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Toxicant contents of oral nicotine pouches (ONPs): comparative quantitative analysis with Swedish snus and cigarette smoke

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ORAL NICOTINE POUCHES

USE



Consumers place the pouch between their gum and upper lip

COMPOSITION



FLAVOURINGS



PLANT-BASED
MATERIALS



NICOTINE



SWEETENERS



WATER

ONPs mainly contain water, plant-based materials, flavourings, sweeteners and nicotine. All prepacked in small pouches



CHEMICAL COMPLEXITY



>7,500

individual chemicals present¹



100s of

individual chemicals present



10s of

individual chemicals present

No external heating or tobacco makes Oral Nicotine Pouches BAT's **simplest Smokeless Product**

NO TOBACCO

NO COMBUSTION

NO SMOKE

NO TAR

STUDY DESIGN SUMMARY

13 products

9 BAT ONPs

Representative commercial range:

- Nicotine 6 to 20mg
- Sweet and salt base formulations
- Mint, fruit and salt flavours
- 2 different pouch sizes, slim and large

2 Commercial competitor ONPs

2 Snus products

- 1S4 – University of Kentucky reference product
- Commercially available product



STUDY DESIGN SUMMARY

TOXICANTS

129* toxicants selected from established lists including:



List of harmful and potentially harmful constituents (HPHCs) in tobacco products and tobacco smoke



Toxicant groups assessed

Elements (9)	Carbonyls (4)	Major Components (3)	Hydrocarbons (5)
Aflatoxins (4)	Radionucleotides (27)	Alkaloids (9)	TSNAs (7)
Ash (1)	Nitrosoacids (11)	Polycyclic aromatic hydrocarbons (PAHs) (21)	Miscellaneous* (9)
Aromatic amines (4)	Microbiological counts (3)	Nitrosamines (12)	



IARC Monographs on the Evaluation of Carcinogenic Risks to Humans Volume 89 Smokeless Tobacco and Some Tobacco-specific N-Nitrosamines



GothiaTek® quality standard for snus

*excluding water, mass & pH

SAMPLE GENERATION



**Data generated on a 'as is'
per pouch basis**

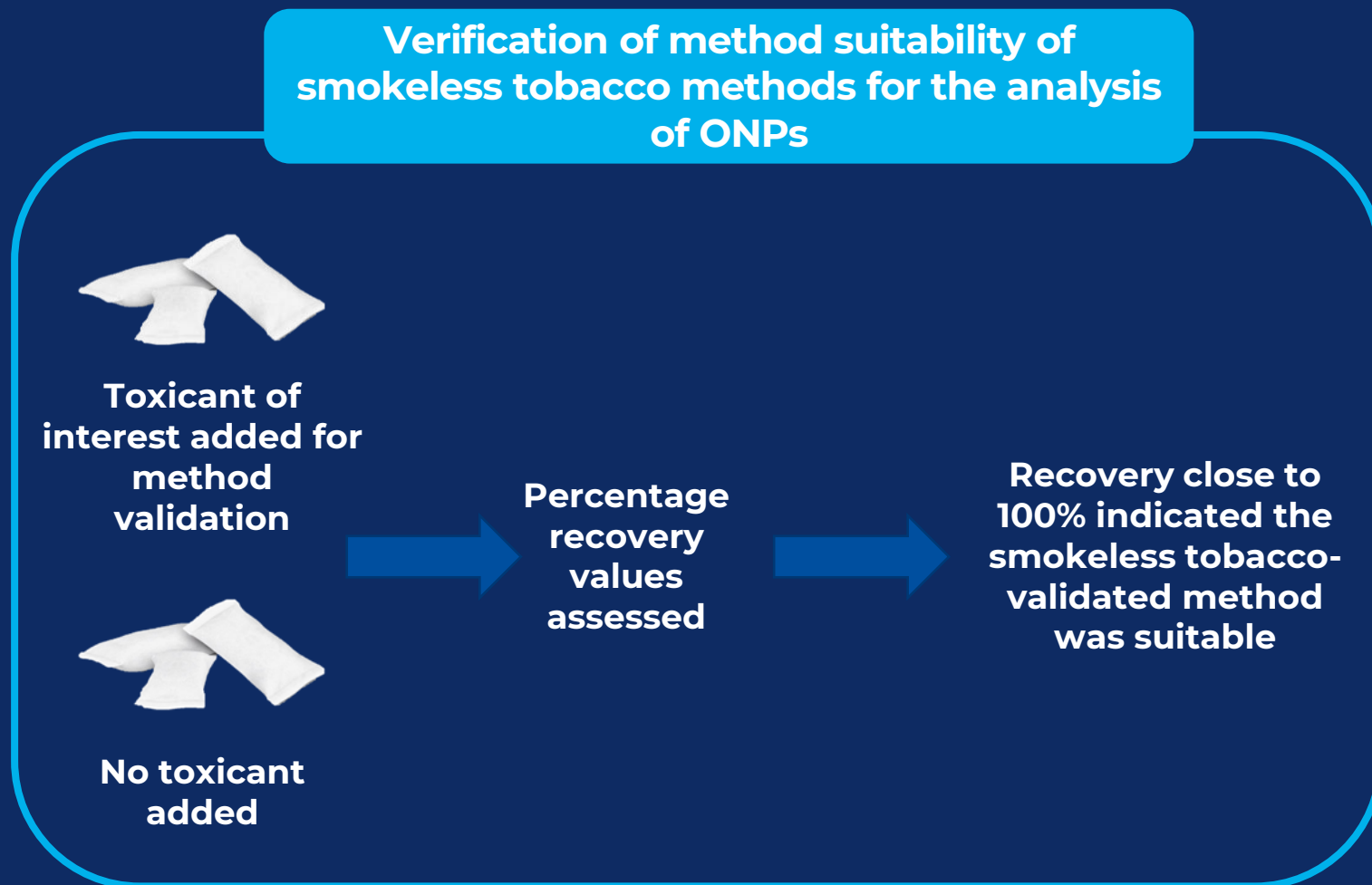
- ONPs were analysed as a combined sample of fleece material and pouch contents.
- Assumption that the pouch is fully exhausted during use



