BS ISO 20311:2017

BSI Standards Publication

Traditional Chinese medicine—*Salvia miltiorrhiza* seeds and seedlings

bsi.

National foreword

This British Standard is the UK implementation of ISO 20311:2017.

The UK participation in its preparation was entrusted to Technical Committee CH/100/1, Traditional Chinese Medicine.

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

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Published by BSI Standards Limited 2017

ISBN 978 0 580 93284 7

ICS 65.020.20

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 March 2017.

Amendments/corrigenda issued since publication

Date	Text affected

BS ISO 20311:2017

INTERNATIONAL STANDARD

ISO 20311

First edition
2017-03

Traditional Chinese medicine — *Salvia miltiorrhiza* seeds and seedlings

Médecine traditionnelle chinoise — Graines et plants de Salvia miltiorrhiza

Reference number
ISO 20311:2017(E)

COPYRIGHT PROTECTED DOCUMENT

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Contents

Page

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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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

For an explanation on 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 the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 249, *Traditional Chinese medicine*.

Traditional Chinese medicine — *Salvia miltiorrhiza* seeds and seedlings

1 Scope

This document specifies the minimum requirements and test method for *Salvia miltiorrhiza* seeds and seedlings. It is suitable for use in quality assurance during the production and management of *Salvia miltiorrhiza* seeds and seedlings.

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.

International Seed Testing Association (ISTA), *International Rules for Seed Testing*

International Seed Testing Association (ISTA), *Working Sheets on Tetrazolium testing*

3 Terms and definitions

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

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

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1
seed lot
specified quantity of *seed* (3.7) that is physically and uniquely identifiable

[SOURCE: ISTA, International Rules for Seed Testing, 2.2.1]

3.2
primary sample
portion taken from the *seed lot* (3.1) during one single sample action

[SOURCE: ISTA, International Rules for Seed Testing, 2.2.2]

3.3
composite sample
sample formed by combining and mixing all the *primary samples* (3.2) taken from the *seed lot* (3.1)

[SOURCE: ISTA, International Rules for Seed Testing, 2.2.3, modified]

3.4
subsample
portion of a *primary sample* (3.2) obtained by reducing a sample

[SOURCE: ISTA, International Rules for Seed Testing, 2.2.4]

3.5
submitted sample
sample that is to be submitted to the testing laboratory and may comprise either the whole of the *composite sample* (3.3) or a *subsample* (3.4)

Note 1 to entry: The submitted sample may be divided into subsamples packed in different material meeting conditions for specific tests (e.g. moisture or health).

[SOURCE: ISTA, International Rules for Seed Testing, 2.2.5]

3.6
working sample
whole of the *submitted sample* (3.5) or a *subsample* (3.4), to which one of the quality tests described in the ISTA Rules is applied

Note 1 to entry: The working sample is at least the weight prescribed by the ISTA Rules for the particular test.

[SOURCE: ISTA, International Rules for Seed Testing, 2.2.7, modified]

3.7
seed
mature ovule produced by *Salvia miltiorrhiza* Bunge

Note 1 to entry: It consists of three basic parts: embryo, endosperm and the seed coat.

3.8
seedling
young plant of *Salvia miltiorrhiza* Bunge after cultivation for one year, consisting of bud, *tap root* (3.14), lateral root and fibrous root

3.9
purity
weight percentage of pure *seed* (3.7) fraction over the total weight of the *working sample* (3.6)

Note 1 to entry: The pure seed refers to the species stated by the applicant, or found to predominate in the test and includes all botanical varieties and cultivars of that species.

Note 2 to entry: It is expressed in per cent (%).

[SOURCE: ISTA, International Rules for Seed Testing, definition 3.2.1, modified]

3.10
viability
potential ability of a *seed* (3.7) to germinate or the capability of an embryo to live

Note 1 to entry: It is the percentage of stained seeds in the *working sample* (3.6), estimated using the Topographical Tetrazolium Test.

