ISO 19036:2019-10 (E)

Microbiology of the food ch ain - Estimation of measurement uncertainty for quantitative determinations

Contents

Page

Foreword v

Introduction vi

1 Scope 1

2 Normative references 1

3 Terms,definitionsandsymbols 1
3.1 Terms and definitions 1
3.2 Symbols 4

4 General considerations 5

5 Technical uncertainty 6
5.1 Identification of main sources of uncertainty 6
5.1.1 General aspects 6
5.1.2 Sampling uncertainty 7
5.1.3 Bias 7
5.1.4 Critical factors 7
5.2 Estimation of technical uncertainty 8
5.2.1 General aspects 8
5.2.2 Reproducibility standard deviation derived from intralaboratory experiments, sIR 8
5.2.3 Reproducibility standard deviation derived from interlaboratory studies 13

6 Matrix uncertainty 14
6.1 General aspects 14
6.2 Case of homogeneous laboratory (or test) sample 15
6.3 Multiple test portions from laboratory samples 15
6.4 Known characteristic of the matrix 16

7 Distributional uncertainties 17
7.1 General aspects 17
7.2 Colony-count technique -- Poisson uncertainty 17
7.3 Colony-count technique -- Confirmation uncertainty 17
7.4 Most probable number uncertainty 18

8 Combined and expanded uncertainty 19
8.1 Combined standard uncertainty 19
8.1.1 General considerations 19
8.1.2 Combined standard uncertainty based on separate technical, matrix, and distributional standard uncertainties 19
8.1.3 Combined standard uncertainty based on reproducibility standard deviation alone 20
8.2 Expanded uncertainty 20
8.3 Worked examples 20
8.3.1 Example 1 -- Technical, matrix and Poisson components of uncertainty 20
8.3.2 Example 2 -- Poisson component negligible 20
8.3.3 Example 3 -- Poisson, matrix and confirmation components 21
8.3.4 Example 4 -- Technical, matrix and most probable number components 21

9 Expression of measurement uncertainty in the test reports 22

9.1 General aspects 22
9.2 Results below the limit of quantification 23
9.2.1 General aspects 23
9.2.2 Example 23

Annex A (informative) Calculation of standard deviations with two or more than two test portions (intralaboratory reproducibility standard deviation and matrix uncertainty standard deviation) 25

Annex B (informative) Matrix effect and matrix uncertainty 30

Annex C (informative) Intrinsic variability (standard uncertainty) of most probable number estimates 32

Annex D (informative) Correction of experimental standard deviations for unwanted uncertainty components 34

Bibliography 37