



BSI Standards Publication

## **Textiles — Determination of index ingredient from coloured textile**

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Part 5: Lac

## National foreword

This British Standard is the UK implementation of [ISO 22195-5:2021](#).

The UK participation in its preparation was entrusted to Technical Committee TCI/80, Chemical testing of textiles.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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# INTERNATIONAL STANDARD

**ISO**  
**22195-5**

First edition  
2021-11-09

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## **Textiles — Determination of index ingredient from coloured textile —**

**Part 5:**

**Lac**

*Textiles — Détermination d'indicateurs d'ingrédients de  
textiles colorés —*

*Partie 5: Gomme-Laque*



Reference number  
ISO 22195-5:2021(E)

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## Foreword

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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](http://www.iso.org/directives)).

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This document was prepared by Technical Committee ISO/TC 38, *Textiles*.

A list of all parts in the ISO 22195 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](http://www.iso.org/members.html).

## Introduction

There is no doubt that dyeing plays the most important role in expressing the colour of clothes. Until the invention of synthetic dyes capable of expressing diverse colours today, humankind used materials obtained from nature to dye fabric. Typically, colourants were obtained from plants or various materials were extracted from minerals or insects. Dyeing fabrics using materials derived from these natural substances made it necessary to identify which substances the colourant was derived from. In other words, there has been a demand to confirm whether a fabric has been dyed with a natural substance.

There are several natural dyes raw material which give similar colour tone, they have different colouring molecule and the precise colorant. But each has different environmental profile which decided Environment impact of dyestuff. Textile dyed with natural dyes is claimed for environmental benefit mainly. Identification of dye helps in knowing and verifying the claims, that will help environment to get benefit exactly in the way it is claimed with textile.

This leads to the development of a test method to determine the type of natural substances used.





# Textiles — Determination of index ingredient from coloured textile —

## Part 5: Lac

### 1 Scope

This document specifies a test method which identifies the index ingredient chemical included in coloured fabric with lac. Lac can be applied to both natural fibre and man-made fibre.

### 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 3696](#), *Water for analytical laboratory use — Specification and test methods*

### 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

#### 3.1

##### **lac**

scarlet resinous secretion of a number of species of lac insects, of which the most commonly cultivated is *Kerria lacca*

Note 1 to entry: Lac is the common name of insect *Kerria lacca*. Thousands of lac insects colonize the branches of the host trees and secrete the resinous pigment. The coated branches of the host trees are cut and harvested as stick lac. This stick contains shellac. The spend of shellac extract is used for extraction of lac colorant.

#### 3.2

##### **coloured**

expressing of colours to textiles by dyeing, printing or coating

#### 3.3

##### **natural colourant**

materials obtained from plants, wood, rocks, soil, insects or any other thing existing on earth without any chemical reaction adopted before colouring of textiles

### 4 Principle

The identification of natural colorant is very important in the scientific examination of the colouring sources of textiles, coloured print paintings, illuminated manuscripts and other works where natural colorants are used. Natural colourants are usually composed of several phyto chemicals. Each colourant

Filter about 1 ml of the extracted solution into a HPLC vial using disposable syringe (6.6) equipped with a membrane filter (6.4).

### 7.3 Analysis

The detection and qualification of laccaic acid C is conducted using HPLC with PDA detector (6.7). The recommendable chromatographic conditions are given in Annex A. Confirm that the retention time and the maximum absorption wavelength of the catechin standard match, or the spectrum matches.

### 7.4 Qualification of laccaic acid C

Comparison between analyses of standard and sample through 7.3 can show the result of existence of laccaic acid C in sample.

NOTE Detection of laccaic acid C can vary due to conditions of coloured sample. In this case, the amount of specimen and extraction solution can be modified and concentration of extracted solution can be adopted.

## 8 Test report

The test report shall include the following information:

- a) a reference to this document, i.e. [ISO 22195-5:2021](#);
- b) identification of the sample;
- c) conditions of chromatographic analysis;
- d) test result;
- e) any deviation from the specified procedure in this document;
- f) the date of the test.