3.11
1 000-seed weight
average weight of every 1 000 pure *seeds* (3.7) of a *working sample* (3.6)

3.12
seed moisture content
loss of weight of *seed* (3.7) after drying over the weight of seed before drying

3.13
germination percentage
percentage of germinated *seed* (3.7) over the *working sample* (3.6)

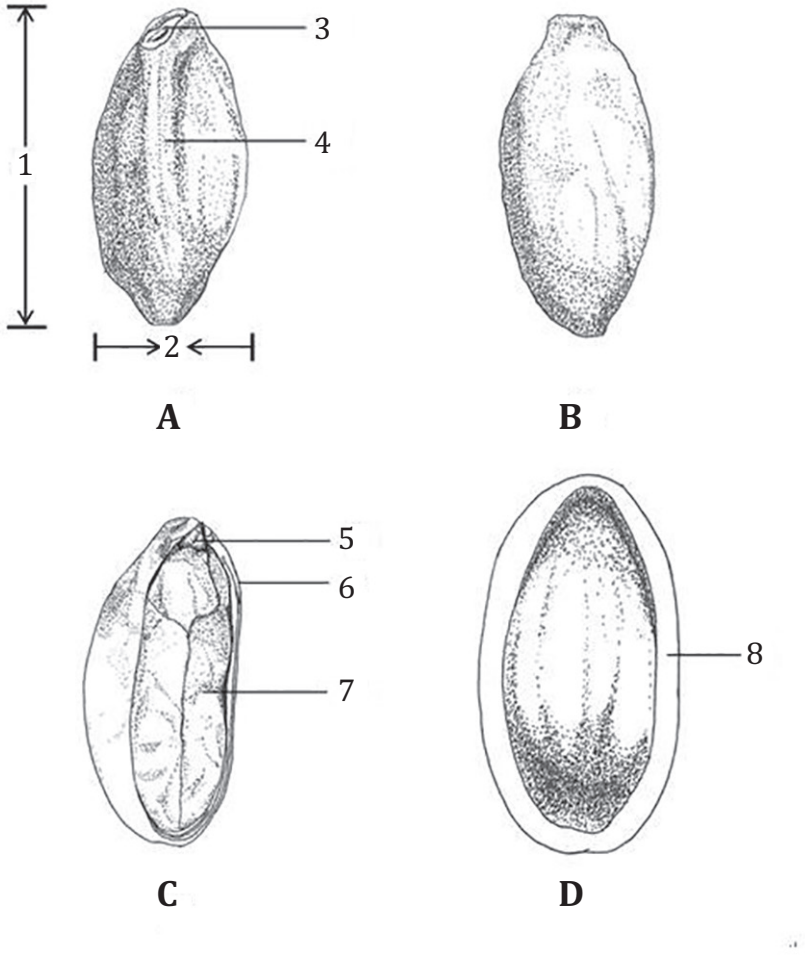
3.14
tap root
root generated from the one year development of the radical after *seed* (3.7) germination

3.15
seedling length
largest distance from the lower part to the top

Note 1 to entry: It is expressed in centimetres.

4 Descriptions

Salvia miltiorrhiza seed is the dried seed of the plant *Salvia miltiorrhiza* Bunge and consists of three basic parts: the embryo, cytoledon and the pericarp (see Figure 1 C). The epidermal mucilage layer swells to a transparent mucilage membrane surrounding the seed after soaking the seed with warm water (Figure 1 D).

