QUANTITATIVE ANALYSIS OF 7 NICOTINE DEGRADATION PRODUCTS AND ALKALOIDS IN TOBACCO, TOBACCO PRODUCTS AND TOBACCO DERIVED PRODUCTS WITH (b) (4)

Purpose

To determine the concentrations of seven alkaloids (b) (4)) and nicotine degradation products (b) (4) in tobacco, tobacco products and tobacco derived products with (b) (4)

Applies to

APS

General information

Principle of the method

(b) (4) is extracted from the sample matrix into (b) (4) after the addition of the internal standards (IS). The extract is then filtered to a vial and diluted with (b) (4) . The sample preparation is done manually. Separation and quantification are done with (b) (4) . Calculations are performed in (b) (4) and (b) (4) . The capacity per instrument and person is (b) (4) single samples/week. The chemical structural formula for the analytes are shown in **Figure 1**.

Note: All reference documents and additional information stated "available upon request" are in Swedish. They are available upon request but need to be translated into English first.

Analytes

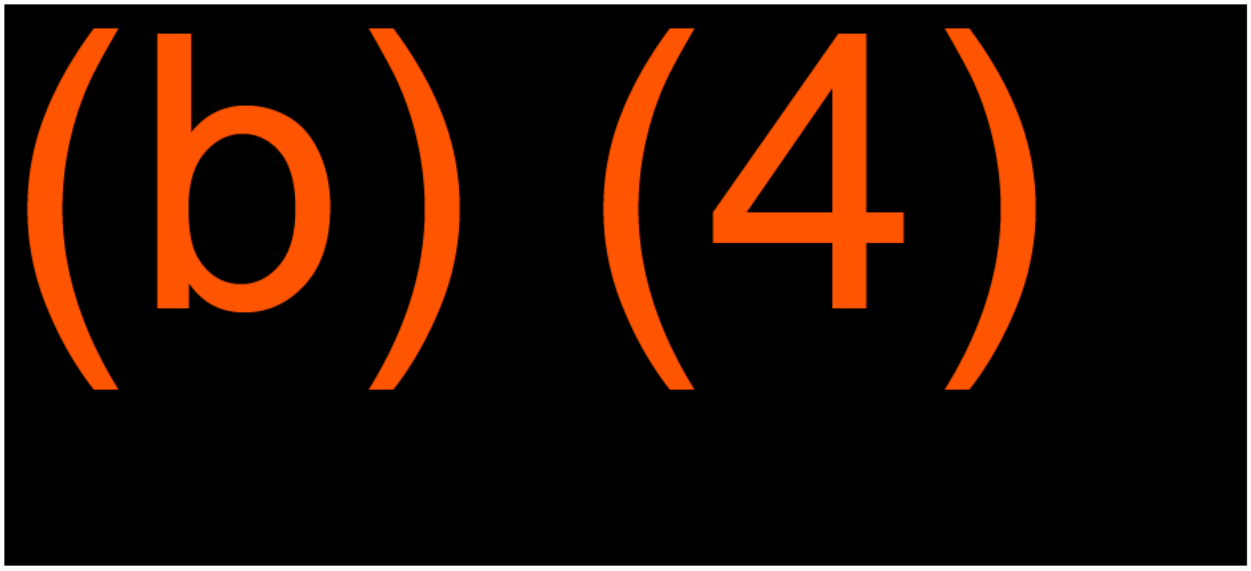

Fig. 1. The chemical structural formula for alkaloids and nicotine degradation products

Method scope, measurement range and measurement uncertainty

The method is used for the quantitative analysis of alkaloids and nicotine degradation products in (b) (4) and derivatives, as well as nicotine derived products. **Table 1** sets out the delimitations of the method.

Table 1. Delimitations of the method.

Analyte	Calibration range (ng/ml)	Measurement range (ppm by weight) as is	LOQ Zyn (ppm by weight) as is	LOQ other (ppm (weight) as is)	Measurement uncertainty (%)* Single sample	Measurement uncertainty (%)* Duplicate samples	Measurement uncertainty (%)* Triplicate samples
(b) (4)							

*Extended measurement uncertainty with coverage factor 2.

