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Information model of Chinese materia medica processing

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Foreword

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This document was prepared by Technical Committee ISO/TC 215, *Health informatics*.

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Introduction

Chinese materia medica is widely utilized as a part of complementary and alternative medicine throughout East Asia and western countries. In order to ensure the quality and therapeutic effect of Chinese medicines, it is important to use a proper manufacturing process of Chinese materia medica.

There are guidelines for processing Chinese materia medica in the Traditional Chinese Medicine industry, and clinical trials are already available. A large number of relevant trials have been conducted to assess the function of decoction pieces of Chinese materia medica. However, the descriptions of processing in reports tend to be insufficient for the interpretation of heterogeneity among trials, often causing difficulties for data synthesis in meta-analyses. This arises from two reasons: firstly, because of the lack of use of an appropriate information model of the processing of Chinese materia medica, and secondly because semantic associations between concepts of Chinese materia medica processing have yet to be explicitly identified.

In order to address these problems, this document defines the information model within the field of Chinese materia medica processing.

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Information model of Chinese materia medica processing

1 Scope

This document specifies an information model within the field of Chinese materia medica processing. It defines a set of domain constraints of sanctioned characteristics, each composed of a relationship and an applicable information model.

This model aims at representing the concepts applicable to Chinese materia medica processing in the making of decoction pieces.

This document is not applicable to Japanese traditional Kampo medicine.

2 Normative references

There are no normative references in this document.

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:

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

3.1 General

3.1.1 concept

internal conception of some thing; general notion or idea of some thing

[SOURCE: ISO/TS 18876-2:2003, 3.1.3]

3.1.2 entity

any concrete or abstract thing of interest

3.1.3 relationship

association between two or more *entities* (3.1.2) indicating the purpose or type of association

Note 1 to entry: Can also be known as an association when the information model is based upon object classes.

3.1.4 information model

graphical and textual representation of *entities* (3.1.2) and the *relationships* (3.1.3) between them

Note 1 to entry: Can also be known as a data model, a conceptual data model, a logical data model, an entity relationship model, an object class diagram, or a database definition.

[SOURCE: ISO/IEC 19763-12:2015, 4.2.24]

3.2 Characterizing categories

3.2.1

traditional Chinese medicine

TCM

traditional medicine that originated in China, and is characterized by holism and treatment based on pattern identification/syndrome differentiation

[SOURCE: ISO/TS 17948:2014, 2.2]

3.2.2

Chinese materia medica

CMM

medicinal parts of medicinal plants, animals, and minerals after preliminary *processing* (3.2.4), which are used as raw materials in Chinese medicines

Note 1 to entry: This refers to the raw materials used to make decoction pieces.

[SOURCE: ISO 18668-1:2016, 3.2]

Note 2 to entry: Preliminary processing can include washing and drying. Large and bulky items can also be cut into smaller pieces or shorter lengths.

3.2.3

decoction piece

prescription medicine processed from *Chinese materia medica* (3.2.2) under the direction of *traditional Chinese medicine* (3.2.1) and *processing* (3.2.4) methods for Chinese medicines, which can be directly used in clinical practice or the production of prepared medicines

3.2.4

processing

physical or chemical technique of converting *Chinese materia medica* (3.2.2) into *decoction pieces* (3.2.3) based on the theory of pharmacology of *traditional Chinese medicine* (3.2.1), the *nature of Chinese materia medica* (3.2.30), the need for dispensing, *preparation* (3.2.19) and clinical application

Note 1 to entry: This definition is taken from Reference [24].

3.2.5

toxicity

ability of a substance to produce an adverse effect upon a living organism

[SOURCE: ISO 472:2013, 2.767]

3.2.6

effectiveness

accuracy and completeness with which users achieve specified goals

[SOURCE: ISO/TS 20282-2:2013, 4.7]

3.2.7

adjuvant material

substance added during *processing* (3.2.4) in order to enhance the therapeutic usefulness of pharmaceutical herbal medicament treatment

Note 1 to entry: Adjuvant material is different from excipient material. The latter is usually used to produce pills or tablets, inseparable from tablets, etc. But the solid adjuvant material is discarded after processing.

[SOURCE: ISO/TS 18062:2016, 3.4, modified — Note to entry has been modified.]

3.2.8**channel tropism**

meridian tropism

orientation of the medicinal action according to the meridian/channel on which the therapeutic action is manifested

Note 1 to entry: This definition is taken from Reference [20].

