

# Traditional Use of Botanicals and Botanical Preparations

## An International Perspective

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*Botanicals are used worldwide in food and supplements for their nutritional and physiological effects and have become part of the local and regional cultural heritage. The use of botanicals has evolved from experience over a long period of time, often over centuries. Folk knowledge of this use has been passed on from generation to generation and later been systematically recorded. This information is collectively called 'traditional use' and is the largest body of observational evidence in humans available. It is recognised as a valid body of knowledge to support the safe use of botanicals and document their health benefits. This paper describes the experience on how traditional use is accepted as a basis for support of the safety and benefits for health of botanical preparations used in food supplements. It proposes a common basis for the mutual acceptance of the evidence as assessed by expert judgement that may lead to recognition of the safety and benefits of botanicals in different parts of the world.*

*Keywords: Traditional use; botanicals; folk use; systematic use; conditions of use; physiological benefits; safety; food law; supplements.*

## I. Introduction

The use of botanicals and botanical preparations (hereafter referred to as botanicals) is as deeply rooted in local and regional culture as are traditional dishes and dietary habits. It is part of the heritage of knowledge that has accumulated over time and is transferred from generation to generation.

Representing four regions of the world, each with a distinct and extensive history and clear recognition of history of use of botanicals, this paper reflects the collective views of leading experts in the field on what information constitutes traditional use, exploring and describing how such traditional knowledge has accumulated and is used. This paper focuses exclusively on the tradition of use of botanicals used for nutritional or physiological benefits in supplements. In this paper, the term 'supplements' is used to designate a category of products in various jurisdictions referred to as 'food supplements', 'dietary supplements' or 'health supplements'. It covers concentrated forms of botanicals and other food com-

pounds, in small unit dose form, intended to supplement the diet.

The aim of this paper is to:

- Provide an authoritative account of traditional uses of botanicals, principally in foods and supplements, based on knowledge, practice and experience from different parts of the world.
- Identify the key parameters characterising traditional use.

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- Describe how the traditional evidence regarding the safe and beneficial use of botanicals is generated, compiled, documented, transmitted and accepted.
- Contribute to the reflection of regulatory authorities on the potential use and application of such evidence in the context of regulatory initiatives ongoing or under consideration in individual countries or regions around the world.

## II. The Concept of Traditional Use

### 1. Traditional Use in a Regulatory Context

Botanicals and their preparations have been used by man for millennia. Many have become part of ordinary diets. Initially botanicals were selected on the basis of their organoleptic and morphologic characteristics. Their nutritional and functional qualities have been improved by selection and propagation over centuries. Beneficial effects of certain botanicals on the body have also been observed and these botanicals have been used primarily for health promotion and medicinal purposes, resulting in an extensive and long history of use. Regions around the world recognise the rich history of these uses and much of this is now well documented.

However, what constitutes this body of information has not been widely shared or achieved global agreement. Understanding of issues such as extent and duration of use, conditions of use and where and how traditional use should be documented varies globally. Furthermore, how this information supports safety and benefit assessments of botanicals in supplements is being actively and widely considered.

Based on tradition of use products consisting of or containing botanicals have been classified in formal categories, such as food, supplement and medicine. Classifications are not always straight forward,

as a botanical may be used for several purposes. The same botanical may have different properties, making it suitable for nutritional, health maintenance/promotion or medicinal purposes.

In many jurisdictions, the use of botanicals for nutritional and physiological purposes, including their use in tea and herbal infusions and in supplements is considered under the umbrella of food.

