

www.cropwatch.org



THE FIRST TRULY INDEPENDENT WATCHDOG FOR THOSE
WORKING WITH NATURAL AROMATIC MATERIALS

E: info@cropwatch.org T: ++44 (0)7771 872 521

‘Banned’ Essential Oils.

Compiled by Cropwatch from a variety of Cropwatch sources Oct. 2009 v1.07a.
[To be continuously updated].

A number of essential oils & extracts have been prohibited on toxicological grounds from use in specific product applications by various authorities & organisations over the years – Cropwatch has attempted to list out some of these below. Please note that essential oils whose concentration is **restricted** in consumer products (including foodstuffs) because their make-up includes biologically active principles of concern (as opposed to those that are **prohibited**), constitute a far larger list. The restricted biological principles which have a specific limit in foodstuffs include agaric acid, aloin, β -asarone, berberine, coumarin, hydrocyanic acid, hypericine, pulegone, quassine, safrole & isosafrole, santonin & (α - & β -) thujones.

Please note also that essential oils derived from plants which are banned or restricted CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora, which is implemented by EC Regulation No 338/97) from over-exploitation or serious decline via the actions of unscrupulous traders & rogue elements, are listed below in **blue-grey font**. For a complete list of Threatened Aromatic Species see Cropwatch’s data-base at <http://www.cropwatch.org/Threatened%20Aromatic%20Species%20v1.11.pdf>). Labelling data for natural substances below was checked against the IFRA-IOFI Labeling Manual 2009 (where listed).

Agarwood oils.

For *Aquilaria agallocha*:

CAS No: 94350-09-1. EINECS-CAS: 94350-09-1 EC No: 305-227-1.

Hazard symbol: - - - Risk phrases: - - -

Status: All *Aquilaria*, *Gonystylus* & *Gyrinops* spp. were added to Appendix II CITES (2004), a move reflected in Commission Regulation (EC) No 1332/2005 of 9 August 2005 amending Council Regulation (EC) No 338/97. The listing does not apply to agarwood oil & extracts, despite the fact that commercial trading in these commodities has devastated the populations of individual agarwood species in many locations.

Alantroot oil, absolute & concrete (syn. Elecampane oil). Steam distilled from the dried roots (or whole herb including the roots) of *Inula helenium* L., widespread throughout Europe & Asia in naturalized in the US.

CAS No: 97676-35-2.

Prohibited IFRA (rev. Sept.2002) because of its sensitising effects (Opdyke D.L.J. (1976), *FCT* **14**, 307).

Essential oil is listed in Annex II of EU Cosmetics Directive 76/768/EEC (No. 423) although SCCP Opinion 0320/00 listed alantroot essential oil, concrete & absolute as perfumery materials which must not form part of cosmetic products.

Essential oil is on List of Prohibited & Restricted Ingredients (Health Canada) Mar 2007 (as 'Inula helenium oil').

Notes: Sensitisation probably derives from sesquiterpene lactone content, which includes atlantalactone.

Almond Oil Bitter Unrectified. From *Prunus amagdalus* (Mill.) D.A. Webb var. *amara* (DC) H.E. Moore, and, in practice, often from a number of other (amagdalin-containing) kernels from other *Prunus* spp.

CAS No: 8013-76-1 EINECS-CAS: 90320-35-7, EC No: 290-060-9

Hazard symbol: Xn. Risk phrase: R22.

Free hydrogen cyanide, arises from the hydrolysis of the glycoside amygdalin present in the macerated pressed nut-cake prior to steam distillation. The unrectified cyanide-containing oil however, is not commercially available.

Boldo oil Steam distilled from dried leaves of *Peumus boldus* Molina produced in Chile, Bolivia . Peru etc.

CAS No: 8022-81-0. EINECS-CAS: 84649-96-7 EC No: 283-476-4.

Hazard symbols: T + N. Risk phrases R(10-21-25-43-51/53-65).

Prohibited under IFRA's 44th Amendment for use in fragrances. Alleged to produce convulsions in rats in doses of 0.07g/Kg.

Ecological Status: Threatened (Cropwatch 2007).

Notes: Toxic effects (acute oral LD₅₀ 0.13g/Kg, Opdyke 1982) probably due to ascaridole content. Treated leaf extracts approved by FDA to flavour alcoholic beverages.

Cade oil unrectified. From destructive distillation of wood of *Juniperus oxycedrus* L.

CAS No: 8013-10-3. EINECS-CAS: 90046-02-9. EC No: 289-969-0.

Hazard` symbols: Xn + N. Risk phrases R(50/53-65).

Prohibited IFRA for use in fragrances – last amended April 2004 (but the rectified oil is permitted IFRA).

Notes: Contains carcinogenic polyaromatic hydrocarbons (PAH's) such as benzo- α -pyrene & 1,2-benzanthracene, the concentration of which should be reduced by rectification to 1 ppb.

Cedrela odorata oil. From distillation of wood of *Cedrela odorata* L.

CAS No: 93062-64-7. EINECS/ELINCS: 296-819-8.

Ecological Status: Threatened (Panama); Vulnerable elsewhere.

Wood export illegal: Appendix III CITES (2004); attempts at Appendix II listing failed at CITES CoP14.

Notes: EC Reg 1332/2005 (amending 338/97) only applies to logs, sawn wood & veneer sheets from *Cedrela odorata*, not to essential oil or extracts.

Chenopodium oil. syn. American Wormseed oil. Steam distilled from aerial parts (including seeds) of *Chenopodium ambrosioides* L. var. *anthelminticum* (L.) Grey.

CAS No: 8006-99-3. EINECS-CAS: 89997-47-7. EC No: 289-682-0.

