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Traditional Chinese Medicine — General requirements for the ultrafine powder of herbs

Médecine traditionnelle chinoise — Exigences générales relatives à la poudre ultrafine d'herbes médicinales

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Foreword

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

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

Ultrafine powder of herbs is an innovative development of the traditional powder form of decoction pieces that have been used commonly in traditional Chinese medicine for over 2 000 years. Ultrafine powder of herbs is prepared by pulverizing decoction pieces into ultrafine powder, followed by systematic quality analyses, which can increase the utilization efficiency, ensure consistency of quality and guarantee the safety of Chinese medicines. Ultrafine powder of herbs can be directly taken orally but is more commonly used as a raw material in the preparation of finished products. This is done by turning ultrafine powder of herbs into dosage form, such as granules, capsules or tablets, in order to achieve longer storage times and make its use more convenient.

Ultrafine powder of herbs and its products are becoming increasingly popular due to the obvious advantages in safety control, consistency of quality and high efficacy compared with traditional decoction pieces. Ultrafine powder of herbs and its products have been developed, registered and commercialized in areas including China, Hong Kong SAR, Taiwan Province of China, the Republic of Korea, Japan, Singapore, the United States of America and Canada. In 2018, China exported US$ 3,91 billion of Chinese medicines. The sales volume of herbal supplements in the global market since 2015 is US$ 93,15 billion. The sales volume of ultrafine powder of herbs products in China is over US$ 137 million in 2020.

The lack of an International Standard for ultrafine powder of herbs could put consumers at risk when they take ultrafine powder of herbs and its products and thus jeopardize the market and reputation of Chinese medicines. Therefore, there is an urgent need to establish general requirements for ultrafine powder of herbs to ensure the safety and consistency of quality of ultrafine powder of herbs and related products and also enhance the international trade of ultrafine powder of herbs products.

Traditional Chinese Medicine — General requirements for the ultrafine powder of herbs

1 Scope

This document specifies general requirements for ultrafine powder of herbs to ensure their quality and safety. This document applies to ultrafine powder of herbs that are sold and used as natural medicines in international trade, including finished products derived from this powder.

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 18664, *Traditional Chinese Medicine — Determination of heavy metals in herbal medicines used in Traditional Chinese Medicine*

ISO 19609-2, *Traditional Chinese medicine — Quality and safety of raw materials and finished products made with raw materials — Part 2: Identity testing of constituents of herbal origin*

ISO 21371, *Traditional Chinese medicine — Labelling requirements of products intended for oral or topical use*

ISO 22258, *Traditional Chinese medicine — Determination of pesticide residues in natural products by gas chromatography*

ISO 22283, *Traditional Chinese medicine — Determination of aflatoxins in natural products by LC-FLD*

ISO 22412, *Particle size analysis — Dynamic light scattering (DLS)*

ISO 22467, *Traditional Chinese medicine — Determination of microorganisms in natural products*

ISO 22590, *Traditional Chinese medicine — Determination of sulfur dioxide in natural products by titration*

ISO 23190, *Traditional Chinese medicine — Determination of aristolochic acids in natural products by high-performance liquid chromatography (HPLC)*

ISO 23191, *Traditional Chinese medicine — Determination of selected Aconitum alkaloids by high-performance liquid chromatography (HPLC)*

ISO 23723:2021, *Traditional Chinese medicine — General requirements for herbal raw material and materia medica*

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
ultrafine powder of herbs
herbal powder processed with modern pulverization technology from *decoction pieces* (3.2) with a D_{90} (3.4) of the powder being no more than 45 µm

Note 1 to entry: Ultrafine powder of herbs can be taken directly or used as a raw material to make *finished products* (3.3) in dosage form, such as granules, capsules and tablets.

3.2
decoction piece
prescription medicine processed from Chinese materia medica under the direction of traditional Chinese medicine and processing methods for Chinese medicines

Note 1 to entry: Decoction pieces can be directly used in clinical practice or for the production of prepared medicines.

[SOURCE: ISO 18662-2:2020, 3.1.3.2]

3.3
finished product
finished dosage form made from ultrafine powder of herbs including packaging in its final container and labelling

3.4
D_{90}
particle diameter corresponding to 90 % of the cumulative undersize distribution

Note 1 to entry: D_{90} describes a diameter where 90 % of the distribution has a smaller particle size and 10 % has a larger particle size.

4 General requirements

4.1 General

General requirements cover identification, assay, extractives, moisture content, uniformity of appearance, particle size distribution and safety tests of pesticide residues, heavy metals, residue of sulfur dioxide, mycotoxins and microorganisms. For each testing item, a suitable limit shall be set based on the quality requirement of each ultrafine powder product, and all the testing items shall be tested. Decoction pieces used for ultrafine powder of herbs should have been used in powder form in history and should be chosen based on research. The number and position of sampling points as well as sampling quantity shall be determined to ensure the testing of representative samples.