This paper addresses the tradition of use of botanicals with nutritional and physiological benefits for people in a state of homeostasis (eg as described by the Council of Europe), but not necessarily in optimal health or physiological conditions.<sup>1</sup> Such benefits include physiological effects (eg relaxation and anti-stress), improvement of bodily functions (eg gastrointestinal transit or liver function), strengthening the body's immune function and resistance and reduction of disease risk factors (such as cholesterol or blood pressure, thereby supporting cardiovascular health, bone health, etc). Normal people can suffer from stress; may be in particular physiological situations (eg menopause or old age); may experience discomfort (eg dyspepsia, hard stools, difficulty sleeping, etc); and have elevated cholesterol or blood pressure. In all such cases, the use of botanicals has proven to be helpful to soothe, ease or solve the specific health or physiological condition and support the adaptability of the body (resilience) to external sources of stress, in particular during the process of ageing. As an example, in the EU, the European Food Safety Authority has defined many distinct effects that are considered to be beneficial for health.<sup>2</sup>

This is distinct from the use of botanicals for therapeutic purposes (in case of diagnosed diseases or disorders), for which close supervision by healthcare professionals is required. This medicinal traditional use falls outside the scope of this paper.

### 2. The History of Tradition of Use

Traditional use has been referred to as 'the body of information available on how a botanical has been used over time.'<sup>3</sup>

This includes information on how the botanical has been identified, collected or cultivated and processed after harvesting, which parts have been used, how it has been prepared for human consumption and the conditions under which it has been used

1 Council of Europe. Homeostasis, a model to distinguish between foods (including food supplements) and medicinal products. 07-02-2008.

2 Anton R, Serafini M, Delmulle L. The Substantiation of Claims for Botanical Food Supplements in Relation to Traditional Use. *European Food and Feed Law* 5:321-328;2013.

3 Anton R, Serafini M, Delmulle L. The role of Traditional Knowledge in the Safety Assessment of Botanical Food Supplements – Requirements for Manufacturers. *European Food and Feed Law* 5:241-250;2012.

and the evolution of these conditions over time. This body of information has accumulated in stages.

#### a. Folk use

Folk use covers communication of the traditional use or consumption of botanicals and preparations, which has historically involved a ‘trial and error’ approach leading to observations of benefits and other effects on humans (or animals). Such observations mostly originate from rural areas and were passed on verbally from person to person and generation to generation, given that most people did not have the possibility to formally record such information. It follows that folk use tends to originate in individual communities and expand over time as knowledge and experience is shared more widely. Folk use tends not to be well documented or codified in any organised manner. The usage and experiences observed, however, can be quite detailed and might include information on recipes, modes of preparation, intended use and adverse effects (botanical species/botanical parts or types of preparations to avoid).

#### b. Systematic use

Over time much of the same information from folk use was recorded, refined and documented and became part of the botanical’s traditional use. The information was codified in authentic texts, written recipes, books and recognised monographs, allowing for more formalised knowledge and information sharing. This documentation was used to further educate people and develop experienced professionals, especially in more populated areas.

Systematic use is normally more detailed and systematically extended with further knowledge and experience. It may include information on cultivation practices, such as growing location, growing conditions (soil conditions, watering, and sunlight exposure) and time of year or season. Also addressed may be the mode of harvesting, storage and initial processing or preparation for use.

Today, in many regions, an extensive body of monographs and recognised text books covering the traditional effects of botanicals exists. Over time, this knowledge may have been further confirmed by scientific data, identifying the compounds responsible for the beneficial effects and researching these effects in a more structured way.<sup>4</sup>

### III. Systematic Approach to Tradition of Use

#### 1. Key Parameters that Constitute Traditional Use of Botanicals

A series of key parameters have been described and used to characterise traditional use of botanicals for nutritional and physiological purposes (Table 1).

*Table 1: Key parameters and information that characterise traditional use for nutritional and physiological purposes*

Parameter	Details
<b>Identity</b>	Scientific name (incl. author), vernacular and common name, botanical family
<b>Extent of use</b>	Widespread across population(s) / regions
<b>Time/duration of use</b>	Over generations (eg ≥ 25-30 years)
<b>Conditions of use</b>	
– Botanical collection and treatment	Fresh, dried, etc
– Botanical part(s)	Leaf, flower, fruit, seed, root, stem, pollen, cortex, tuber, rhizome, resin, exudates, etc
– Mode/nature of preparation	Whole botanical or part, fresh, juice, dried, cooked, infused, extracted, distilled, etc
– Mode of use	Oral use, single or in combinations (mixtures), etc
– Quantity of use	Intake amount and frequency
<b>Intended use</b>	Nutritional, physiological benefit
<b>Documentation</b>	Authentic texts (ie books, recipes) Monographs Recognised textbooks Scientific and other publications

<sup>4</sup> Anton R, Serafini M, Delmulle L. Traditional Knowledge for the Assessment of Health Effects for Botanicals – A Framework for Data Collection. European Food and Feed Law 2:74-80;2012.