3.2.9**moisture content**

amount of water contained in *decoction pieces* (3.2.3) after *processing* (3.2.4)

Note 1 to entry: General moisture content of CMM and decoction shall be controlled between 7 % and 13 %.

Note 2 to entry: This definition is taken from Reference [22].

3.2.10**ash content**

basic *purity* (3.2.12) indicator for the quality control of *decoction pieces* (3.2.3)

Note 1 to entry: Ash is present in the residue weight of decoction pieces left after incineration at high temperature (500 °C to 600 °C).

Note 2 to entry: Ash content including physiological ash and acid incompatibility ash.

EXAMPLE The total ash content of GLYCYRRHIZAE RADIX ET RHIZOMA (Gancao) is not more than 7 %. The acid incompatibility ash content is not more than 2 %.

Note 3 to entry: This definition is taken from Reference [22].

3.2.11**texture**

shape, size, colour, quality of the herb and *decoction pieces* (3.2.3)

Note 1 to entry: This definition is taken from Reference [23].

3.2.12**purity**

quota of the impurities or non-medicinal parts in processed *Chinese materia medica* (3.2.2)

Note 1 to entry: This definition is taken from Reference [22].

3.2.13**pressure**

exertion of force upon a surface

3.2.14**decoction ingredient**

chemical components including bioactive or therapeutic agents, and other invalid chemical constituents in *decoction pieces* (3.2.3) which stem from *botanical medicine* (3.2.16), *mineral medicine* (3.2.17) and *animal medicine* (3.2.15)

Note 1 to entry: This definition is taken from Reference [25].

3.2.15**animal medicine**

Chinese materia medica (3.2.2) derived from animals

Note 1 to entry: Terrestrial animals, insects, marine creatures, organs, tissue, secretion, discharge, glue, solid particles formed in the organs, shell can also be used as CMM.

EXAMPLE PHERETIMA (Dilong), BOVISC ALCULUS (Niuhuang).

Note 2 to entry: This definition is taken from Reference [18].

3.2.16

botanical medicine

Chinese materia medica (3.2.2) derived from plants

Note 1 to entry: Whole plant, plant part, tissue, resin or gum can be used as CMM.

Note 2 to entry: This definition is taken from Reference [18].

3.2.17

mineral medicine

Chinese materia medica (3.2.2) derived from a solid, naturally occurring inorganic substance

Note 1 to entry: These medicines can be original or created after simple processing of the mineral product.

Note 2 to entry: This definition is taken from Reference [18].

3.2.18

seeds medicine

Chinese materia medica (3.2.2) derived from mature seeds

Note 1 to entry: Seeds medicine is a subcategory of botanical medicine.

EXAMPLE Peach kernel (PERSICAE SEMEN, Taoren), bitter apricot seed (ARMENIACAE SEMEN AMARUM, Ku xingren).

Note 2 to entry: This definition is taken from Reference [24].

3.2.19

preparation

action or process of preparing or being prepared for use or consideration

EXAMPLE Calcining, frying.

Note 1 to entry: This definition is taken from Reference [24].

3.2.20

stir-frying

procedure where cleaned and cut *decoction pieces* (3.2.3), are put into a pre-heated container and heated continuously while stirring or rotating it

Note 1 to entry: This is a procedure used for processing decoction pieces which have been cut and cleaned.

Note 2 to entry: This process can be with or without adjuvants.

Note 3 to entry: This process is classified into plain-frying or frying with solid adjuvants.

Note 4 to entry: This definition is taken from Reference [24].

3.2.21

cutting

operating procedure of softening *Chinese materia medica* (3.2.2) after cleaning, and then slice them up into different shapes of pieces, shreds, cubes, segments

Note 1 to entry: Unripe bitter orange (AURANTII FRUCTUS IMMATURUS, Zhishi) can be cut into slices and dried to serve as medicine.

Note 2 to entry: This definition is taken from Reference [24].

3.2.22**steaming**

exposure of cleaned *decoction pieces* (3.2.3) to vapour into which water is converted when heated, forming a white mist of minute water droplets in the air to decoction pieces in a containerized environment

Note 1 to entry: This process may be with or without adjuvants.

EXAMPLE Fleece-flower root (POLYGONI MULTIFLORI RADIX, Heshouwu) processed by steaming.

Note 2 to entry: This definition is taken from Reference [24].

3.2.23**boiling**

placing *decoction pieces* (3.2.3) into a container of liquid which has reached the temperature at which it bubbles and turns to vapour

EXAMPLE Kusnezoff monkshood root (ACONITI KUSNEZOFFII RADIX, Caowu) processed by boiling.

