CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES
OF WILD FAUNA AND FLORA

Twenty-third meeting of the Plants Committee
Geneva (Switzerland), 22 and 24-27 July 2017

Species specific matters

Maintenance of the Appendices

ANNOTATIONS FOR APPENDIX II ORCHIDS

1. This document has been submitted by Switzerland and prepared by the Co-Chair (Ms. Moser) of the former Working Group of the Plants Committee on Annotations for Appendix-II orchids*.

2. At the 22nd meeting of the Plants Committee (PC22, Tbilisi, 2015), the Committee established an intersessional working group regarding amendment of the annotation for Appendix II orchids after discussion of a document submitted by Switzerland seeking exploration of the potential risks and/or benefits of an exemption for orchid products, particularly with respect to wild specimens.

3. As agreed by the Committee, the Secretariat was asked to prepare and distribute a Notification to the Parties seeking additional expressions of interest from Parties to participate in the intersessional working group encouraging a wide representation from range States, importers, exporters and re-exporters; asking Parties to communicate with relevant non-governmental organizations and industries to identify additional working group members from these stakeholders; and asking Parties to communicate the names and contact information of these additional members to the working group co-chairs.

4. The Notification (2016/035) was issued on April 1, 2016 with a May 1, 2016 deadline for input. Two additional Parties (Cuba and Peru) have joined the working group. These two Parties, China and Mexico have also communicated the names of other members, including researches, non-government organizations and producers (Annex 1 to this document).

5. Prior to the 17th meeting of the Conference of the Parties, the members of the intersessional working group, comprising Parties and non-governmental observers were as follows:

   Co-Chairs: Alternate Representative of North America (Ms. Sinclair) and Switzerland (Ms. Moser);

   PC Members: Representative of Asia (Ms. Zhou);

   Parties: Canada, China, Cuba, Czech Republic, European Union, France, Germany, Ireland, Italy, Latvia, Mexico, Netherlands, Peru, Republic of Korea, Slovakia, Sweden, Thailand, United Kingdom of Great Britain and Northern Ireland and United States of America;

   IGOs and NGOs: ITC, UNCTAD, UNEP-WCMC, IUCN, FTS Botanics, Species Survival Network, and TRAFFIC.

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* *The geographical designations employed in this document do not imply the expression of any opinion whatsoever on the part of the CITES Secretariat (or the United Nations Environment Programme) concerning the legal status of any country, territory, or area, or concerning the delimitation of its frontiers or boundaries. The responsibility for the contents of the document rests exclusively with its author.*

6. At its CoP17 meeting, the Conference of the Parties reviewed the outcomes of the work and adopted the following Decision 17.318:

Directed to the Plants Committee

The Plants Committee shall:

a) re-establish a working group on Annotations for Appendix II Orchids. The working group shall be chaired by a member of the Plants Committee and work on the basis of the following terms of reference:

i) The working group shall develop a questionnaire taking into consideration previous discussions and work on this topic, to seek information on the trade in orchid parts and derivatives (wild and artificially propagated) in consideration of the potential conservation impact of exempting orchid products from CITES controls.

A) The questionnaire should invite Parties to provide available information on: the trade in orchid products from source to final product, including the identification of the major industry sectors involved in the trade; how NDFs are made; traceability along the trade chain; and trade reporting. It should also request information on orchid parts and derivatives used in products, sectors involved (cosmetics, nutritional supplements, traditional medicine, foodstuffs – in particular flours -etc.), and conservation concerns for wild populations.

B) The questionnaire should be transmitted to the Parties via a Notification and should emphasize the importance of responses from range States, with a sufficient deadline for responding.

ii) Subject to the availability of funding, the working group may also consider actions to enable a full analysis of the potential conservation impact of orchid exemptions. These may include developing case studies on key orchid species identified in trade as finished products, including the 39 species identified in the Annex of document PC22 Doc. 22.1, as well as the two cases of orchid foodstuffs outlined in PC22 Inf. 6, workshop(s), or a study on trade data sources.

iii) Based on the information obtained from Parties in their responses to the questionnaire, as well as other information from the potential actions identified above, and other appropriate sources, the working group shall analyze the risks of trade in orchid products to conservation and provide its conclusions about such risks. Based on the findings and the analyses, the working group shall review the current annotation for Appendix II-listed orchids, and suggest such amendments as it considers appropriate, if any.

iv) The working group shall also consider and highlight the knowledge gaps of the orchid species in trade, i.e., consider identification, nomenclature and distributional information gaps where these are found to exist, and highlight these to the wider orchid research community and traders during trade events and forthcoming international meetings and workshops.

v) The working group will conduct its work via electronic means.

vi) The working group will report its findings to the Plants Committee;

b) consider the results of the working group; and

c) report its findings and recommendations to the Standing Committee for its consideration.

8. Work done so far:

The Swiss Management Authority commissioned several in-depth case studies (*Vanda coerulea, Vanda tessellata, Papilionanthe teres (Vanda teres), Cypripedium parviflorum var. pubescens, Gastrodia elata*) and overviews (Salep, Chikanda, flower and vibrational essences, orchids and fragrances, overview of the use

of orchids species in the cosmetic and personal care product trade). An interim report containing summaries of all the case studies is included in annex 2 to this paper.

Outreach has been carried out with the cosmetic industry, particularly in connection with the use of *Vanda* species. Cosmetic companies and CITES authorities recognize the issue and it appears that industry is willing to work with CITES to reach a conclusion for this sector. However more research needs to be undertaken with the USA, Korea, China, India and Japan in order to fully resolve further concerns.

The Swiss MA have funded further research to continue work on *Vanda* species and the cosmetic industry to be concluded by the end of 2017.

The Swiss MA has noted a large increase in permitting requests from the cosmetic industry as a result of this outreach, and encourages Parties to work together to relieve this burden.

Recommendations:

9. It is recommended that the working group be re-established in accordance with Decision 17.318. It is further recommended that the working group discuss the following:

   i) Discuss the work carried out so far (in-depth case studies and overviews), including identification of knowledge gaps and conclusions thus far;

   ii) Develop a work plan including liaison with the SC Working Group on Annotations;

   iiI) Draft the questionnaire

   iv) Identify possible funding sources for further in-depth studies

Additional Members to the intersessional Working Group on Annotations for Appendix II Orchids

Contact information of members representing China:

Dr. ZHOU Zhihua (Ms.)
Deputy Director-General
The Endangered Species Import and Export Management Office of P. R. China
State Forestry Adminstration
No. 18, Hepingli Dongjie
Beijing 100714
P. R. China
Tel: 86 10 84239005 Fax: 86 10 84256388
E-mail: citeszzh@sina.com
zhouzhihua@forestry.gov.cn

Dr. YUAN Liangchen (Mr.)
Deputy Chief
Division of Flora Affairs
The Endangered Species Import and Export Management Office of P. R. China
State Forestry Adminstration
No. 18, Hepingli Dongjie
Beijing 100714
P. R. China
Tel: 86 10 84239010 Fax: 86 10 64299515
E-mail: citesyuan@126.com
yuanliangchen@forestry.gov.cn