**Annex A**  
(informative)

**Example of test result**

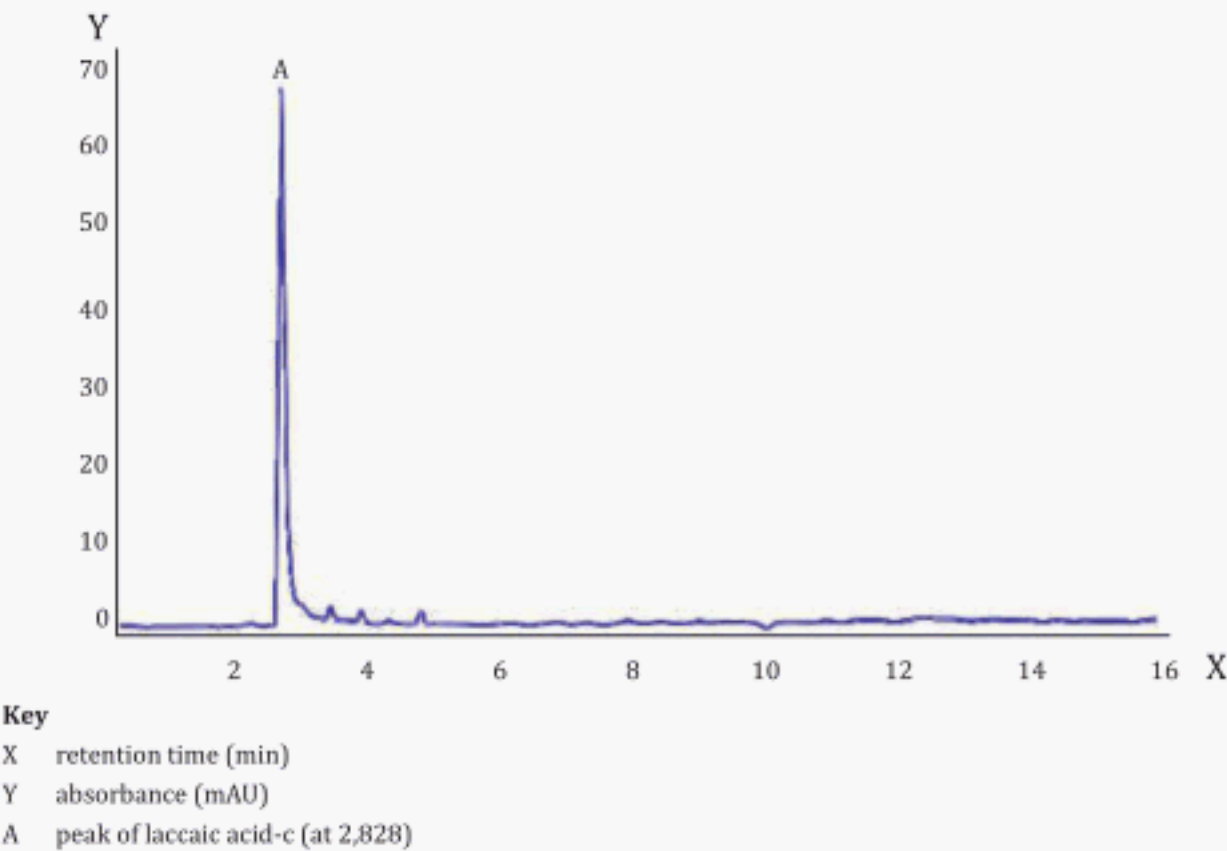
**A.1 Analysis of Lac colourant**

Prepare 1 ml of Lac colorants solution with 1 mg/ml according to 7.1 by disposable syringe (6.6). The result of chromatogram is shown Figure A.1.

**A.1.1 Chromatographic conditions for the HPLC-PDA**

The HPLC-PDA analysis is adopted to find out the specified wavelength in 300 nm and its chromatographic conditions are as follows:

- Detection wavelength: 300 nm
- Column: (C-18) 250 mm, 4,6 mm, 5 µm
- Mobile Phase: (a) Trifluoroacetic acid (5.5) (0,2 %) with water and (b) acetonitrile (5.2) (30:70)



**Figure A.1 — Chromatogram of Lac colourant by HPLC-PDA**

## A.2 Analysis of coloured fabric with Lac colourant

### A.2.1 Chromatographic conditions for the HPLC-PDA

As the instrumental equipment of the laboratories may vary, no generally applicable parameters can be provided for chromatographic analyses.