Note 1 to entry: This definition is taken from Reference [24].

3.2.24**blanching**

boiling (3.2.21) and item for a short period of time so that only its exterior is heated

Note 1 to entry: This process is used to separate the skin or peel from items.

EXAMPLE Bitter apricot seed (ARMENIACAE SEMEN AMARUM, Kuxingren) processed by blanching.

Note 2 to entry: This definition is taken from Reference [24].

3.2.25**parameter**

numerical or other measurable factor forming one of a set that defines a system or sets the conditions of a *processing* (3.2.4) method

EXAMPLE Temperature, proportion of adjuvant material, duration.

Note 1 to entry: This definition is taken from Reference [24].

3.2.26**calcining**

cleaning of *Chinese materia medica* (3.2.2) by heating in containers

Note 1 to entry: Calcining can be performed directly in a smokeless fire or in an appropriate refractory vessel.

Note 2 to entry: There are two types of calcining: open calcining and sealed calcining.

Note 3 to entry: This definition is taken from Reference [24].

3.2.27**quenching**

dipping *mineral medicine* (3.2.17) into cold liquid adjuvants after calcination at a temperature sufficient to change their colour to red and ensure aerobic conditions

Note 1 to entry: This definition is taken from Reference [24].

3.2.28**leaching rate**

amount of active ingredients released from crude drug into the contacting liquid over unit time

3.2.29

decocting rate

solubility rate

amount of active ingredients dissolved in the decocting liquid over unit formula by heating with a temperature >90 °C

3.2.30

nature of Chinese materia medica

basic properties of *Chinese materia medica* (3.2.2) that can be used to treat disease

Note 1 to entry: The nature of Chinese materia medica includes the *four properties* (3.2.31) and the *five flavours* (3.2.32).

EXAMPLE Four properties and five flavors, upbearing, downbearing, floating, sinking, meridian entry, toxic effect.

Note 2 to entry: This definition is taken from Reference [22].

3.2.31

four properties

Chinese materia medica (3.2.2) properties: cold, hot, warm, and cool nature

Note 1 to entry: This definition is taken from Reference [20].

3.2.32

five flavours

five tastes of medicinals, pungency, sweetness, sourness, bitterness, and saltiness, representing the basic actions of the medicinals

Note 1 to entry: This definition is taken from Reference [20].

3.2.33

purifying

method of obtaining relatively pure *Chinese materia medica* (3.2.2) by using physical or chemical methods to remove the non-medicinal parts and other impurities from the raw materials

4 Categorial structure

4.1 Overview

The formal concept representation system in the field of the Chinese materia medica processing includes characterizing categories (see 3.2) and semantic links (see 4.2).

The outline of those characterizing categories and semantic links is illustrated in a concept diagram in Figure 1.

