



**Microbiology of the food chain —
Polymerase chain reaction (PCR)
for the detection and quantification
of microorganisms — General
requirements and definitions**

*Microbiologie de la chaîne alimentaire — Réaction de
polymérisation en chaîne (PCR) pour la recherche et la
quantification de micro-organismes — Exigences générales et
définitions*

ISO 22174

**Second edition
2024-08**

This is a preview of ISO 22174:2024. [Click here](#) to purchase the full version from the ANSI store.



COPYRIGHT PROTECTED DOCUMENT

© ISO 2024

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

This is a preview of ISO 22174:2024. [Click here to purchase the full version from the ANSI store.](#)

Foreword	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
3.1 General terms.....	2
3.2 Terms related to the extraction and purification of DNA/RNA.....	3
3.3 Terms related to reverse transcription of RNA to DNA.....	4
3.4 Terms related to DNA amplification by PCR/RT-PCR.....	4
3.5 Terms related to controls.....	5
3.6 Terms related to qPCR.....	6
3.7 Terms related to dPCR.....	7
4 Principle	8
4.1 General.....	8
4.2 Laboratory sample.....	9
4.3 Sampling, transport and storage.....	9
4.4 Preparation of test sample.....	9
5 Microbial enrichment and virus concentration	9
5.1 Microbial enrichment.....	9
5.2 Virus concentration.....	9
6 Nucleic acid preparation	10
6.1 General.....	10
6.2 Prevention of amplification of DNA from dead cells.....	10
6.3 Nucleic acid extraction, release and purification.....	10
6.4 Nucleic acid quality and quantity.....	10
7 PCR amplification	11
8 Detection and confirmation of amplicons	11
9 General environmental laboratory requirements	12
9.1 General.....	12
9.2 Laboratory setup.....	12
9.2.1 General.....	12
9.2.2 Control of flows.....	13
9.2.3 Cleaning of laboratory.....	14
9.2.4 Environmental monitoring for nucleic acid contamination.....	14
10 Reagents and consumables	14
11 Equipment	14
12 Procedure	15
12.1 Enrichment and sample treatment.....	15
12.2 Amplification.....	16
12.2.1 General.....	16
12.2.2 Control reaction.....	16
12.2.3 Detection of amplicon.....	18
12.2.4 Data analysis.....	18
12.3 Evaluation.....	19
12.3.1 Qualitative evaluation.....	19
12.3.2 Quantitative evaluation.....	20
12.4 Test report.....	21
13 Performance characteristics of PCR-based methods	21
14 Validation and verification of PCR-based methods	21
14.1 General.....	21

This is a preview of ISO 22174:2024. [Click here to purchase the full version from the ANSI store.](#)

Annex A (informative) Fluorescence signals and amplification curve	23
Bibliography	26

This is a preview of ISO 22174:2024. [Click here to purchase the full version from the ANSI store.](#)

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee TC 34, *Food products*, Subcommittee SC 9, *Microbiology*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 463, *Microbiology of the food chain*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces ISO 22174:2005, ISO 20837:2006, ISO 20838:2006 and ISO 22119:2011, which have been technically revised.

The main changes are as follows:

- inclusion of requirements for the implementation of digital PCR;
- inclusion of requirements for laboratory flows monitoring including environmental monitoring for PCR;
- extension of [12.2.2](#) control reaction with descriptions of the different controls;
- change of [12.3](#) to include quantitative evaluation;
- inclusion of [Clause 14](#) on validation and verification.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.