Ideally, each of these parameters should be addressed and well documented for a given botanical to be considered as traditionally used for the intended purpose.

- ‘Identity’ covers the correct identification of the botanical. This includes the scientific name (genus, species, subspecies and author), the botanical family, and the common and vernacular names. This information should be sufficient to indisputably establish the identity of the botanical.
- Widespread use of a botanical in or across population groups or geographic locations is referred to as ‘Extent of use’. The more widespread the traditional use, the greater the extent of use. Convergence of the use of the same botanical and/or preparation for similar purposes from different regions of the world constitute strong evidence for the extent of use, safety and health benefits.
- Time or ‘Duration of use’ refers to the number of years a botanical has been used traditionally. To represent a long history of use, it is generally considered that this duration should be at least two generations (eg 50 years). It is noted that some jurisdictions accept 25-30 years of demonstrated use as a sufficiently long period for regulatory purposes.
- ‘Conditions of use’ comprises a series of critical details on how the botanical was traditionally used. This includes how the botanical was collected or harvested and its initial treatment (eg dried), as well as the botanical part(s) used, such as the leaf, flower, fruit, root, stem, seed, tuber, rhizome, etc. Another key aspect of ‘Conditions of use’ is the mode of preparation or presentation, such as fresh, dried, syrup, extraction or any other way of preparation. The latter comprises details on the type of extract (water, alcohol, etc) or preparation (powder, macerate, infusion, extract, tincture, distillate, expressed, etc), including the conditions applied. ‘Mode of use’, such as ingestion (eg drinking, swallowing, and sublingual), along with frequency and quantity of use are also part of ‘Conditions of use’. Compatibility and non-compatibility of a botanical with other ingredients, and ripe vs unripe are also relevant aspects of ‘Conditions of use’.
- ‘Intended use’ includes the described nutritional or physiological benefit. For botanicals used in supplements, this includes nutrition (based on nutrient content) and health maintenance/promotion. Also relevant is information about the botanical species, parts, types of preparation, and uses

that may be associated with adverse health effects or are not recommended for certain population groups.

- Appropriate ‘documentation’ is the foundation of traditional use of botanicals regardless of the culture or origin, as it allows for the capture, maintenance and dissemination of the details of the key parameters. More importantly, documentation helps ensure consistency with respect to the intended use of the botanical. Sources of documentation for the traditional use of botanicals include authentic texts in the form of recognised textbooks, recipes, monographs, scientific and other publications.

## 2. Types of Acceptable Evidence

The assessment and acceptance of the traditional benefits of botanicals is based on the whole body of documentation available. The information from individual sources may be fragmented, but the body of evidence across the sources must demonstrate consistent documentation and contain sufficient information to characterise the botanical, its preparation and effect as assessed based on the key parameters described above.

The conclusion of this assessment is by nature an expert judgment. In all regions, such expert judgements are usually already available for the most common botanicals belonging to the local heritage of tradition of use. These judgements are documented in recognised textbooks, monographs and publications describing the key parameters of the botanical’s use to ensure the safety and traditional benefit.

It is noted that not all information available is of acceptable quality and therefore each source of information should be critically appraised to judge its acceptability to support the traditional use. A non-exhaustive list of the most important generally recognised documentary reference sources for tradition of use available and used in four regions of the world is presented in Appendix 1.

## 3. Assessing the Validity of Traditional Use from the Available Documentation

Thousands of botanical species and preparations have a long history of traditional use for nutritional

and physiological purposes and have been recognised as such.

The basis for assessing the benefit and safety of a botanical based on tradition of use from the documentation available follows a common approach in most regions of the world.

