



DPC: 23 / 30451320 DC

BSI Group Headquarters

389 Chiswick High Road London W4 4AL

Tel: +44 (0)20 8996 9000

Fax: +44 (0)20 8996 7400

www.bsigroup.com

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Interested committees:

Title: BS ISO 5354-1 Molecular biomarkers # Detection of DNA in textiles derived from cotton

Part 1: Extraction of DNA from cotton and cotton-derived textile materials

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Responsible Committee Secretary: Ms Sara Gibbs (BSI)

Direct tel:

E-mail: sara.gibbs@bsigroup.com

Introduction

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For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

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Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/Figure/ Table/Note	Type of comment	Commend (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	

DRAFT INTERNATIONAL STANDARD

ISO/DIS 5354-1

ISO/TC 34/SC 16

Secretariat: ANSI

Voting begins on:
2023-04-03

Voting terminates on:
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Molecular biomarkers — Detection of DNA in textiles derived from cotton —

Part 1:

Extraction of DNA from cotton and cotton-derived textile materials

ICS: 59.080.01

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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

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Foreword

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 documents 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).

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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 34 Food Products, Subcommittee SC 16 Horizontal methods for molecular biomarker analysis.

A list of all parts in the ISO 5354 series can be found on the ISO website.

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.

Introduction

The purpose of this document is to provide guidance to laboratories worldwide to assess, in a standardized way, whether cotton, cotton fibre or cotton-derived materials or all of these contain a specific DNA sequence or sequences. It can be applied to, for example, detection of genetically modified (GM) cotton in non-GM cotton and textile production, detection of a specific genetically modified (GM) cotton in other GM cotton and for confirming or tracing a particular species, variety, or genetic marker.

The DNA sequence screening approach described in this document is based on polymerase chain reaction (PCR)-based methods. The standard is designed to work on all four of the major commercial cotton species: *Gossypium hirsutum*, *G. barbadense*, *G. arboreum*, *G. herbaceum*.

Cotton (*Gossypium* spp.) has been cultivated for lint for over 8 000 years. There are over 50 species in the *Gossypium* genus.^[1] The *Gossypium* genome is complex, containing 2,25 to 2,43 gigabasepairs^[2].

One primary purpose of this standard is to provide standardisation of detection of GM cotton in non-GM cotton. While GM-cotton cultivation covers a large percentage of global cotton production today^[3] there are countries where the cultivation of GM cotton is not allowed by law as well as voluntary, private and public standards that do not allow the intentional use of genetically modified organisms (GMOs) in the cotton and textile production process. This creates a need for an adequate and harmonized protocol on the screening of cotton and cotton-derived materials for the potential presence of GM-cotton related sequences.

Due to asynchronous regulatory approvals, a GM cotton that is approved for growth and import in one country may not be approved in another country. There is therefore a need for detection of a specific GM cotton event in GM (or non-GM) cotton. The detection methods submitted and approved by global regulatory agencies are available for that purpose and this method does not supplant those nor the results of those analyses.

This document describes the key factors necessary to screen cottonseed, leaf and fibre samples at different stages of textile development in the cotton production chain for the potential presence of specific DNA elements. The protocol describes three major steps:

- a) an effective way to isolate DNA from cotton materials;
- b) a method to confirm that the isolated DNA consists of amplifiable cotton DNA, i.e., suitable for PCR. Preferred markers chosen for this purpose will be nuclear, and low copy number;
- c) A screening method for GM event specific cotton detection, or other molecular markers to be performed on the cotton DNA isolate.

If the results of the screening methods described in this protocol are 'not detected', the likelihood that the cotton sample is (at least partly) derived from GM cotton is minimal, based on the ability of the screening methods to detect elements and constructs of the GM cotton events. "Not detected" results do not preclude the possibility that GM was present at levels below the limit of detection of the method, or that the sample carried unknown GM events that do not contain targets detected by the method.

When one or more screening method indicates that GM elements are present, 'detected', the sample may be considered as derived from GM cotton and confirming detection methods may be applied to identify a specific event. In analysis of GM cotton seed and cotton products, the screening approach is designed to differentiate the intended target(s) from the bulk background material.

Similarly, molecular markers that are intended to identify specific markers will be designed to do so in a background of other varieties.

Molecular biomarkers — Detection of DNA in textiles derived from cotton —

Part 1:

Extraction of DNA from cotton and cotton-derived textile materials

1 Scope

This document provides requirements and recommendations to laboratories that perform polymerase chain reaction (PCR) analyses for the extraction of deoxyribonucleic acid (DNA) from cottonseed, leaf, cotton fibre and cotton fibre-derived materials. The following are within the scope of this document:

- a) Identifying material throughout the cotton cloth production process from which good quality, fit-for-purpose DNA may be derived;
- b) specifying a method for efficient DNA isolation from cotton and cotton-derived materials;
- c) specifying the cotton-specific marker(s) to be used as control for amplifiable DNA;
- d) specifying the screening procedure that provides the greatest probability of detecting target DNA as a result of the performance of the lowest number of element screening assays.

This document does not cover bulk sampling of the seed, bale or processed fabric and yarn.

NOTE 1 The standard describes the conditions for obtaining DNA for the screening of specific DNA elements and is set up in a way that offers the probability of also detecting unknown GM cotton events that possibly contain similar DNA sequences.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 21569, *Foodstuffs — Methods of analysis for the detection of genetically modified organisms and derived products — Qualitative nucleic acid based methods*

ISO 21570, *Foodstuffs — Methods of analysis for the detection of genetically modified organisms and derived products — Quantitative nucleic acid based methods*

ISO 21571, *Foodstuffs — Methods of analysis for the detection of genetically modified organisms and derived products — Nucleic acid extraction*

ISO 24276, *Foodstuffs — Methods of analysis for the detection of genetically modified organisms and derived products — General requirements and definitions*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in *ISO 16577 Molecular biomarker analysis — Molecular biomarker analysis — Vocabulary for molecular biomarker analytical methods in agriculture and food production* and the following apply.