Prof. Dr. LUO Yibo (Mr.)
President of Orchid Society of China
State Key Laboratory of Systematic and Evolutionary Botany
Institute of Botany
Chinese Academy of Sciences
20 Nanxincun, Xiangshan
Beijing 100093
P. R. China
Tel: 86 10 62836514 Fax: 86 10 62590843
Email: luoyb@ibcas.ac.cn
luoyi_bo@hotmail.com

Contact information of members representing Cuba:

Lic. Yorlien Borroto Barreda
Autoridad Administrativa CITES en Cuba
Centro de Inspección y Control Ambiental (CICA)
Calle 28 No. 502 esq. 5ta Ave.
Miramar, Playa. La Habana, Cuba. CP 11 300.
Tel. (537) 202 7573; Fax: (537) 202 7030 y (537) 204 2676
yorlien@orasen.co.cu

Contact information of members representing Peru:

Isela Del Carmen Arce Castañeda
Bióloga Responsable en Conservación y Autorizaciones de Investigación
Autoridad Administrativa CITES-Perú
Telf.: (511) 2259005 Anx.: 143
Avenida 7 Nro. 229, Urb. Rinconada Baja
La Molina. Lima - Perú
www.serfor.gob.pe

Sara Ruth Yalle Paredes
Directora
Dirección de Gestión Sostenible del Patrimonio Forestal
Telf.: (511) 2259005 Anx.: 142
Cel.:974875758 - #974875758 - 947574922
Avenida 7 Nro. 229, Urb. Rinconada Baja
La Molina. Lima - Perú
www.serfor.gob.pe

N°	EMPRESA	REPRESENTANTE	EMAIL
1	CORPORACION G Y G E.I.R.L.	Astrid Domy Gutiérrez Ríos	astridomy@gmail.com
2	AGRORIENTE VIVEROS S.A.C.	Karol Villena Bendezú	karol@orquideasamazonicas.com
3	PERUANINO S.crl	Víctor Manuel Arias Cucho	gerencia@peruanino.com

Contact information of members representing Mexico:

ONG					
Dr. Eduardo A. Pérez García	Presidente de la Asoc. Mexicana de Orquideología, A. C.	Asociación Mexicana de Orquideología A. C.	55 34156597	encyclia_nizandensis@yahoo.com.br	Departamento de Ecología y Recursos Naturales Grupo: Ecología y Diversidad Vegetal, 1er piso, edificio B, Circuito Exterior s/n, Ciudad Universitaria Del. Coyoacán, C.P.04510, Ciudad de México
	Profesor de Asignatura B, Departamento de Ecología y Recursos Naturales	Facultad de Ciencias, UNAM	5622 4835	eduardo.perez-garcia@ciencias.unam.mx	
Productores					
Ing. Sandro Cusi	Director	Orquídeas Río Verde	722 371 52 88, 716 266 52 52	info@orquideas.com	Camino a Real de Arriba nº 3000 Temascaltepec, Edo. de México C.P. 51300
Ing. Raquel Escobedo Molina	Directora	Orquídeas Rancho la Joya/La Joya de Guadalupe en Atlixco, Puebla, S. P. R. DE R. L.	244 445 7075	raquelescobedo49@gmail.com	Rancho Guadalupe S/N, Tenextepec, San Jose y Caminos Coyuca, Atlixco Puebla., 74200 Atlixco, Pue.
Gobierno Federal SEMARNAT					
Biól. Omar E. Rocha	Subdirector de Manejo y Desarrollo de Poblaciones	Dirección General de Vida silvestre, SEMARNAT	5556243655	omar.rocha@semarnat.gob.mx	Av. Ejército Nacional 223, Piso 13, Col. Anahuac, Delg. Miguel Hidalgo, Distrito Federal. C.P. 011320

Directorio de Expertos en Orquídeas de México

Investigadores					
Nombre	Puesto	Institución	Teléfono	Correo electrónico	Dirección
Dra. Rebeca A Menchaca García	Coordinadora del Orquidario Universidad Veracruzana	Universidad Veracruzana	2281862243 2281869934	rebecamenchaca@hotmail.com	Lago Menor de La USBI Zona Universitaria Xalapa, Ver.
Dr. Rodolfo Solano Gómez	Profesor titular B de tiempo completo	Instituto Politécnico Nacional, CIIDIR Oaxaca	Extensiones en el IPN: 82781 (oficina) y 82731 (herbario OAX)	solanogo@yahoo.com.mx ; rsolanog@ipn.mx	Hornos 1003, Santa Cruz Xoxocotlán, Oaxaca, CP. 71230, México
M. en C. Miguel Ángel Lozano Rodríguez Carretera Tuxpan-Tampico Km 7.5, Tuxpan, Veracruz. CP 92895	Docente Facultad de Ciencias Biológicas y Agropecuarias, Campus Tuxpan.	Universidad Veracruzana	783 8344950 2281469567	mialozano@uv.mx	Carretera Tuxpan-Tampico Km. 7.5, Col. Universitaria, Tuxpan, Ver.
Dra. Irene Ávila Díaz	Profesora Investigadora Titular A de la Facultad de Biología	Universidad Michoacana de San Nicolás de Hidalgo	4433167212	iaviladiaz5@gmail.com	Amado Camacho 477 Col. Chapultepec Oriente Morelia, Michoacán CP 58260 México

Case studies and overviews of selected key orchid species in international commerce

Commissioned by Federal Food Safety and Veterinary Office FSVO

CITES Management Authority of Switzerland and Lichtenstein

2017

Madeleine Groves and Catherine Rutherford

Acknowledgements
The authors of this report would like to thank the numerous private individuals and representatives from industry, government, enforcement and policy agencies and NGOs who have contributed to this report.
NOTE: All references and personal communications are listed in the individual case studies and overviews, and not in the summaries contained in this report.

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Background

Discussions on finished products containing orchid species and possible amendment of the annotation for Appendix-II orchids took place at the 22nd meeting of the CITES Plants Committee (PC22 Tbilisi, Georgia, Oct. 2015) where Docs. PC22.1 and PC22.1 Annex 1 were presented by the Swiss CITES Management Authority (Swiss MA). The Annex documents a Europe-wide trade study commissioned in May 2014 by the Swiss MA (Brinckmann, 2014 - *Quick scan of Orchidaceae species in European commerce as components of cosmetic, food and medicinal products*). Following discussions, the Plants Committee established an intersessional working group on annotations for Appendix-II orchids whose terms of reference were to explore the potential risks and/or benefits of an exemption for orchid products, particularly with respect to wild specimens, review the current annotation for Appendix II-listed orchids accordingly, and suggest such amendments it considered appropriate, if any.