- Mobile phase: (a) Trifluoroacetic acid (5.5) (0,2 %) with water and (b) acetonitrile (5.2) (30:70)
- Column: (C-18) 250 mm, 4,6 mm, 5  $\mu$ m
- Detection: 300 nm
- Injection: 5  $\mu$ l
- Flow rate: 0,8 ml/min
- Run time: 18 min

### A.2.2 Determination example of index ingredient of lac colourant from coloured fabric

Take coloured fabric dyed with lac and prepare test solution in according to 7.2. The chromatogram is found out through 7.3 and the index ingredient of lac colourant, laccaic acid C was detected as shown in Figure A.2.

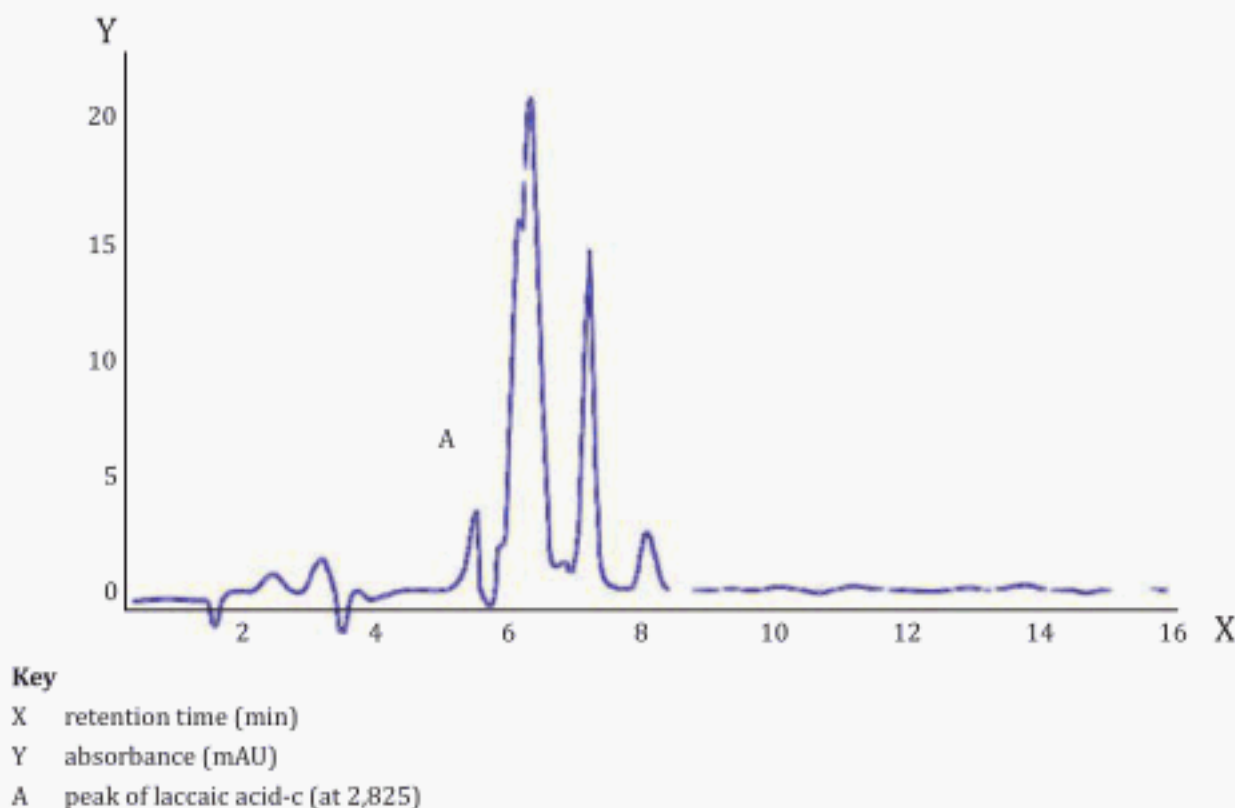


Figure A.2 — Chromatogram of coloured fabric extraction by HPLC-PDA

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