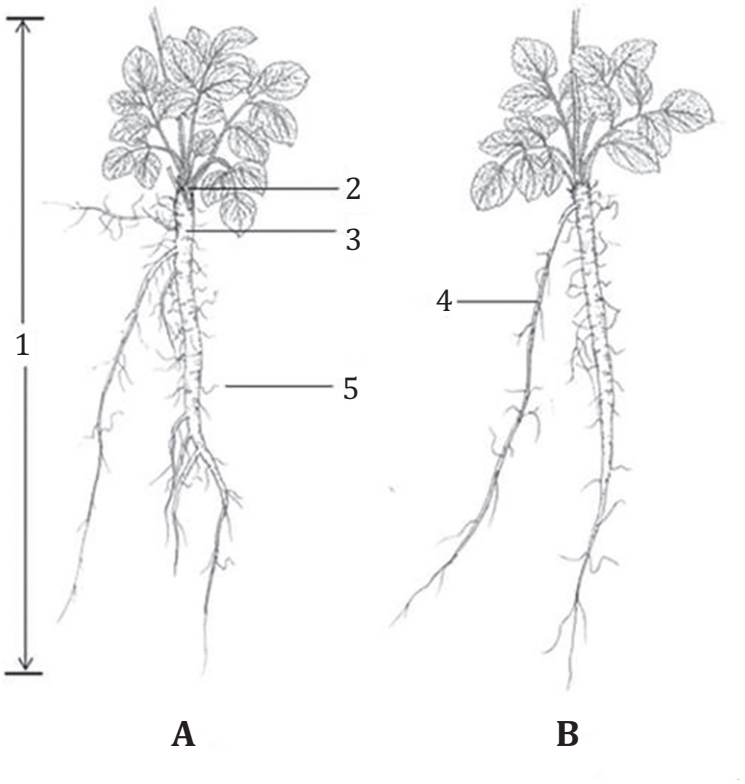


Key

1	seed length	A	facade of the seed
2	seed thickness	B	back of the seed
3	hilum	C	longitudinal section of the seed
4	raphe	D	seed after soaking in water
5	embryo		
6	pericarp		
7	cotyledon		
8	mucilage layer		

Figure 1 — Structure of *Salvia miltiorrhiza* seed

The *Salvia miltiorrhiza* seedling is a one-year seedling, consisting of four parts: bud, tap root, lateral root and fibrous root, as shown in Figure 2.



Key

1 seedling length
2 bud
3 tap root
4 lateral root
5 fibrous root
A seedling with more lateral roots
B seedling with fewer lateral roots

Figure 2 — *Salvia miltiorrhiza* seedling

5 Requirements

5.1 General characteristics

The following requirements shall be met before separating the bulk sample into test samples:

a) *Salvia miltiorrhiza* seedlings shall be healthy and intact;

b) the presence of living insects, mouldy seeds and external contaminants which are visible to the naked eye shall not be permitted.

5.2 *Salvia miltiorrhiza* seeds

5.2.1 The colour of the seed shall be black or brown. The seed shall have a hard texture, without any peculiar smell and mildew.

5.2.2 The mass fraction of moisture shall not be greater than 10 %.

5.2.3 Seed purity shall not be less than 70 %.

5.2.4 Viability shall not be less than 90 %.

5.2.5 Maturity shall not be less than 90 %.

5.2.6 The 1 000-seed weight, moisture content, germination percentage and seed purity shall comply with the requirements in Table 1.

Table 1 — Grading requirements of the *Salvia miltiorrhiza* seeds

Grade	1 000-seed weight g	Moisture content %	Germination percentage %	Purity %
First	≥1,80	≤6,00	≥60,0	≥90,0
Second	≥1,60	≤8,00	≥50,0	≥80,0
Third	<1,60	≤10	≥40,0	≥70,0
NOTE The establishment of the above requirements is based on the seeds collected from different regions.				

5.3 Seedlings

5.3.1 The tap root and lateral root of the *Salvia miltiorrhiza* seedling shall be intact with no diseases or insects. The tap root shall be full and substantial.

5.3.2 The bud of the *Salvia miltiorrhiza* seedling shall be intact with no diseases or insects.

5.3.3 Nematode shall not be detected.

6 Sampling

6.1 Seed sampling

Seed sampling shall be carried out in accordance with ISTA, *International Rules for Seed Testing*, Chapter 2. The maximum weight of the lot and the minimum weight of the sample are specified in Table 2.

Table 2 — Maximum weight of seed lot and minimum weight of sample

Maximum weight of seed lot kg	Minimum weight of sample g	
	Submitted sample	Purity analysis
2 000	250	50
NOTE The establishment of the above requirement is based on the seeds collected from different regions and handled with different treatments.		

6.2 Seedling sampling

The maximum sample lot of seedlings is 300 000 and the minimum samples should not be less than 100.

7 Test method

7.1 Moisture

Determination of the mass fraction of moisture shall be in accordance with the high constant temperature method specified in ISTA, *International Rules for Seed Testing*.