The working group reported to the 17th meeting of the Conference of the Parties (CoP17, Johannesburg, South Africa 2016) and was re-established with its terms of reference laid out in Decisions 17.318 and 17.319. Point ii) of the ToR states "*Subject to the availability of funding, the working group may also consider actions to enable a full analysis of the potential conservation impact of orchid exemptions. These may include developing case studies on key orchid species identified in trade as finished products*, *including the 39 species identified in the Annex of document PC22 Doc. 22.1, as well as the two cases of orchid foodstuffs outlined in PC22 Inf. 6...".* This report was commissioned by the Swiss MA (Nov 2016 - March 2017) and consists of in-depth case studies and shorter overviews of orchid species selected from these 39 species that are in trade for cosmetic, food and medicinal uses at an international level. They include the following:

In-depth case studies:

- *Vanda* spp.
    - *Vanda coerulea*
    - *Vanda tessellata*
    - *Papilionanthe teres (Vanda teres)*
- *Cypripedium parviflorum* var*. pubescens*
- *Gastrodia elata*

Overviews:

- Salep
- Chikanda
- Flower and vibrational essences
- Fragrances
- The use of orchid species in the cosmetic and personal care industry

The following report contains the Executive Summaries for all case studies and overviews and builds on information contained in PC22.1 Annex 1, expanded to analyse the use of orchids in trade as finished products on a global level. Research was carried out to examine the size and stability of wild populations, the conservation status of the various species, the extent of artificial propagation and the different products in and size of international trade. Many orchids were identified as being used in finished cosmetic and personal care products and the report was extended to include outreach to this industry and its trade associations. This situation is similar to others on which CITES and industry have collaborated in the past, including candelilla wax (*Euphorbia antisyphilitca*) and to some extent *Aniba rosaeodora* and *Bulnesia sarmientoi*.

Analysis

This report, together with outreach to the cosmetic and personal care industry has highlighted a number of issues and knowledge gaps that require further discussion and clarification within the PC working group on annotations for Appendix-II orchids, the Plants Committee, the Standing Committee and the Standing Committee's Working Group on annotations:

- **Improving reporting by CITES Parties**

    - **Derivatives** – from completion of the case studies and input from the cosmetic industry, it is apparent that many finished products containing orchids are described in trade under the term "derivative". The CITES Glossary defines this term as "*Any processed part of an animal or plant (e.g. medicine, perfume, watch strap)"*and the Guidelines for the preparation and submission of CITES annual reports (January 2017) as "*derivative (other than those included*

elsewhere in this table)". The rather broad definition of this term makes analysis of the trade challenging as without a qualifier it is hard to determine at what point a commodity stops being a derivative and starts being a finished product. This is compounded by the lack of reporting of the units of measure for derivatives, as with the *Vanda coerulea* derivative trade. Without reporting the unit it is difficult to relate quantities in trade to the species in any meaningful way. The aim of this project is to identify finished products containing orchid species and assess whether exemption from CITES controls would be a conservation risk to the species, or whether it was possible to reduce the regulatory burden on Parties reporting on products further down the production chain.
ACTION: Discussions should focus on whether the definition of "derivative" is appropriate and whether more detail can be captured when using this term which may help trade analysis in the future. As this term applies to both animals and plants the Animals Committee and Standing Committee should be kept informed of any discussions. This may involve inclusion of any previous analysis of this term.

- **Readily recognizable part or derivative** – there may also be merit in having additional discussion about the definition of "readily recognizable part or derivative" as laid out in Resolution Conf. 9.6 (Rev. CoP16) (Trade in readily recognizable parts and derivatives). The case study for *Cypripedium parviflorum* var. *pubescens* and the overview of flower and vibrational essences raises the issue of products that may not contain even a molecular presence of the plant from which the product is said to derive. This issue was raised at CoP13 (Bangkok, 2004) on the use of primate DNA in vaccines and several years later on the case of flower essences exported from Europe to the US and Canada. Discussion focused on whether these products, which often state they contain CITES-listed species including orchids, fall under this Resolution. As such CITES Parties have determined that the term 'readily recognizable part or derivative' "*shall be interpreted to include any specimen which appears from an accompanying document, the packaging or a mark or label, or from any other circumstances, to be a part or derivative of an animal or plant of a species included in the Appendices, unless such part or derivative is specifically exempted from the provisions of the Convention*."
ACTION: This issue relates to the trade in many finished products containing orchids, as noted above, and discussions within the working group on annotations for Appendix-II listed orchids, the CITES Committees and their working groups should include outreach to the relevant industries affected by such discussions.

- **CITES and industry nomenclature and species information**

  - **Tracking taxonomic changes and species information** – the current CITES accepted plant nomenclature references and databases require updating to include taxonomic changes identified in a number of the case studies, for example the inclusion of new genera and species in the genus *Vanda*. The case studies also identified discrepancies in the reporting of a species distribution depending on the source consulted. For example, *Papilionanthes teres* is not cited from Bhutan in UNEP-WCMC's Species + database, but is recognised as from this country by orchid experts.

  - **Nomenclature of cosmetic ingredients** – see the overview of the Use of Orchids in the Cosmetic Industry for more information on connecting a cosmetic ingredient, such as an orchid extract, to the species used in its manufacture. Ensuring there is a clear association allows species to be better tracked in trade, enables identification of major products in trade and a clear understanding of the supply chain. These issues are important when assessing the effects of trade on a species and consequently whether they can be exempted from CITES regulations.
ACTION: It is recommended that CITES engages further with the cosmetic and personal care industry, relevant regulatory bodies and trade associations to ensure that the maximum information on the species botanical name is included in ingredient lists or against industry names so as to support the implementation of CITES and ensure transparency throughout the supply chain.

Knowledge gaps

- **Species population status and cultivation** – it is apparent from many of the case studies that several knowledge gaps exist concerning the status of the species in the wild and their propagation to supply cosmetic or medicinal industries, in particular *Vanda* species including *V. tessellata*.
- **New case studies** – the next steps for the Plants Committee's working group on annotations for Appendix-II listed orchids include the prioritisation of species where knowledge gaps exist, the possible commissioning of new case studies and establishing how funding may be secured for their completion.

Cosmetic and personal care product industry

- **Further outreach** – this industry is complex in nature and features a wide range of product confidentiality issues and stakeholders, from nurseries to finished product manufacturers. However, many sectors of this industry and a number of trade associations have been helpful and engaged in the production of this report and have expressed enthusiasm in continuing to work to explore the possibility of an amendment to the annotation for Appendix-II listed orchids for finished cosmetic and personal care products.
  ACTION: CITES Committees and their working groups to continue working with this industry, including the fragrance and flower essence industries, to ensure the working group on annotations for Appendix-II orchids has a clear and full understanding of all related industries and stakeholders.