1. Characterisation of the botanical or botanical preparation
2. Characterisation of the traditionally observed health benefit (nutritional or physiological effect)
3. Compilation of the body of traditional use documentation
4. Compilation of the body of relevant scientific data available from published sources (where available)
5. Expert judgement based on the complete body of evidence.

The outcome of the expert judgement will particularly provide guidance on the extent to which the tradition of use supports the preparation, the intake amount and frequency of use, the intended use and, where relevant, restrictions of use and/or advisory statements relating to specific population groups or situations to be observed.

The outcome of the above described assessment is already applied for many botanicals and documented in monographs and reference textbooks. The key parameters of the traditional use listed in Table 1 have been identified and documented. This information serves as a starting point for the assessment of the safety and benefit of botanicals under comparable or similar conditions of use.

#### IV. Role of Traditional Use for Benefit and Safety Assessment

##### 1. Confidence in Tradition of Use Information

The extent to which traditional use information serves as a basis for the safety and benefit of botanicals in supplements largely depends on the level of detail, quality and consistency of the documentation. The more detailed and thorough the information, the more it can be confidently used to inform current assessments of safety and benefit.

Drawing conclusions regarding the safety or benefit of a botanical requires confidence in the duration and extent of exposure. In other words, the more wide-

spread the documented use, the more confidence can be derived from the information that the evidence of benefit and/or absence of adverse effects is justified.

Similarly, confidence is strengthened if this benefit and/or absence of adverse effects has been observed following exposure over a substantial time period, eg generations, and across the lifecycle (young and old).

Safety and benefit of a botanical is strongly dependent on botanical species, the botanical part and the conditions of use. Traditional and modern scientific literature provides information on important differences in safety and efficacy of closely related botanical species, as well as differences between botanical parts within a species. For example:

- The leaves of *Abrus precatorius* L. are widely used but the fruits of the plant are toxic because of the presence of abrin. If the leaves are consumed with the fruits, toxic effects will occur.<sup>5</sup>
- The juice of the fruits of *Momordica charantia* L. supports the maintenance of blood glucose levels, but this effect disappears with decoction of fresh or dried fruits.<sup>6</sup>
- Differences of species in the same genus contain different compounds leading to different properties, eg *Artemisia absinthium* L. (thujones -neurotoxicity), *A. annua* L. (artemisinin - antimalarial), *A. cina* (santonine - anthelmintic), *A. dracuncululus* L. (methyleugenol- digestive effect), *A. vulgaris* L. (camphor – pain relief).<sup>7</sup>
- Different parts of a plant contain fundamentally different compounds: *Cinnamomum zeylanicum* bark contains cinnamic aldehyde; the leaf contains eugenol.<sup>8</sup>
- Decoction of fresh rhizome of *Curcuma xanthorrhiza* showed better hepatoprotective effect in comparison to that of dried rhizome.<sup>9</sup>

5 ASEAN guiding principles on inclusion into or exclusion from the negative list of active substances for health supplements. Annex 1 (2017) of ASEAN Traditional Medicines and Health Supplements Scientific Committee.

6 WHO monographs on selected medicinal plants Volume 4, World Health Organization, Geneva, 2009.

7 Bruneton J. Pharmacognosie, Phytochimie, Plantes médicinales (5th Ed.). Ed. Lavoisier, Paris. 2016.

8 ibid.

9 Pramono S, Arifah FH, Pribadi FH, Nugroho AE; Hepatoprotective activity of *Curcuma xanthorrhiza* Roxb. on paracetamol induced liver damage in rats and correlation with their chemical compounds; Thai Journal of Pharmaceutical Sciences, TJPS 42 (4): 188-195, 2018.

- The poppy seeds of *Papaver somniferous* are extensively used as spices in foods and are devoid of narcotic activity while the latex from fruits is the source material of opium, a highly restricted narcotic substance.

The conditions of use, which encompass the botanical species and part(s), type of preparation, mode of use, intake quantity and frequency of use, mode and level of exposure are also key determinants of safety and benefit. Consumed raw, some botanicals may not be palatable or may exert adverse effects. However, when cooked, these effects are eliminated. Similarly, the type of preparation can yield preparations differing significantly in composition and chemical profile, which in turn, determines their effects. The intake quantity and frequency of use determine exposure and also influence the intended use.

