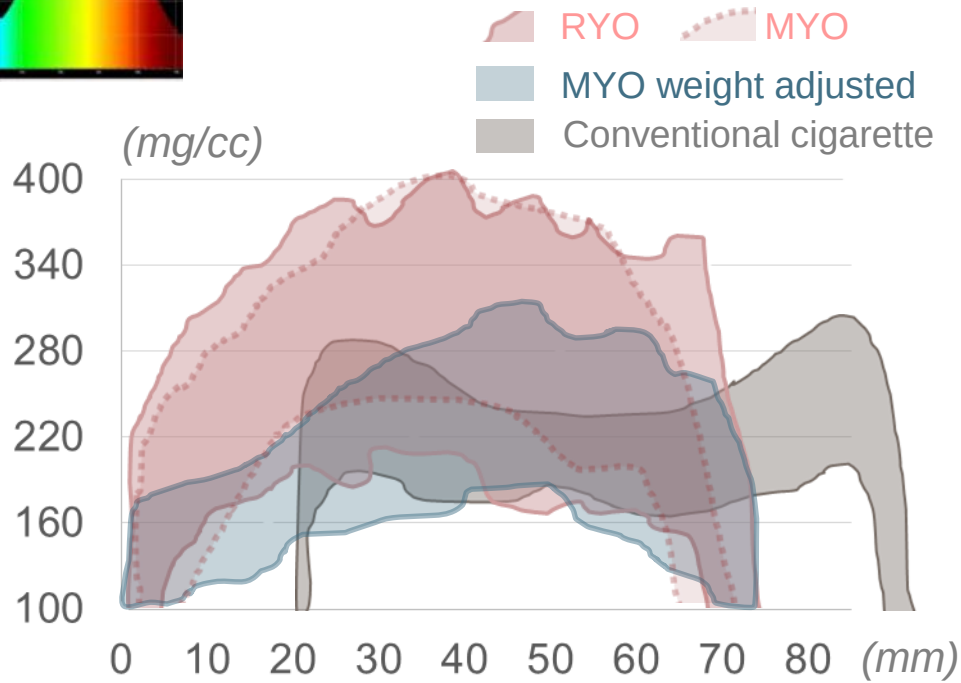
Similar hardness between RYO and MYO when Pressure drop is adjusted.

results

Tobacco density





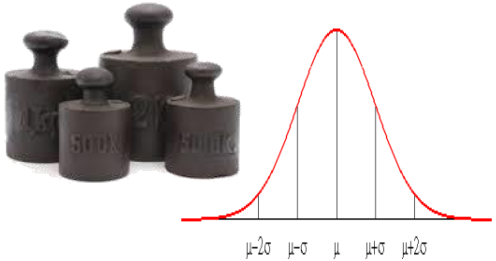


Hand made making generates huge variability in FCSA

Conclusion

Making at constant weight or pressure drop?

Constant weight

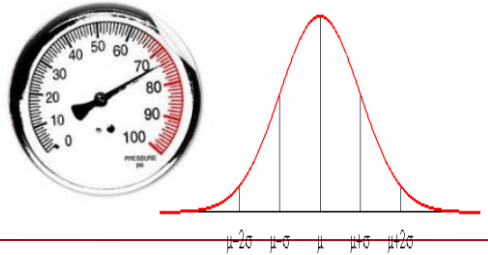


Weight of tobacco as a basic step for making

Need to consider filling power /PD for MYO

High variability of PD

Constant Pressure Drop



Does not require filling power determination

Valid for MYO, special cut

Difficult in practice (weight of tobacco)

High variability of tobacco weights

Conclusion

Making at constant weight or pressure drop?

For both making,

- Advantage & inconvenient
- Highly variable but in a different way (hand made)

NL-A paper (market specific) provide high variation in PD

Impact of physical variation on smoke yields need to be considered in future regulatory development

Special thanks to Imperial Tobacco Laboratories

Thank You

www.imperialtobaccoscience.com