- **Knowledge gaps and implementation issues** - as outlined in the overview of the Use of Orchids in the Cosmetic Industry, there are a number of CITES processes that are relevant to the workings of this industry. They include the implementation of the derogation for personal and household effects (Resolution Conf. 13.7 (Rev. CoP17), implementation of the definition of artificial propagation (Resolution Conf. 11.11 (Rev. CoP17) and the use of the exemption under point b) of #4 annotation that permits the trade in tissue cultured plants without CITES permits if they are "*seedlings or tissue cultures obtained in vitro*, *in solid or liquid media, transported in sterile containers*". There may be a lack of knowledge or incorrect implementation of these processes. Some companies were found to ship tissue cultured plants in sterile containers but minus any solid or liquid media. The terms "farmed" or "jungle farmed" as used by some cosmetic companies may not fully meet the definition of artificial propagation and the industry may not be passing on information to their retail customers over the movement of cosmetics containing orchids under the personal and household effects derogation.
  ACTION: through further outreach to this industry, seek clarification from the industry over their understanding of these processes and where implementation problems exist so that the working group can take these into consideration.

Plant Committee's Working Group on annotations for Appendix-II orchids

- **Intersessional workload** – under Decision 17.318, the working group shall "*develop a questionnaire taking into consideration previous discussions and work on this topic, to seek information on the trade in orchid parts and derivatives (wild and artificially propagated) in consideration of the potential conservation impact of exempting orchid products from CITES controls*". Given the work already carried out, it would seem logical to concentrate on filling knowledge gaps for those species already covered in case studies or overviews and continue outreach to the cosmetic and related industries. This way a complete picture of a species' conservation status and its use by this industry is available, which can then be used to explore any amendments of the annotation to the Appendix II listing for orchids to exempt finished products of certain orchid species and / or genera.

Orchid identification

The identification of orchid species in trade, whether in crude, semi-processed or processed forms, is a key tool for the implementation of CITES for orchids. Combining identification with other information provided with the product (e.g. provenance, intended use) can help determine the genera/species under investigation. The following identification techniques are currently available:

Crude / minimal processing

Orchids traded as live plants or as stems, roots or dried plants can be identified to genus level, or possibly to species level, if carried out by an orchid expert, particularly if an orchid species is a documented ingredient or processed consistently (e.g. orchids used in Traditional Chinese Medicines -TCM). This form of identification must take into consideration the use of substitutes / fakes within the same genus, from other genera of orchids or other plant groups. High level imaging technology can also play a part in the identification of specimens where vouchered material, such as herbarium specimens, is lacking. It may be important to differentiate between species within a genus that have differing conservation status or sustainability of harvesting.

Medium / high processing

The identification of processed products depends on the amount of recoverable DNA from the product and the level of processing it has undergone. While the DNA-based identification of orchids is challenging, it is feasible from products that have undergone lower levels of processing, such as pills, drinks, powders, processed forms, foods, traditional medicines in their raw form, including Ayurvedic medicines. Identification may not be possible from cosmetics, fragrances, household cleaning products, extracts and essential oils as they are likely to contain purified extracts without sufficient DNA for identification (or the DNA is precipitated by the alcoholic extraction). Identification is generally possible to genus level, but up to species level only with the right sequence reference database (Ghorbani et al., (2016). Advances in the use of amplicon metabarcoding using the barcoding markers nrlTS1 and nrlTS2 show that orchid species identification of ingredients in highly processed food products (e.g. salep and chikanda) is possible thus allowing enforcement and policy efforts to focus on those species identified in trade (de Boer and Gravendeel pers. comm., 2016).

Executive Summaries

Vanda coerulea

Vanda coerulea is an epiphytic orchid found in India, Myanmar, Nepal, PR China and Thailand and likely to occur in Bhutan, Lao PDR and Viet Nam. This taxon has not yet been assessed for the IUCN Red List but threats include loss of *h*abitat and collection for local / regional medicinal and horticultural markets. These threats may have contributed to the restriction of the species range, hence the lack of recorded occurrences in certain range States. Due to over-collection this species was listed in Appendix I of CITES in 1979; it was later downlisted to Appendix II in 2005. Up-to-date field studies of this species throughout its range are lacking which leads to an incomplete assessment of its current conservation / population status and creates difficulties in assessing the effects of trade on wild populations. This species is in cultivation worldwide, but it is its hybrids that are preferred in trade and which are in commercial cultivation for the live plant and cut flower industries. This species does not appear to be in general use in modern Ayurvedic medicine in Europe, but it is documented as used in local medicinal treatments in India.

V.coerulea and its hybrids are also traded as extracts that are included as ingredients in finished cosmetic products. Outreach to the cosmetic industry indicates that the trade flow from raw material to finished cosmetic or personal care product can entail unprocessed or processed material (e.g. stems, aerial / flower tips, tissue cultured live plants, dried plants) being sourced from horticultural nurseries in range States (e.g. Thailand and PR China) and non-range States (e.g. France). No nurseries specifically growing this species for extraction purposes were identified for this report. This material goes through an extraction process, often carried out by companies based in Europe specialising in the creation of botanical extracts. Extraction companies identified in range States did not appear to sell extracts of *V. coerulea*, although they may offer bespoke botanical extractions on application. These extracts are then sold on to finished cosmetic and personal care product manufacturers, often based in Europe, and distributed and sold worldwide.

From CITES trade statistics covering the period 2005-2015, and outreach to the cosmetic industry, the trade in live specimens and parts and derivatives of this species and *Vanda* hybrids shows a clear pattern between a defined group of CITES Parties. Much of the trade is comparatively new, commencing in 2008, which corresponds with the increased submission of patents documenting the cosmetic properties of this species. Overall, the trade is in artificially propagated live specimens and parts and derivatives of this species and is small in volume, although there are no unique HS customs tariff codes to allow an in-depth analysis. Exports of this material come from two range States, Thailand and PR China, and the major importer is France. France is also the only re-exporter of derivatives which implies that the manufacture of extracts and finished products is being carried out in France. The trade in hybrids is recorded at the level of "*Vanda* hybrid" and, other than as live plants, they are traded as four main commodities – roots, dried plants, tissue cultured plants and derivatives – all from artificially propagated sources and mirroring the trade for *Vanda coerulea*.

Finished products containing this species are traded globally and are regulated under CITES, but analysis of the trade data indicates it is unlikely that the full trade is documented or legal. This may be due to the misinterpretation or lack of knowledge of CITES among industry, deliberate circumvention of CITES regulations, poor knowledge of orchid extracts in cosmetics by CITES policy and enforcement authorities and the burden placed on both Parties and industry to comply with CITES implementation given the large quantities of commodities in trade. This situation is similar to others on which CITES and industry have collaborated, including candelilla wax (*Euphorbia antisyphilitca*) and to some extent *Aniba* and *Bulnesia*. Further collaboration between CITES and the cosmetic and personal care product industry and its trade associations should continue to ensure a complete assessment of this species' conservation status and its use by this industry. This can then be used to explore any amendments of the annotation to the Appendix II listing for orchids to exempt finished products of certain orchid species or genera.