The relevance of the traditional use information is also of importance for supplements containing botanicals. It is generally considered that the more a product deviates from the key parameters described for the traditionally used form of the botanical (from monographs and/or recognised textbooks), the less the traditional use information may be valid and the more it should be complemented with additional data to justify the safety and benefit.

Significant differences in conditions of use between the traditionally used botanicals and current products need therefore to be considered and addressed in the application of traditional use information for the assessment of safety and benefit.

The information from traditional use can be considered as sufficient to properly assess the safety and benefit of a given botanical or preparation. However, the level of confidence in the traditional use data will be determined by how closely the product meets the traditional use criteria.<sup>10</sup>

## 2. The Value of Tradition of Use for Benefit Assessment of Botanicals

One important reason for the longstanding use of botanicals is the observed benefits for health that people have identified over time. Wide use of botan-

icals for these purposes has provided a strong body of observational evidence supporting the plausibility of the effects, without these effects having been confirmed by scientific studies. This traditional use evidence has been accepted by regulators in many jurisdictions as the sole basis to justify the intended benefits.

A key aspect for the assessment of the traditional value of a specific botanical for health is the characterisation of the health benefit as such. In contrast to therapeutic effects on symptoms of diseases that can clearly be identified in patients, effects of botanicals on the normal functioning of the body/systems are more subtle and described in more general terms, often referring to reduction of discomfort (eg gastrointestinal manifestations, such as bloating, cramps, reflux, etc); menopausal discomfort (eg mood swings, hot flashes, etc) or improving the feeling of being healthy by unspecified actions on organs or bodily functions (eg soothing for the respiratory tract, increased resistance against cold or infection, invigorating effects, promotion of relaxation and sleep, etc).

An assessment of the validity of the traditional use documentation can therefore, by its very nature, not be very specific and is mostly related to observed experiences of improved health. There are only limited traditional effects that can be scientifically confirmed because the sensitivity required would necessitate an impossibly high number of subjects.

Given that these effects are experienced by people and have been recognised because of this tradition of use, they do not need to be described in more precise ways to be understood by consumers. An indication that such effects are the result of the traditional use can be helpful to bridge the widening gap between people, countries or regions that are aware of the traditional benefits and people, countries or regions that have never acquired this knowledge. The acceptance of the evidence across different regions can help preserve this knowledge for posterity.

## 3. The Value of Tradition of Use in Relation to Safety Assessment of Botanicals

An important element, often ignored or undervalued in approaches for safety assessment, is information and experience from the traditional use of the botan-

10 Anton R, Serafini M, Delmulle L. Traditional Botanical Preparations and Health Benefits: The Key Concept of History of Use. European Food and Feed Law 6:391-398;2014.

ical. The knowledge gathered over time has taught mankind how to use botanicals in a safe way, either by avoiding certain botanicals or botanical parts or by appropriate processing.

It follows that the safety profile derived from traditional use is valid for the specific preparations recorded and used in accordance with the traditional conditions of use. Deviations from the traditional processing (eg change of extraction solvent or skipping specific processing steps) may introduce new elements that can be of safety concern. Also, deviations from the traditional conditions of use may lead to a different level of exposure or increased intake of specific botanical compounds.

However, for botanicals with an extensive history of use and no observed adverse effects, there can be sufficient confidence in their safety, given the number of humans that have been exposed to the botanicals and benefited from their effects.

This observational evidence can be further supported by analytical data on the chemical composition of the botanical and compounds that may be present and scientific knowledge on the nature of any possible safety concern. It often appears that the traditional way of preparing and using a botanical has led to the removal or inactivation of the substances of concern, without people having had today's technical and scientific understanding.

Today, risk assessment of botanicals is a discipline where modern and traditional knowledge complement each other to communicate possible safety risks that could exist with a specific botanical preparation.

As with all assessments based on tradition of use, it is critical to clearly characterise the botanical preparation and match it with the historically used preparation to ensure that the preparations are substantially equivalent. The more a preparation differs in chemical profile from the traditional preparation, the more additional safety checks will be required.