- One or more pouches per replicate (depending upon weight, 1g required per method test)
- Five replicates, one replicate per can
- Due to no aerosol emissions, CO, NO, NOx were not measured

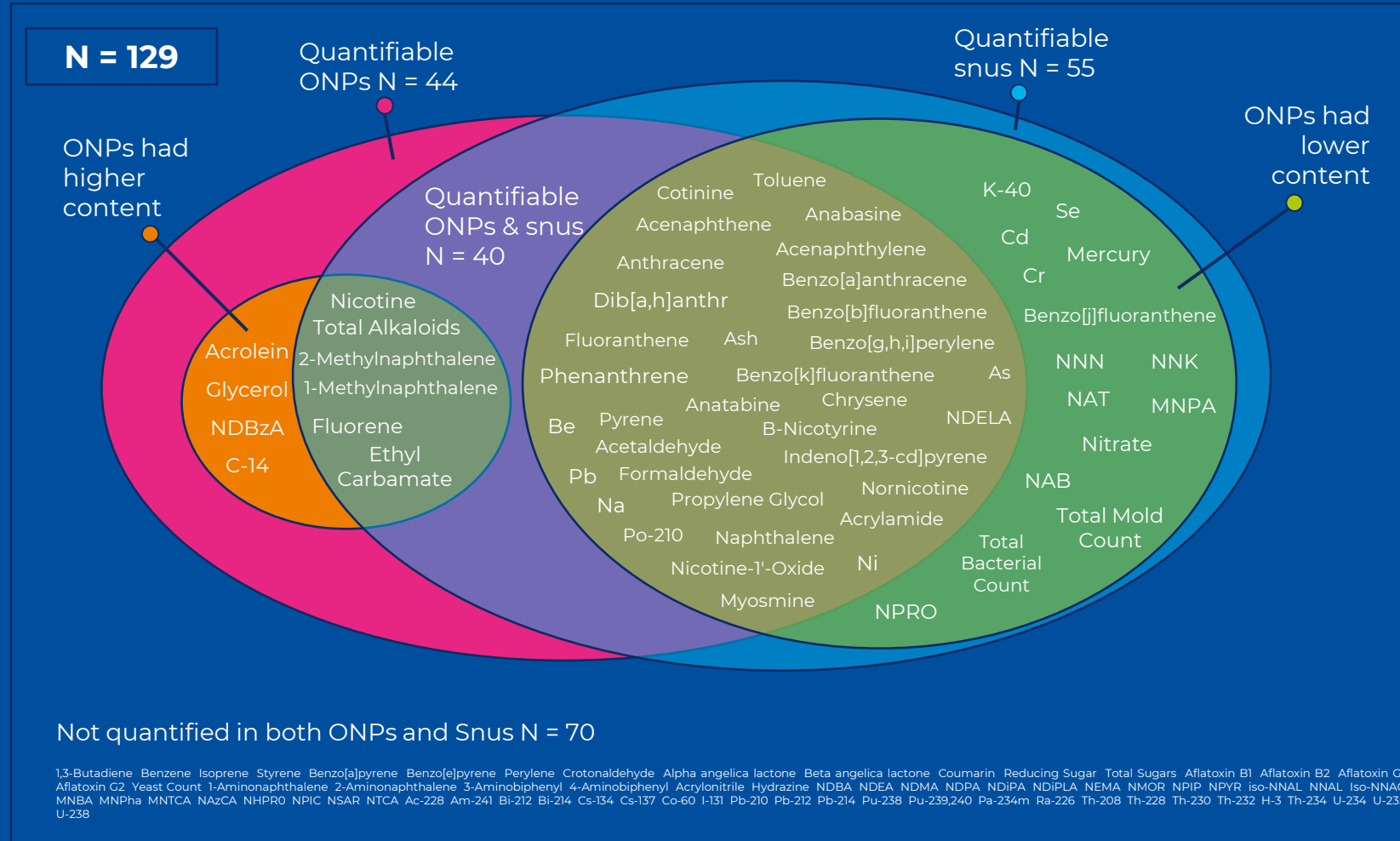
METHOD SUITABILITY

- For several of the toxicants no existing method had been validated for the analysis of ONPs.
- Methods validated for the analysis of smokeless tobacco were used.
- An unflavoured 0mg nicotine pouch was tested both with and without the toxicant of interest to assess recoveries