Vanda tessellata

Vanda tessellata, also known by its synonym *Vanda roxburghii*, is an epiphytic orchid found in Bangladesh, India, Nepal, Myanmar and Sri Lanka. This species is known for its medicinal properties. It is used in Ayurvedic, Siddha, and Unani medicine, particularly in India, and for the production of Ayurvedic medicinal products available globally, particularly through the Internet. *V. tessellata*, along with a number of non-CITES listed plant species, such as *Pluchea lanceolata*, is traded under the Sanskrit name "Rasna", an ingredient of finished medicinal products that are in global trade. More recently this species has been investigated for its potential as a cosmetic ingredient, although no finished cosmetic products containing this species were found in trade. This species has been assessed as Least Concern by the IUCN Red List (ver 3.1), but is considered Vulnerable in Sri Lanka and Critically Endangered in parts of India. National-level conservation assessments are absent for orchids in general throughout parts of this species' range but the current population trend, area, extent and/or quality of habitat of *V. tessellata* appear to be declining. Further surveys and monitoring are required to establish the current habitat and population status. While there is legislation prohibiting the harvesting of wild orchids throughout its range, the illegal wild collection of orchids, including *Vanda* species, for horticultural and medicinal purposes in local and regional markets is documented. Surveys have identified major markets within Southeast Asia and a medicinal trade in dried orchids for Vietnamese and Chinese consumption.

This species is in low level cultivation for the live plant trade and cut flower industry, but its hybrids are cultivated on a larger scale for these industries. However, no information on the specific cultivation of this species for its medicinal or cosmetic properties was found. *V. tessellata* is found in trade as semi-processed products and as an ingredient in finished medicinal and personal care products, mostly Ayurvedic products. Artificially propagated *Vanda* hybrids shipped under certain conditions, and certain parts and derivatives listed under the #4 annotation of the Appendix-II Orchidaceae spp. listing (e.g. tissue cultured plants), are not regulated. Also, India does not allow the export of wild collected specimens for commercial purposes of Appendix I and II species, with the exception of cultivated varieties of plant species. The short timeframe for completion of this report meant that outreach to industry, policy makers and practitioners was incomplete and further research is required. Responses were limited or constrained by confidentiality issues.

The CITES Trade Database shows that the trade in *V. tessellata* is comparatively low in volume. Fewer than 3,000 live plants were traded over the period 2005-2015 and the trade in parts and derivatives is comparatively recent, commencing in 2009. The database records India as the only exporter of extracts, derivatives, unspecified material and medicines of this species. It is also the largest exporter of live plants closely followed by Thailand. All material in trade is from artificially propagated sources except in the case of a number of exports from India of derivatives under the source code "I" (seized or confiscated material).

Finished products purporting to contain this species are traded globally and are regulated under CITES, but from analysis of trade data it is unlikely that the full trade in these products is documented or legal. This may be due to the misinterpretation or lack of knowledge of CITES among the Ayurvedic / herbal and medicinal plant product industry and practitioners, deliberate circumvention of CITES regulations, poor knowledge of the use of orchids in medicinal products by CITES policy and enforcement authorities and the burden placed on all to comply with CITES implementation given the large quantities of commodities in trade. Further collaboration between CITES and the Ayurvedic / herbal medicinal plant industry and practitioners and their trade associations should continue to ensure a complete assessment of this species' conservation status and its use by industry.

Papilionanthe teres (Vanda teres)

Papilionanthe teres, also known by its synonym *Vanda teres*, is an epiphytic orchid found in Bangladesh, Bhutan, India, Lao People's Democratic Republic, Myanmar, Nepal, PR China, Thailand and Viet Nam. It has not yet been assessed for the IUCN Red List and there is a lack of up-to-date field studies and conservation assessments on the status of this species. However, it is generally considered to be vulnerable throughout its range due to habitat loss and the high levels of illegal orchid trade in range States, such as Lao PDR and Myanmar, for local and regional (PR China and Viet Nam) horticultural and medicinal markets. This species is documented as having medicinal properties and is used at a local level; it is also in the horticultural trade but no finished medicinal products were found containing this species and no nurseries were identified growing this species to supply the medicinal market. This species is in ex situ conservation in botanic gardens.

While P. teres is in cultivation worldwide, in particular in SE Asia, it is its hybrids that are preferred in trade and are in wider cultivation for the live plant and cut flower industries. This species is also traded in the form of extracts used as cosmetic ingredients in finished cosmetic products. The extracts can be manufactured from most parts of the plant, including the stems. This report did not identify any nurseries cultivating this species specifically for extraction purposes and, at present, extracts from this species are found in a very limited number of cosmetic finished products but they are in worldwide trade. From extensive outreach to the cosmetic industry, and supported by analysis of CITES trade data, it appears that the trade flow from raw material to finished cosmetic product for this species can entail unprocessed and processed material (dried plants, stems) exported from artificially propagated sources in Thailand. This material then goes through an extraction process, often carried out by companies based in Europe that specialise in creating botanical extracts. While extraction companies were identified in range States, none were found to sell extracts of *P.teres*, although they may offer bespoke botanical extractions on application. These extracts are then sold to cosmetic and personal care product manufacturers, often based in Europe, and distributed and sold worldwide.

The CITES Trade Database records low volumes of this species in trade, all from artificially propagated sources, between a similar group of CITES Parties as those identified for other orchids used in the cosmetic trade. The trade in live plants over the last 10 years amounts to no more than 6,000 live plants and the trade in parts and derivatives is equally low in volume and comparatively new, commencing around 2010-2011. The major exporter for all this material is Thailand and France is the major importer, apart from live plants. France is also the major re-exporter of extracts and derivatives (i.e. finished products).

Finished products purporting to contain this species are traded globally and are regulated under CITES, but analysis of trade data indicates it is unlikely that the full trade in these products is documented or legal. This may be due to the misinterpretation or lack of knowledge of CITES among industry, deliberate circumvention of CITES regulations, poor knowledge of orchid extracts in cosmetics by CITES policy and enforcement authorities and the burden placed on Parties and industry to comply with CITES implementation given the large quantities of commodities in trade. This situation is similar to other species on which CITES and industry have collaborated, including candelilla wax (*Euphorbia antisyphilitca*) and to some extent *Aniba* and *Bulnesia*. Further collaboration between CITES and the cosmetic and personal care product industry and its trade associations should continue to ensure a complete assessment of this species' conservation status and its use by this industry.

Cypripedium parviflorum var. pubescens

Cypripedium parviflorum var. *pubescens* is native to North America and is widespread in its region. Historically wild collected for both medicinal and ornamental use, this species was considered difficult to grow in cultivation and was subject to several conservation measures. Various trade recommendations for herbal use are in place to discourage wild collection. In recent years developments in artificial propagation have made it possible to cultivate *Cypripedium* species and there are now several nurseries in the USA, Canada, Belgium, the Netherlands and Germany cultivating this genus, including *Cypripedium parviflorum* var. *pubescens*, in numbers apparently sufficient to supply the demand from both the horticultural and pharmaceutical markets.

Cypripedium parviflorum var. *pubescens* is advertised globally as Cypripedium pubescens extract and widely used in homeopathic medicine, in which there may be no molecular presence of the part or derivative of the plant species from which the remedy is derived due to the constant dilution of the potency. It is less widely used in the cosmetic industry and only four products were identified manufactured by three companies. Little information was received from this industry but those that responded stated that the raw material used in their products came from cultivated specimens.