7.2 Maturity

Take duplicate samples of dry seeds using the quartering method, each containing 100 to 150 seeds. The seed shall be cut into two parts along the raphe. The shape of its embryo is determined with a microscope. The seed is considered to be mature if its embryo is pyriform or saddle. Formula (1) is used to express the maturity of a seed lot:

$$M(\%) = \frac{A_{\mathrm{m}}}{\mathrm{A}} \times 100 \tag{1}$$

where

M is the maturity (%);

A_{m} is the number of mature seeds;

A is the number of seeds in the working sample.

If the difference between measured maturities of the duplicate sample is less than 5 %, then the maturity of the seed lot shall be the arithmetic mean of two measured values; otherwise, it shall be re-estimated.

7.3 Purity

Determination of the seed purity shall be in accordance with the purity analysis of ISTA, *International Rules for Seed Testing*.

7.4 Seed viability

Determination of the seed viability shall be in accordance with ISTA, *International Rules for Seed Testing* and ISTA, *Working Sheets on Tetrazolium Testing*.

7.5 1 000-seed weight

Determination of the 1 000-seed weight shall be in accordance with Weight Determination of ISTA, *International Rules for Seed Testing*.

7.6 Germination percentage

Germination percentage shall be in accordance with the purity analysis of ISTA, *International Rules for Seed Testing*.

7.7 Fungus testing

7.7.1 Preparation of seed

Add 100 seeds and 20 ml sterilized water into a sterilized flask and shake for 8 min. The suspension is then centrifuged at 4 000 rpm for 20 min. The residue is re-suspended with 2 ml of sterilized water. Spot 100 µl of the final suspension on the blotter or filter paper on a plate for incubation. There shall be a total of five spots on the plate.

7.7.2 Preparation of seedling

Add 500 ml sterilized water into a flask. Take 10 to 20 seedlings. Immerge the seedling into the flask and shake for 8 min one by one. The suspension is then centrifuged at 4 000 rpm for 20 min. The residue is re-suspended with 2 ml of sterilized water. Spot 100 micro litter of the final suspension on the blotter or filter paper in a plate for incubation. There shall be a total of five spots on the plate.

7.7.3 Test of *Alternaria* spp.

Alternaria spp. testing shall be in accordance with ISTA, *International Rules for Seed Testing*, method 7-001a.

7.7.4 Test of *Fusarium* spp.

Fusarium spp. testing shall be in accordance with ISTA, *International Rules for Seed Testing*, method 7-009.

7.8 Nematode testing

Take 100 to 150 seedlings. Test nematode knots or lesions with the naked eye. Check the root knot or root lesion for nematode under microscope.

7.9 Seedling diameter

Take 100 to 150 seedlings and measure the top of the tap root using a Vernier caliper (two digits of the significant figures). The arithmetic mean indicates the average seedling diameter of the seedling lot.

7.10 Seedling length

Take 100 to 150 seedlings and measure from the lower part to the top of the seedling using a ruler (two digits of the significant figures). The arithmetic mean indicates the average seedling length of the seedling lot.

8 Test report

For each test method, the test report shall specify the following:

a) all information necessary for the complete identification of the sample;

b) the sampling method used;

c) the test method used;

d) the test result(s) obtained;

e) all operating details not specified in this document, or regarded as optional, together with details of any incidents which may have influenced the test result(s);

f) any unusual features (anomalies) observed during the test;

g) date of the test.

9 Packaging, storage and transportation

The packaging shall not transmit any odour or flavour to the product and shall not contain substances that can damage the product or constitute a health risk.

The temperature of seed storage should be not higher than 20 °C.

The temperature of seedling storage should be between 0 °C and 20 °C for long distance delivery.

10 Marking

The following information shall be marked or labelled on the packages:

a) the grade of the product should be in accordance with 5.2;

b) all quality features, indicated in 5.2 and 5.3, should be determined in accordance with methods specified in Clause 7;

c) the maximum weight of the lot and that of the samples, as specified in Table 2;

d) the country and province/state of origin of the seed and seedling;

e) the expiration date of the seeds;

f) items required by the regulatory body of the destination country.