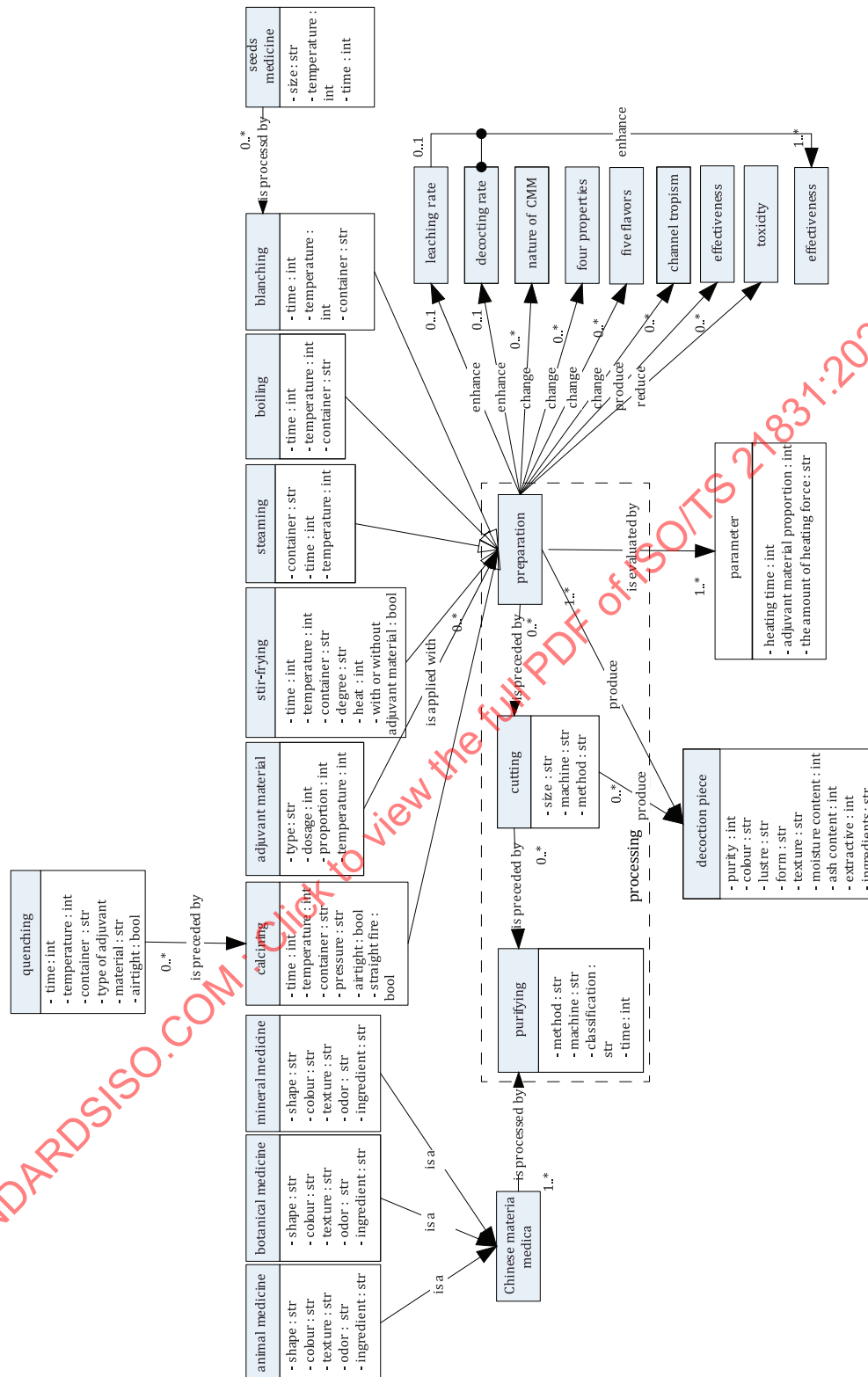


Figure 1 — Information model of representation of CMM processing

4.2 Semantic link

4.2.1 is processed by

The action of certain standard traditional pharmaceutical technologies which change CMM into decoction pieces.

It expresses the semantic link between Chinese materia medica (see [3.2.2](#)) and processing (see [3.2.4](#)).

EXAMPLE <Gecko (GECKO, Gejie)> is processed by <cutting the head, feet and scales>.

4.2.2 change

Action or process of becoming different, of making something different.

It expresses the semantic link between preparation (see [3.2.19](#)) and channel tropism (see [3.2.8](#)).

EXAMPLE <Vinegar processing> changes <the channel tropism of corydalis rhizome (CORYDALIS RHIZOMA, yan hu suo)>.

4.2.3 enhance

Action or process to improve the quality or value of something.

It expresses the semantic link between preparation (see [3.2.19](#)) and leaching rate (see [3.2.28](#)).

EXAMPLE <Processing with vinegar> enhances <the analgesic effect of corydalis rhizome (CORYDALIS RHIZOMA, yanhusuo)>.

4.2.4 reduce

Action or process to make less or decrease something.

It expresses the semantic link between preparation (see [3.2.19](#)) and toxicity (see [3.2.5](#)).

EXAMPLE 1 The inherent toxicity of Chinese materia medica can be reduced through processing.

EXAMPLE 2 <Cooking or steaming> can reduce <the toxicity of kusnezoff monkshood root (ACONITI KUSNEZOFFII RADIX, Cao wu)>.

4.2.5 produce

Relationship between the maker of a product and the product indicating the act of making that product.

It expresses the semantic link between preparation (see [3.2.19](#)) and decoction piece (see [3.2.3](#)).

EXAMPLE <Processed rehmannia root (shu di huang, REHMANNIAE RADIX)> can produce <the new effect of blood-tonifying and yin-tonifying after processing on unprocessed rehmannia root (Di huang, REHMANNIAE RADIX)>.

4.2.6 is applied with

Something used in a particular situation, activity, or process such as a method, idea, or material.

It expresses the semantic link between adjuvant material (see [3.2.7](#)) and preparation (see [3.2.19](#)).

EXAMPLE <Vinegar> is applied with <preparation>.

4.2.7 is evaluated by

Action that assesses the value of something.