There is no unique HS customs code for this species and the only source of specific trade data comes from the CITES Trade Database. Small amounts (about 5,700) of live plants have been exported over a ten year period

2005-2015. The main exporters are Canada, Belgium, the Netherlands and Germany. The main exporter of derivatives is Belgium to the EU.

The market for this species is small and niche. The majority of products identified as being in international trade are homeopathic remedies for which the conservation risk to species in the wild could be seen as minimal. In recent years, the trade in derivatives has increased within Europe but it appears that cultivated specimens grown in specialist orchid nurseries are supplying this trade. There appears to be a small amount of wild collection in North America but this is not exported internationally.

Gastrodia elata

Endemic to eastern Asia, *Gastrodia elata* is found in Bhutan, the People's Republic of China, Chinese Taipei (Taiwan), India, Democratic People's Republic of Korea, Republic of Korea, Japan, Nepal, and Russian Federation. This research found no data on occurrence, use or trade from Bhutan and India. This species is cultivated on a large scale in PR China and Republic of Korea and is collected from the wild in PR China, mainly from Yunnan Province. Wild populations in the Gaoligong Mountains are reportedly dwindling due to over-collection for commercial trade. No data were found on wild collection in Japan, Democratic People's Republic of Korea, Republic of Korea and Russian Federation. Although there is almost no data showing a history of use or trade in Nepal, one source reports that wild-collection of Gastrodiae Rhizoma, expressly for export trade to PR China, began as recently as the late 1990s and reportedly continues today despite efforts to control harvesting and trade of endangered species.

The cut, sliced or powdered dried plant material as well as dry and liquid extracts are used as components of traditional herbal medicinal products or practitioner-prescribed formulations as well as of dietary or food supplement products and cosmetic products. The primary producers of *G. elata* raw material, processed forms (extracts) and finished products packaged for retail trade are the PR China and the Republic of Korea. While almost all of the commercial supply is produced from cultivated *G. elata*, wild-collected material commands a premium price in the main Chinese medicine markets. Lower cost and lower quality raw materials are dedicated for use in the manufacture of standardized extracts that are also destined for the export market and not generally used internally in PR China.

Importers of *G. elata* ingredients of Chinese origin (Hong Kong SAR, Japan, Malaysia, Republic of Korea, Taiwan, Australia, New Zealand, and Canada) appear to use it mainly in the manufacture of medicinal products. Very little evidence was found for *G. elata* ingredients or finished products in European commerce. According to a report on nationwide production of *Gastrodia* in 2016, supply considerably outstrips demand. It is estimated that annual demand of fresh *Gastrodia* is around 2,500 tons but in 2015 the nationwide production was about 7,000 tons. Wild grown material is still considered the highest quality and feedback from the markets implies that the quality of hybrid *Gastrodia* is poor and difficult to sell.

It appears that exported finished herbal medicine products (TCM formulations containing *G. elata*) and finished herbal dietary supplement products (containing novel standardized or purified extracts of *G. elata*) are all made from cultivated *G. elata* rhizome. The high value wild-collected rhizomes have a market within PR China, for stocking in TCM pharmacies or dispensaries of TCM practitioners who demand daodi raw materials for their formulations.

Salep

The overview of species traded for the manufacture of salep was restricted to Turkey, Greece and Iran. Salep refers to dried tubers of terrestrial orchids, ground tuber powder and the beverage made from this powder. Historically consumed in the Ottoman Empire, its popularity spread to Europe in the late 17th century but is now consumed mainly in Turkey and Greece. Annual salep production in Turkey is estimated at between 35-40 tons, and requires the harvest of around 40-50 million wild collected orchid plants.

All species of terrestrial orchid with spherical or ellipsoidal tubers are used for salep. The main genera involved are *Orchis*, *Anacamptis*, *Neotinea, Ophrys, Serapias* and *Himantoglossum*; some with digitate or carrot-like tubers are also collected (e.g. *Dactylorhiza, Gymnadenia and Platanthera*). The trade in eastern Mediterranean, Asia Minor and Middle Eastern orchid tubers for salep is possibly increasing as demand rises. Significant numbers of tubers are collected indiscriminately from the wild and are traded for production of salep tuber powder. Harvested tubers are washed in water, boiled in either water or milk, sun- or air-dried and traded as dried tubers. The tubers are then ground into a powder and used to prepare the beverage. This powder is also used as a

stabiliser in the manufacture of Dondurma, or Maraş, ice cream, known for its elasticity and resistance to melting. Studies carried out in 1999 showed that demand for ice cream with the typical salep flavour had decreased and that there were only a few places left in Ankara, Turkey, where ice cream produced with pure salep was still sold. However, salep appears to be enjoying a renewed popularity in the region, driven by consumer demand for traditional, organic and alternative food, with consumers possibly unaware of the conservation risks to threatened species associated with this popularity.

Packaged instant salep was previously considered to contain insignificant amounts of orchid species but recent studies may prove otherwise. DNA barcoding and metabarcoding were used to identify orchid and other plant species present in 55 commercial salep products purchased in Iran, Turkey, Greece and Germany and 42% contained orchids belonging to 12 terrestrial species with tuberous roots. Separate analysis carried out on seven samples of salep powder bought in Germany identified *Dactylorhiza* DNA in five samples, comprising between 0.3-9%.

Reports indicate that tuberous orchids are not only collected from the wild in Turkey, Greece and Iran but also in Syria, Afghanistan, Albania and Lebanon. A study on the conservation risks associated with an increase in wild harvesting in Iran implies that as orchids in Turkey become scarcer, collection in neighbouring countries may increase, threatening more populations of orchids. Salep products are present in all countries that have a large Turkish diaspora, and are widely available in Germany, the Netherlands and the UK. Unregulated trade of salep products poses a substantial threat to wild orchids in Greece, Turkey and Iran.

Indian salep is not the same as the Mediterranean variety; salep *misri* sold in the Indian bazaars is derived from various species of *Eulophia*. Concoctions made from tubers are also sold medicinally in India, Nepal and Pakistan and are considered to have aphrodisiac properties. Species and volumes collected for this trade have not been assessed for this report, but appear to be considerable and unsustainable.

Chikanda

Chikanda, also known as kinaki, kikanda or African polony, is a meatless ‘cake’ made of pounded groundnuts (peanuts) and the tubers of at least three genera of terrestrial orchids, including *Disa, Habenaria* and *Satyrium*. A traditional dish consumed in Zambia and Tanzania for decades, its increasing popularity has led to a huge and unsustainable rise in harvesting these orchids from the wild. Zambia is by far the major consumer of this dish and the scarcity of wild orchids in Zambia due to overharvesting has forced traders to identify new sources in adjacent countries.