The contribution to measurement uncertainty is greatest from precision and the bias from accuracy. In order to reduce the uncertainty contribution from precision, care must be taken when adding the internal standard solution.

Literature references

(b) (4)

Internal reference documents (available upon request)

(b) (4)

Risk assessment and safety instructions

(b) (4)

Summarised risk assessment

(b) (4)

Substances hazardous to the environment

(b) (4)

Flammable substances

(b) (4)

Equipment

Apparatus and laboratory equipment

(b) (4)

(b) (4)

Parameters for analysis

UHPLC parameters

(b) (4)

(b) (4)

MS/MS-parameters

(b) (4)

Multiple Reaction Monitoring (MRM) Functions

(b) (4)

Table 3: (b) (4)

(b) (4)

Table 4: (b) (4)

(b) (4)

Other equipment

(b) (4)

Check samples and reference materials

(b) (4)

Preparation of standards

(b) (4)

Swedish Match
Quality and Environmental Management System

Document Title
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Valid From
19/03/2018

Page
13(34)

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(b) (6)

Document Type
Method Description

Document Publisher
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(b) (4)

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19/03/2018

Page
14(34)

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Contract Analysis APS

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Method Description

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(b) (4)

Table 5: (b) (4)

(b) (4)

Table 6: (b) (4)

(b) (4)

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Document Title
Quantitative analysis of seven nicotine degradation products and alkaloids with (b) (4)

Valid From
19/03/2018

Page
17(34)

Owned by Process
Contract Analysis APS

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(b) (6)

Document Type
Method Description

Document Publisher
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(b) (4)

(b) (4)

Sample handling

Sample storage and preparation

(b) (4)

Sample amount

(b) (4)

Analysis

Calibration and verification of apparatus

(b) (4)

Sample stability

The shelf life of prepared samples in vials with whole (b) (4) stored in the refrigerator is (b) (4) week.

Analytical procedure

General information

(b) (4)

Sample preparation

(b) (4)

Documentation

(b) (4)

Data

Collection and storage of data

(b) (4)

Calculations

(b) (4)

(b) (4)

Quality assurance

Control chart

(b) (4)

Swedish Match
Quality and Environmental Management System

Document Title	Valid From	Page
Quantitative analysis of seven nicotine degradation products and alkaloids with (b) (4)	19/03/2018	22(34)

Owned by Process
Contract Analysis APS

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(b) (6)

Document Type
Method Description

Document Publisher
(b) (6)

(b) (4)

(b) (4)

Reporting of analysis results

(b) (4)

Revision history

Version	(b) (4)
25/08/17	
19/03/18	

Person responsible

Director APS

Validation report

The matrices and samples used for validation are listed in **Table 7**.

Supporting documentation for validation

Calculations and all raw data files used are available upon request

Table 7: (b) (4)

Matrix	Description	Validation
(b) (4)		

Specificity/Selectivity

(b) (4)

Cross talk

(b) (4)

Carry-over

(b) (4)

Figure 2: (b) (4)

(b) (4)

Figure 3: (b) (4)

(b) (4)

Repeatability

(b) (4)

Precision within the laboratory

(b) (4)

Table 8: (b) (4)

(b) (4)

Accuracy

(b) (4)

Table 9: (b) (4)

(b) (4)

Bias from accuracy

(b) (4)

Table 10: (b) (4)

(b) (4)

Assessment of matrix effects, process efficiency and extraction yield (b) (4)

In order to investigate the matrix effect, yield and process efficiency, all matrices were spiked with each analyte prior to preparation, in prepared extracts and in pure extraction solution.

Matrix effect

(b) (4)

Absolute yield

(b) (4)

Process efficiency

(b) (4)

Table 11: (b) (4)

(b) (4)

(b) (4)

Limit of detection

(b) (4)

Table 12: (b) (4)

(b) (4)

Limit of quantification

(b) (4)

Table 13: (b) (4)

(b) (4)

Linearity

(b) (4)

(b) (4)

Robustness

Extraction times

(b) (4)

Post-extraction stability

(b) (4)

Stability of prepared samples

(b) (4)

Measurement range and measurement uncertainty

(b) (4)

Table 14: (b) (4)

(b) (4)

Conclusion

(b) (4)