Mixtures of botanicals deserve particular attention. Mixtures are part of the holistic approach where a physiological function is not seen as a stand-alone function but as part of a broader system. As a consequence, traditional information on botanical mixtures should also be taken into account. The effects of potential interactions between the plants should be addressed on a case-by-case basis. Where safety concerns are identified, additional data may be required. This is in particular the case when the com-

ination of the botanicals is likely to lead to an increased intake of specific compounds.

A conclusion on safety can be reached based on expert judgement considering the complete body of evidence available, including information on the characterisation of the botanical preparation, relevant documentation on the traditional use and a systematic literature investigation relating to the botanical and its preparations.

When the totality of the data does not indicate that a specific risk has been identified, this increases the confidence in the safety of the botanical preparation. It should however be ensured that the absence of identified risk is not caused by the absence of data.

It is also possible that defined risks are identified, but where the traditional way of processing or use is known, the identified risk can be removed or neutralised during development or manufacturing of the product.

## V. Application of Tradition of Use in the Regulatory Context of Supplements

Traditional use of botanicals is an important part of local cultural heritage. In all regions of the world, there are botanicals today that are accepted as having beneficial effects for health based on history of such use. This knowledge has passed from generation to generation, first orally and later recorded in recognised textbooks and monographs.

Basic food legislation principles today rely on scientific evidence of a high level and depending on regulatory culture, the validity or acceptance of traditional use as a regulatory basis for the safety and beneficial effects of botanicals may be regarded with scepticism or be challenged.

Overall health and wellbeing are holistic concepts that cannot be fully defined in terms of individual biochemical or physiological indicators. The subtlety of their effects on such indicators that in many cases may be already within normality is best supported by observational evidence, in view of the inherent difficulties to demonstrate such effects by Randomised Controlled Trials (RCT). The 'extent of use' of the botanical covers a huge number of people having used the botanical over a long period of time and offers observational confirmation of the physiological effect.

Likewise, safety assessment is mostly focused on a toxicological assessment of pure or isolated molecules that are not consumed by man in that form or in the quantities investigated. Not considering the natural matrix in which the molecules are present and the traditional way in which the preparations have been used carries a real risk that botanicals with a long history of use are considered toxic solely on the basis of *in vitro* and animal testing.

Traditional use should not be considered as opposing scientific data; it should be viewed as additional and where there is absence of data, well-documented traditional use should provide a legitimate basis for a regulatory framework for botanicals.

This would encourage the preservation and potential enhancement of such knowledge as well as the sharing of it among different regions of the world.

## VI. Conclusions

This paper has shown that traditional use knowledge is recognised in different regions of the world. It is additional to scientific data and often is the only evidence available. It provides a strong body of observational evidence that in itself is sufficient to support the safety and health benefits of traditional preparations of botanicals with a long history of use. The extent to which the available data is acceptable and gives confidence to support the safety and benefit of a botanical will depend on the volume and quality of the data and needs to be assessed by expert judgment.

A common basis for performing these expert judgments may lead to recognition of the safety and benefit of a botanical in different parts of the world and provide a strong basis for making the traditional health benefits of many botanicals available to people all over the globe.



# Appendix 1. References in Support of the Traditional Use of Botanicals

## 1. Reference Text Books

### ASEAN

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## 2. Documents Issued by National or International Regulatory Bodies or Competent Advisory Organisations

- EFSA compendium of botanicals.
- Safety assessment reports from safety assessment bodies (eg AFSSA).
- National lists of botanicals and their intended uses (eg Italy).
- Reference monographs published by the Council of Europe.
- Monographs, in so far as these cover physiological effects (eg World Health Organisation (WHO), European Scientific Cooperative on Phytotherapy (ESCOP), European Medicines Agency Herbal Medicinal Product Committee (HMPC), and Pharmacopeia, Commission E).
- EFSA FEEDAP monographs.
- Monographs of the Scientific Commission on Botanicals Intended for Use as Food, Turkey.

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