The majority of orchid tubers used for chikanda in Zambia now come from abroad, principally from the southern highlands of Tanzania but also from Angola, Democratic Republic of Congo, Malawi and Mozambique. All trade is imported by Zambia, with the vast majority exported by Tanzania and is mainly in unpackaged raw tubers sold in local markets. There also seems to be some trade in ground powder and prepared ‘cake’, some of which is brought over the border from Tanzania, DRC and Malawi. Recent reports indicate that around 5 million tubers are imported annually by Zambia from neighbouring countries. There could also be movement of this commodity in personal luggage due to international travel.

In comparison to orchid species used in the fragrance, cosmetic and personal care and other food industries chikanda is unprocessed, unpackaged and traded directly from the wild to the market. The orchids are unsustainably harvested and the trade appears to be large and unregulated, lacking CITES permits and enforcement of CITES regulations.

Use of orchids in the cosmetic and personal care product industry

Documents presented to the 22nd meeting of the CITES Plants Committee (PC22, Tblisi, Georgia, Sept 2015), in particular PC22 Doc. 22.1 and Doc 22.1 Annex 1 (*Quick Scan of Orchidaceae species in European commerce as components of cosmetic, food and medicinal products*) identified the use of orchids as cosmetic and personal care product ingredients. As a follow up to this work the Swiss CITES Management Authority commissioned this report that included a number of in-depth orchid case studies that confirmed their use in this industry. This report includes input from this industry and trade associations and information on the supply chain from raw material to finished product.

From industry feedback the whole plant or parts of the plant (stems, flowers, leaves, aerial/ flower tips) are used to produce extracts and this material is sourced from artificially propagated sources, either live plants from

nurseries or tissue cultured plants from laboratories. However, further input from the industry is required to ensure material from “farmed” or “jungle farmed” sources is not wild collected. The flow along the supply chain shows that plant material is either sourced in range States, in particular PR China and Thailand, or from non-range States, in particular France (including Tahiti), but also Belgium, Japan, Republic of Korea, The Netherlands and Germany. While botanical extraction companies were identified in range States, none were found to be specifically producing orchid extracts. However, further enquiries often resulted in inadequate responses due to industry confidentiality issues. Orchid extracts are found in trade in liquid form. The inclusion of extracts into finished cosmetic products appears to be carried out mainly in Europe, in particular France, with these products then being sold globally.

Less input was received from cosmetic and personal care product companies and industry associations in the USA, possibly due to confidentiality issues. A number of extraction companies and suppliers of orchid extracts were identified and further contact may show that plant material for extraction and orchid extracts and finished products may be produced within the USA and traded globally.

Finished products purporting to contain orchids are traded globally and are regulated under CITES, but from analysis of trade data it is unlikely that the full trade in these products is documented or legal. This may be due to the misinterpretation or lack of knowledge of CITES among this industry, poor knowledge of orchid extracts in cosmetics by CITES policy and enforcement authorities and the burden placed on both to comply with CITES implementation given the large quantities of commodities in trade. This situation is similar to others that CITES and industry have collaborated on, including candelilla wax (*Euphorbia antisyphilitca*) and to some extent *Aniba* and *Bulnesia*. Further collaboration between CITES and the cosmetic and personal care product industry and industry associations should continue to ensure a complete picture of this industry is available. This can then be used to explore any amendments of the annotation to the Appendix II listing for orchids to exempt finished products of certain orchid species or genera.

Use of orchids in fragrances

Many fragrances citing orchids in their title or in publicity material are probably reconstructions of the orchid fragrance and do not contain any orchid species. Only one fragrance was identified for this report that appears to include a *Vanda* species in its ingredients (“Miss Udorn Sunshine” produced in Thailand from a hybrid that includes *Vanda* Josephine Van Brero (*Vanda* teres x *Vanda insigne*) and *Vanda denisoniana*). Given some companies offer to formulate bespoke fragrances, any suitable orchid species may enter trade. If orchids were in trade as a fragrance ingredient they would likely be in the form of an extract, in particular as an essential oil.

Ingredients on the packaging are often listed as ‘perfume’ or ‘fragrance’ due to Intellectual Property protection concerns, and individual fragrance ingredients do not need to be listed unless they include any of 26 allergens (listed under Regulation (EC) No 1223/2009). Previously, a CAS number would have to be known to identify the species and parts in use, but not all species have such numbers assigned to them. Therefore it is not straightforward to link a fragrance to a plant species or the parts and derivatives used to manufacture it. To address this issue appropriate nomenclature has been developed, based on the ISO Norm 9235, and integrated into the Research Institute for Fragrance Materials (RIFM) database to unambiguously describe natural ingredients used in the fragrance industry by members of the International Fragrance Association (IFRA). The nomenclature will consist of a number indicating the type of extract and a letter representing the botanical parts used for the preparation of the natural ingredients (Natural Complex Substances or NCS). This new nomenclature will soon be published. The RIFM Database is only accessible to members but a list of ingredients (with the botanical name) used in the fragrance industry (so called transparency list) can be found on IFRA’s freely accessible website; however it will not necessarily provide the full level of detail (e.g. plant part, process).

Flower and vibrational essences

Orchids can be used in the manufacture of flower and vibrational essences, which are often used in a number of alternative therapies, such as homeopathy and aromatherapy. Processing the essences can involve harvesting plant parts and placing them in water or through a number of non-cutting methods whereby the plant material and water do not come into direct contact. The filtered water is usually then combined with alcohol to produce a “mother tincture” from which more dilute versions are drawn. If the plant material is submerged in water, plant chemicals may remain in it once it is filtered. Determining whether or not an essence contains an orchid species can be problematic. An orchid name is often mentioned when describing the essence, but the manufacture of the mother tincture might not have involved the harvesting or use of any plant. While harvesting from artificially

propagated greenhouse stock is documented by manufacturers, the level of wild harvesting is harder to determine. The majority of traders are small businesses operating and selling through the Internet.

There has been previous outreach by a number of CITES Parties (the US and the UK) with the flower and vibrational essence industry following their enquiries as to whether essences are regulated, but further outreach and clarification from this industry is required on a number of issues. These include whether, under Resolution Conf. 9.6 (Rev. CoP16), a product that does not contain a CITES-listed species but specifies the name of a CITES-listed species on the packaging or in the ingredients list is regulated; linking vague common names used in ingredient lists, such as “orchid extract”, to CITES-listed species; and whether artificially propagated or wild source material is used in the manufacture of essences and the sources of this material.

Abbreviations and Acronyms

Explanation of terms

CAS number
This abbreviation refers to the code number developed by the Chemical Abstracts Service. The CAS number is a worldwide code enabling identification of chemical substances. It is listed when available.

FDA NDC Directory
The Drug Listing Act of 1972 requires registered drug establishments to provide the Food and Drug Administration (FDA) with a current list of all drugs manufactured, prepared, propagated, compounded, or processed by it for commercial distribution. Drug products are identified and reported using a unique, three-segment number, called the National Drug Code (NDC), which serves as a universal product identifier for drugs. FDA publishes the listed NDC numbers and the information submitted as part of the listing information in the NDC Directory which is updated daily.