For specific ultrafine powder products, the limit value of each testing item shall refer to the respective requirements for raw material in the pharmacopoeias listed in ISO 23723:2021, Annex A if the method of a certain pharmacopoeia is chosen.

4.2 Identification

One or more specific chemical component(s) in final products shall be set for identification. Pattern analysis based on authentic Chinese herbal medicine sample material by thin layer chromatography (TLC) or other chromatographic methods, such as fingerprint, are applicable for positive identification. Besides chemical identification, microscopic and DNA molecular identification are applicable for authenticity.

4.3 Assay

The content of representative chemical component(s) as a quality control marker should be set for quality control. To ensure consistency of quality, the upper and lower limits of the content of representative chemical component(s) are suggested.

4.4 Determination of extractives

Extractives, including water-soluble extractives, ethanol-soluble extractives and/or ether extractives, should be determined according to specific ultrafine powders of herbs.

4.5 Determination of moisture content

Moisture content shall be determined.

The limitation refers to the requirements of the destination country or region. If there is no limit requirement, the limitation refers to a national or regional pharmacopoeia.

4.6 Uniformity of appearance

The appearance shall be uniform in colouration, with no discolorations or colour stains.

4.7 Particle size distribution

The diameter of cells of most plants is in the range of 10 µm to 100 µm. To ensure ultrafine powder of herbs are from broken cells, particle size distribution shall be determined by dynamic light scattering. D_{90} of no more than 45,0 µm is generally accepted, unless otherwise specified.

4.8 Pesticide residues

Targets of testing pesticides shall be selected according to information related to cultivation of the raw materials.

The limitation refers to the requirements of the destination country or region. If there is no limit requirement, the limitation refers to a national or regional pharmacopoeia.

4.9 Heavy metals

The heavy metals such as lead, arsenic, mercury and cadmium should be determined. Other heavy metals (e.g. chromium) can also be determined based on risk assessment.

The limitation refers to the requirements of the destination country or region. If there is no limit requirement, the limitation refers to a national or regional pharmacopoeia.

4.10 Residue of sulfur dioxide

The residual limit of sulfur dioxide should be set for ultrafine powder of herb if its raw material is processed by sulfur fumigation. Sulfur dioxide should be determined.

The limitation refers to the requirements of the destination country or region. If there is no limit requirement, the limitation refers to a national or regional pharmacopoeia.

4.11 Mycotoxins

Determination of mycotoxins should be conducted to obtain accurate evaluation in ultrafine powder of herbs that are easily contaminated by mycotoxins, such as aflatoxins or ochratoxin A. Aflatoxins should be determined.

The limitation refers to the requirements of the destination country or region. If there is no limit requirement, the limitation refers to a national or regional pharmacopoeia.

4.12 Microorganisms

Microorganisms should be determined.

4.13 Aristolochic acids

For some specific materials originating from the Aristolochia genus, aristolochic acids should be determined.

4.14 Aconitum alkaloids

For some specific materials originated from the Aconitum genus, aconitum alkaloids should be determined.

5 Test methods

5.1 Identification

The testing method specified in ISO 19609-2 applies.

5.2 Assay

The testing method and technology for the content of representative chemical component(s) shall refer to a national or regional pharmacopoeia, such as Pharmacopoeia of the People's Republic of China, the Japanese Pharmacopoeia, the Korean Pharmacopoeia or European Pharmacopoeia.

5.3 Extractives

The testing method specified in ISO 23723:2021, 7.2.5 applies.

5.4 Moisture

The testing method specified in ISO 23723:2021, 7.2.1 applies.

5.5 Uniformity of appearance

Spread evenly a sufficient quantity of sample on a smooth paper, press the surface evenly and observe the sample under a bright light. Observe the colour of the testing samples to evaluate the uniformity of appearance.

5.6 Particle size distribution

The testing method specified in ISO 22412 applies.

5.7 Pesticide residues

The testing method specified in ISO 22258 applies.

5.8 Heavy metals

The testing method specified in ISO 18664 applies.

5.9 Residue of sulfur dioxide

The testing method specified in ISO 22590 applies.

5.10 Mycotoxins

The testing method specified in ISO 22283 applies.

5.11 Microorganism

The testing method specified in ISO 22467 applies.

5.12 Aristolochic acids

The testing method specified in ISO 23190 applies.

5.13 Aconitum alkaloids

The testing method specified in ISO 23191 applies.

6 Packaging and labelling

Individual sachets, bags or bottles which can be tightly sealed or closed to prevent moisture entering should be used for packaging. A suitable container shall be chosen, based on the stability test result, to ensure consistency of quality of the product in its shelf life. The product name, names of the raw materials, quantity, expiry date, storage method, lot number and other information should be labelled on the package. The overall labelling requirements specified in ISO 21371 apply.