ISO 20976-1:2019 (E)

Microbiology of the food chain — Requirements and guidelines for conducting challenge tests of food and feed products — Part 1: Challenge tests to study growth potential, lag time and maximum growth rate

Contents

Foreword

Introduction

1 Scope

2 Normative references

3 Terms and definitions

4 Principle

- 4.1 General
- 4.2 Estimation of the growth potential
- 4.3 Estimation of the growth kinetics parameters (lag time and maximum growth rate)

5 Apparatus

6 Culture media and reagents

7 Study design and sampling

- 7.1 General
- 7.2 Setting decision criteria for growth potential
- 7.3 Number of batches and selection criteria
- 7.4 Preparation of the test units
- 7.5 Number of test units to be inoculated

8 Selection of strains

9 Preparation of the inoculum

- 9.1 General
- 9.2 Preparation of the vegetative cell suspensions
- 9.3 Preparation of the spore suspensions

10 Inoculation of the tests units

11 Controls

- 11.1 Food controls
- 11.2 Control units

12 Storage of the test units

- 12.1 General
- 12.2 Estimation of growth potential
- 12.3 Estimation of growth kinetics parameters (lag time and growth rate)

13 Analysis

14 Expression of the results

- 14.1 General
- 14.2 Growth potential (Δ)
- 14.3 Growth kinetics parameters (lag time and growth rate)

15 Test report

15.1 General
15.2 Aim of the study and type of challenge test
15.3 Experimental protocol
15.4 Sample analysis
15.5 Results
15.6 Conclusions
15.7 Reference documents

Annex A (informative) Inter-batch variability assessment based on pH and aw

Annex B (normative) Minimum number of units to prepare for the challenge test study

Annex C (informative) Examples of protocols to prepare inocula

C.1 General
C.2 Examples of protocols inducing injury of vegetative cells
C.2.1 General
C.2.2 Preparation of cultures prior to the injury treatments
C.2.3 Injury protocols
C.2.4 Injury measurement
C.3 Example of protocol to produce spores
C.3.1 General
C.3.2 Preparation of the cell suspension prior to sporulation
C.3.3 Preparation of the spore suspension

Annex D (informative) Examples of how to estimate growth potential, lag time and maximum growth rate from results of challenge tests

D.1 Example applications of challenge tests designed to estimate growth potential
D.1.1 When three batches are inoculated simultaneously
D.1.1.1 Growth/no growth
D.1.1.2 Quantification of growth potential
D.1.2 When three batches are not inoculated simultaneously
D.2 Example application of challenge tests designed to estimate lag time and maximum growth rate

Annex E (informative) Use of simulation to assess a microbial population under different temperature conditions

Page count: 28