HS Code
Harmonized System Tariff Code of the World Customs Organisation (WCO)

INCI name
This refers to the common nomenclature for ingredient labelling on the packaging of cosmetic products. The abbreviation ‘INCI’ stands for International Nomenclature for Cosmetic Ingredients.

INN name
This abbreviation refers to the International Non-Proprietary Name recommended by the World Health Organisation. It is listed where applicable.

LNHPD
Licensed Natural Health Products Database (Health Canada). The Licensed Natural Health Products Database contains information about natural health products that have been issued a product licence by Health Canada. Products with a licence have been assessed by Health Canada and found to be safe, effective and of high quality under their recommended conditions of use.

Ph. Eur. name
This abbreviation refers to the name in the European Pharmacopoeia. It is listed where applicable.

VCRP
US Food and Drug Administration’s Voluntary Cosmetic Registration Program (VCRP) is a reporting system for use by manufacturers, packers, and distributors of cosmetic products that are in commercial distribution in the United States. The VCRP applies only to cosmetic products being sold to consumers in the United States. It does not apply to cosmetic products for professional use only, such as products used in beauty salons, spas, or skin care clinics. It also does not apply to products that are not for sale (Title 21, Code of Federal Regulations (CFR), part 710.9), such as hotel samples, free gifts, or cosmetic products you make in your home to give to your friends.

Regulations and Terminology applicable to the Cosmetics Industry

Trade names
Trade Names are unique identifiers that are assigned to a cosmetic ingredient by the manufacturer or supplier of that ingredient. These names are often designed to reflect a particular company's product line, and do not

necessarily have any direct relationship to the chemical nature of the ingredient. As many different suppliers may provide the same cosmetic ingredient, many ingredients have multiple Trade Names (one or more from each supplier). A Trade Name is a name that identifies an ingredient that is different from the INCI name. Trade Names are not to be used for personal care product labelling purposes.
http://buyers.personalcarecouncil.org/jsp/CMSAcceptancePage.jsp

Fairwild
Established in 2008, the FairWild Foundation promotes the sustainable use of wild-collected ingredients, with a fair deal for all those involved throughout the supply chain. As a response to these concerns, the FairWild Foundation is working with partners worldwide to improve the conservation, management and sustainable use of wild plants in trade, as well as the livelihoods of rural harvesters involved in collection. As a key tool to achieve this goal, the FairWild Standard and certification system is maintained for the sustainable management and collection of wild plants.

Good Agricultural Practice (GAP) certification
A multiplicity of Good Agricultural Practices (GAP) codes, standards and regulations have been developed in recent years by the food industry and producers organizations but also governments and NGOs, aiming to codify agricultural practices at farm level for a range of commodities. Their purpose varies from fulfilment of trade and government regulatory requirements (in particular with regard to food safety and quality), to more specific requirements of specialty or niche markets.

ECOCERT
ECOCERT is an **inspection and certification body** established in France in 1991 by agronomists aware of the need to develop environmentally friendly agriculture and of the importance of offering some form of recognition to those committed to this method of production.
From its creation, ECOCERT is specialized in the certification of organic agricultural products**.**
ECOCERT contributed to the **expansion of organic farming** in the 1990s by helping to draw up French and European regulations. Still very involved in promoting organic farming, Ecocert today works with French and international institutions in supporting project development. By winning the confidence of professionals and consumers, ECOCERT has become a **benchmark in organic certification worldwide.**

Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)
REACH is an EU regulation that is intended to advance the safe use of chemicals and improve the protection of human health and the environment by ensuring companies understand, identify and manage the risks linked to the substances and products they manufacture or supply.
A critical element of the legislation requires manufacturers and importers to register chemical products they put on the market with the European Chemicals Agency (ECHA). Each product or substance requires a dossier of data to be submitted to enable users and suppliers up and down the supply chain to understand the relevant hazards and risks associated with it.

Biocidal Products Regulation (BPR)
The BPR governs the sale and use of biocidal products such as disinfectants used to protect humans, animals, materials or articles against harmful organisms like pests or bacteria. The regulation is intended to better protect humans and the environment. The regulation came in to force September 2013. Product registration timings are dependent on the active substances contained in the product.

Classification, labelling and Packaging (CLP)
Regulation aimed to protect workers, consumers and the environment by means of labelling which reflects possible hazardous effects of a particular chemical. It is also designed to bring labelling regulation in line with the Globally Harmonised System (GHS). All chemical products must be assessed for possible hazards and potential risks to human health and the environment and labelled according to the standardised system. The hazards are communicated through standard statements and pictograms on labels and safety data sheets.

EU (https://ec.europa.eu/growth/sectors/cosmetics_en and https://www.cosmeticseurope.eu/about-us/)
In the European Union (EU), the manufacture of cosmetics is governed by the EU Cosmetics Regulation ((EC) No. 1223/2009). A special database with information on cosmetic substances and ingredients, called **CosIng**, enables easy access to data on these substances, including legal requirements and restrictions. The EU Cosmetics Regulation sets the principles for claims that manufacturers can make on their packaging. Cosmetics Europe has published the 'Charter and Guiding Principles on responsible advertising and marketing communication' to assist members. The EU Cosmetics Regulation includes a set of strict rules for labelling of cosmetic products, all of which must be present on the product container, packaging, or if not possible given space restrictions, in an enclosed leaflet. Without proper labelling, a product will not be permitted onto the market. Cosmetics legislation at EU level also:

- requires that all products to be marketed in the EU must be registered in the Cosmetic Products Notification Portal (CPNP) before being placed on the market;
- requires that some cosmetic products are given special attention from regulators due to their scientific complexity or higher potential risk to consumer health;
- ensures that there is a ban on animal testing for cosmetic purposes;
- makes EU countries responsible for market surveillance at national level.

CosIng is the European Commission database for information on cosmetic substances and ingredients contained in the:
- Cosmetics Regulation Regulation (EC) No 1223/2009 of the European Parliament and of the Council;
- Cosmetics Directive 76/768/EEC (Cosmetics Directive), as amended;
- Inventory of Cosmetic Ingredients as amended by Decision 2006/257/EC establishing a common nomenclature of ingredients employed for labelling cosmetic products throughout the EU
- Opinions on cosmetic ingredients of the Scientific Committee for Consumer Safety (List of SCCS opinions).

CAS, ELINCS or **EINECS** numbers can be searched for in CosIng.
The EU Cosmetics Regulation protects consumers and makes sure that all cosmetic products on the European market are safe. Manufacturers, importers or the responsible person for placing the cosmetics products on the market must ensure that their products meet the required safety requirements. Compliance with the regulations is controlled by the national or regional competent authorities in the EU member states.

Other countries
Products that have ether cosmetic applications or disinfectant properties often fall under 'country specific' regulations that are enforced under the jurisdiction of the country in which the products are sold. These are often in addition to European or Regional legislation and may require specific registrations, compliance documentation or testing.

a) USA - See http://www.cosmeticsinfo.org/cosmetic-regulation-us

b) Other countries See http://www.cosmeticsinfo.org/Regulation-other-countries