ONPs AND SNUS TOXICANT PROFILE

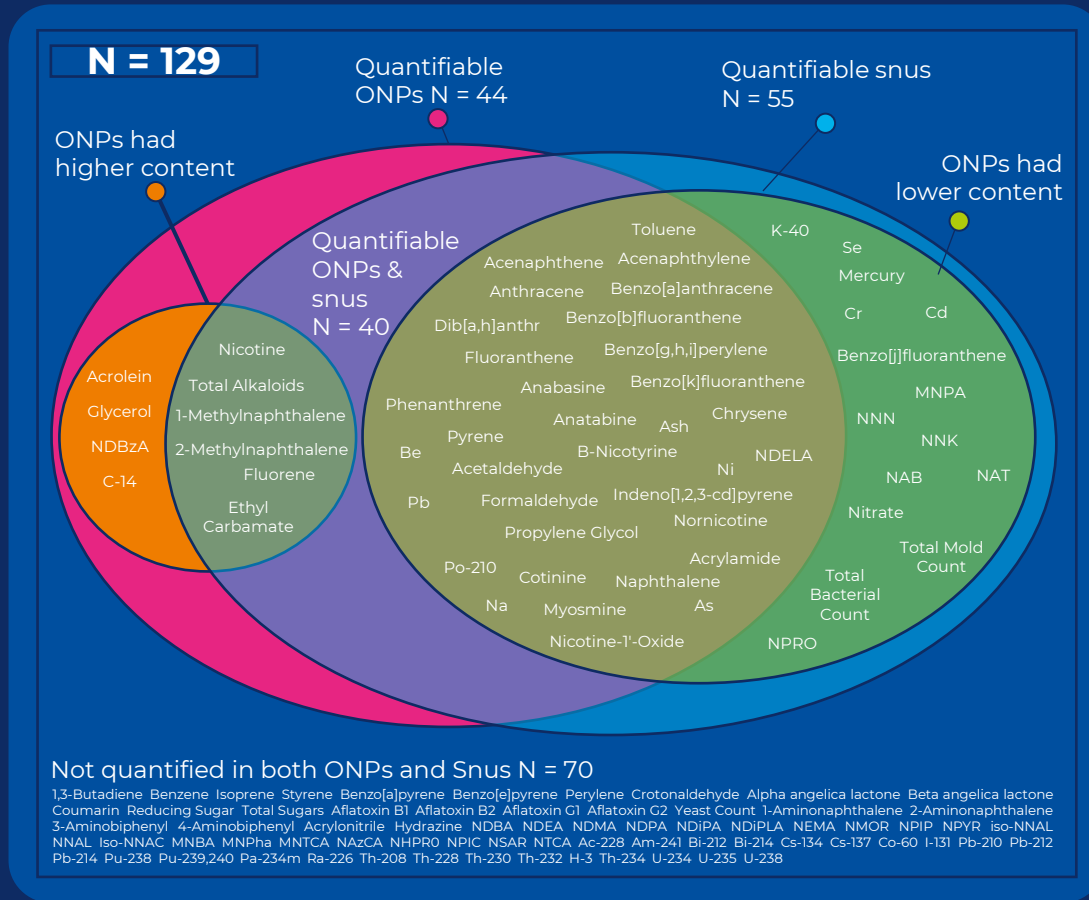
Data Summary



*excluding water, mass & pH

ONPs TOXICANT PROFILE - SUMMARY

Data Summary



- 70 toxicants of the 129* tested were not quantified in any sample
- The majority of toxicants detected in snus and ONPs were >90% reduced in ONPs
- Only 4 toxicants were quantified in 2 or less of the 11 ONPs tested, which were not quantified in either snus products tested

*excluding water, mass & pH

ONPs vs 1R6F TOXICANT PROFILE - SUMMARY

	Toxicants	% reduction of mean ONPs compared to 1R6F reference cigarette	% reduction of mean ONPs compared to 1S4 reference snus
Toxicants recommended for mandated lowering*	1,3-butadiene	99.9	ND in either
	Acetaldehyde	99.9	98.7
	Acrolein	99.9	+17.1
	Benzene	99.9	ND in either
	Benzo[a]pyrene	99.9	ND in either
	CO	NM in ONPs	NM in ONPs
	Formaldehyde	98.7	16.6
	NNK	99.7	99.3
	NNN	99.8	99.3
Toxicants considered high priority for disclosure and monitoring *	2-aminonaphthalene	97.7	ND in either
	4-aminobiphenyl	98.2	NQ in either
	Acrylonitrile	99.9	ND in either
	Cadmium	98.9	99.6
	Catechol	NM in ONPs	NM in either
	Crotonaldehyde	99.9	ND in either
	HCN	NM in ONPs	NM in either
	Hydroquinone	NM in ONPs	NM in either
	NOx	NM in ONPs	NM in either

Of the 18 toxicants recommended for mandated lowering and high priority for disclosure and monitoring in cigarette smoke*:

- 13 toxicants were tested in ONPs
- For those tested, all were lower in the tested ONPs compared to 1R6F

Abbreviation: NM, not measured. ND, not detected, NQ, not quantified

ONPs TOXICANT PROFILE

TobReg 9 reference product comparison¹



Oral Nicotine Pouches* had

99 – 99.8%

Less toxicants compared to 1R6F
reference cigarette 30-day average

^{*}11 products tested



BAT ONPs* had

42 – 92%

Less toxicants compared to
snus reference product

^{*}9 products tested



All samples were lower than the
GothiaTek[®] limits for toxicants tested



¹Hadley, S., et al., Toxicant contents of oral nicotine pouches: comparative quantitative analysis with Swedish snus and cigarette smoke. [Unpublished Manuscript]. British American Tobacco (BAT), 2025.

SUMMARY



ONPs tested contain **no tobacco**

Creates a **simpler** matrix than snus



Fewer toxicants quantified in ONPs compared to Snus

In most cases ONPs contained >90% lower levels than snus



All ONP samples tested comply with GothiaTek® limits for the toxicants tested

This study demonstrates that the studied ONPs have **significantly lower levels of toxicants compared to cigarette smoke** and **similar or lower toxicant profile compared to snus**

THANK YOU FOR YOUR TIME

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