Bibliography

[1] ISO 78-2, *Chemistry — Layouts for standards — Part 2: Methods of chemical analysis*

[2] ISO 5725-1, *Accuracy (trueness and precision) of measurement methods and results — Part 1: General principles and definitions*

[3] ISO 5725-2, *Accuracy (trueness and precision) of measurement methods and results — Part 2: Basic method for the determination of repeatability and reproducibility of a standard measurement method*

[4] JCGM 100:2008, *Evaluation of measurement data — Guide to the expression of uncertainty in Measurement*

ICS 65.020.20

Price based on 10 pages

This page deliberately left blank

British Standards Institution (BSI)

BSI is the national body responsible for preparing British Standards and other standards-related publications, information and services.

BSI is incorporated by Royal Charter. British Standards and other standardization products are published by BSI Standards Limited.

About us

We bring together business, industry, government, consumers, innovators and others to shape their combined experience and expertise into standards -based solutions.

The knowledge embodied in our standards has been carefully assembled in a dependable format and refined through our open consultation process. Organizations of all sizes and across all sectors choose standards to help them achieve their goals.

Information on standards

We can provide you with the knowledge that your organization needs to succeed. Find out more about British Standards by visiting our website at bsigroup.com/standards or contacting our Customer Services team or Knowledge Centre.

Buying standards

You can buy and download PDF versions of BSI publications, including British and adopted European and international standards, through our website at bsigroup.com/shop, where hard copies can also be purchased.

If you need international and foreign standards from other Standards Development Organizations, hard copies can be ordered from our Customer Services team.

Copyright in BSI publications

All the content in BSI publications, including British Standards, is the property of and copyrighted by BSI or some person or entity that owns copyright in the information used (such as the international standardization bodies) and has formally licensed such information to BSI for commercial publication and use.

Save for the provisions below, you may not transfer, share or disseminate any portion of the standard to any other person. You may not adapt, distribute, commercially exploit, or publicly display the standard or any portion thereof in any manner whatsoever without BSI's prior written consent.

Storing and using standards

Standards purchased in soft copy format:

- A British Standard purchased in soft copy format is licensed to a sole named user for personal or internal company use only.
- The standard may be stored on more than 1 device provided that it is accessible by the sole named user only and that only 1 copy is accessed at any one time.
- A single paper copy may be printed for personal or internal company use only.

Standards purchased in hard copy format:

- A British Standard purchased in hard copy format is for personal or internal company use only.
- It may not be further reproduced – in any format – to create an additional copy. This includes scanning of the document.

If you need more than 1 copy of the document, or if you wish to share the document on an internal network, you can save money by choosing a subscription product (see 'Subscriptions').

Reproducing extracts

For permission to reproduce content from BSI publications contact the BSI Copyright & Licensing team.

Subscriptions

Our range of subscription services are designed to make using standards easier for you. For further information on our subscription products go to bsigroup.com/subscriptions.

With **British Standards Online (BSOL)** you'll have instant access to over 55,000 British and adopted European and international standards from your desktop. It's available 24/7 and is refreshed daily so you'll always be up to date.

You can keep in touch with standards developments and receive substantial discounts on the purchase price of standards, both in single copy and subscription format, by becoming a **BSI Subscribing Member**.

PLUS is an updating service exclusive to BSI Subscribing Members. You will automatically receive the latest hard copy of your standards when they're revised or replaced.

To find out more about becoming a BSI Subscribing Member and the benefits of membership, please visit bsigroup.com/shop.

With a **Multi-User Network Licence (MUNL)** you are able to host standards publications on your intranet. Licences can cover as few or as many users as you wish. With updates supplied as soon as they're available, you can be sure your documentation is current. For further information, email subscriptions@bsigroup.com.

Revisions

Our British Standards and other publications are updated by amendment or revision.

We continually improve the quality of our products and services to benefit your business. If you find an inaccuracy or ambiguity within a British Standard or other BSI publication please inform the Knowledge Centre.

Useful Contacts

Customer Services
Tel: +44 345 086 9001
Email (orders): orders@bsigroup.com
Email (enquiries): cservices@bsigroup.com

Subscriptions
Tel: +44 345 086 9001
Email: subscriptions@bsigroup.com

Knowledge Centre
Tel: +44 20 8996 7004
Email: knowledgecentre@bsigroup.com

Copyright & Licensing
Tel: +44 20 8996 7070
Email: copyright@bsigroup.com

BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK

bsi.