Hazard symbols: Xn + N. Risk phrases: R(21/22-38-43-51/53-65)

Prohibited IFRA (July 2006) for use in fragrances (see Human Health Criteria Document (2000) *Reg. Tox & Pharm.*, **31**, 166-181).

Essential oil is in Annex II of EU Cosmetics Directive (No. 76) following its identification in SCCNFP Opinion 0320/00 as a perfumery material which must not form part of cosmetic products.

On List of Prohibited & Restricted Ingredients (Health Canada) Mar 2007.

Prohibited for resale to the public under the UK Medicines Act (1968).

Notes: The essential oil from *Chenopodium ambrosioides* L. var. *anthelminticum* (L.) Grey still has an important place worldwide as an anthelmintic (effective against hookworms & roundworms) for veterinary & other uses. The oil may contain up to 70% ascaridole (IUPAC:

(1S,4S)-4-methyl-1-propan-2-yl-7,8-dioxabicyclo[2.2.2]oct-2-ene) with highest concentrations of essential oil in the seeds. Note that some Latin American plants described as *Chenopodium ambrosioides* L. may have a lower (10% max.) concentration of ascaridole than that found in N. American, European or Indian plants.

Costus root oil, concrete & absolute. Prepared from dried roots of *Saussurea lappa* CB Clarke.

CAS No: 8023-88-9. EINECS-CAS: 90106-55-1. EC No: 290-278-1.

Hazard symbols: Xn. Risk phrases: R(43-65).

Ecological Status: Protected under CITES (2003) Appendix I.

Prohibited IFRA in 1974, as amended May 2006, due to its sensitising potential: “Safer (sesquiterpene lactone free) products are commercially available nowadays, but this development seems to have escaped IFRA’s attention” - Cropwatch 2009. Root oil is listed In Annex II of EU Cosmetics Directive 76/768/EEC (No. 1133).

References: Cheminat, A., Benezra, C., Farral M.J. & Frechet, J.M.J. (1981), *Canadian Journal of Chemistry* **59**, 1405-1414..

Opdyke D.L.J. (1974), *FCT* **12**, 867.

Croton tiglium oil. Produced from seeds of *Croton tiglium* L.

CAS No: 8001-28-3

Listed in Annex II of EU Cosmetics Directive 76/768/EEC (No. 107). On List of Prohibited & Restricted Ingredients (Health Canada) Mar 2007.

Prohibited for resale to the public under the UK Medicines Act (1968).

Notes. The oil of *Croton tiglium* is a drastic purgative, inflammatory and vesicant – the seeds are used to stupefy fish. It contains co-carcinogens and was formerly used in animal experiments in conjunction with other experimental carcinogens to produce experimental tumors on rabbit’s ears. *Croton oblongifolius* Del. has been used for the same purposes.

Fig leaf absolute. By alcohol extraction of the concrete itself produced from solvent extraction of leaves of *Ficus carica* L.

CAS No: 68916-52-9. EINECS-CAS: 90028-74-3. EC No: 289-868-1.

Hazard symbol: Xi. Risk phrases: R43.

Fig leaf absolute is prohibited IFRA – last amended May 2006 - due to its sensitising & extreme photo-toxic potential - see Opdyke D.L.J (1982) *FCT* **20**, 691.

Fig leaf, flesh and preparations listed in Annex II of EU Cosmetics Directive 76/768/EEC (No. 436).

On List of Prohibited & Restricted Ingredients (Health Canada) Mar 2007.

Notes: Contains furanocoumarins.

Horseradish oil. From the steam distillation of tap-roots of *Armoracia rusticana* P. Gaertn., Mey and Scherb.

CAS No: 84775-62-2 EINECS-CAS: 84775-62-2, EC No: 283-891-0

Hazard symbol: T + N. Risk phrases: R10-23/24/25-36/37/38-50/53.

Contains approx 50% allyl isothiocyanate which is prohibited in fragrances by IFRA - probably because of its toxicity & on the grounds that it is a severe irritant.

Jaborandi oil. From steam distillation of dried leaflets of various *Pilocarpus* spp. e.g. *Pilocarpus microphyllus* Stapf. & *P. jaborandi* Holmes ("Pernambuco Jaborandi"), *P. pennatifolius* Lemaire & *P. microphyllus* ("Paraguay Jaborandi"), *P. trachylophus* Holmes ("Ceara jaborandi") and other *Pilocarpus* spp. The essential oil contains 0.8% of toxic alkaloids pilocarpine, isopilocarpine, pilosine etc. and was eventually prohibited under The Medicines (Retail Sale or Supply of Herbal Remedies) Order 1977, although the news apparently failed to filter through to many aromatherapy authors e.g. Lawless (1994).

Karo karunde absolute. From alcohol extraction of concrete, itself produced from hexane extraction of flowers of *Leptactinia senegambica* Hook f. growing in Guinea.

CAS No: 68916-95-0. EINECS-CAS: 94334-19-2. EC No: 305-095-5.

INCI name: Leptactina senegambica,

Hazard symbol: T. Risk phrases: R(22-33).

Notes. **Effectively prohibited** IFRA by prohibition of benzyl cyanide presence in fragrances – last amended April 2004 [karo karunde absolute contains up to 5% benzyl cyanide]. For summary of benzyl cyanide toxicology see *FCT 20* (Suppl.) 803.

Massoia bark oil. From bark of *Cryptocarya massoy* (Oken) Kosterm syn. *Cryptocaria massoia* native to New Guinea.

CAS No: 85085-26-3. EINECS-CAS: 85085-26-3. EC No: 285-357-2.

Hazard symbol: Xi. Risk phrases: R(43-52/53)

Prohibited IFRA for use in fragrances, due to its severe irritating effects.

Melaleuca bracteata oil.

From steam distillation of parts of tree *Melaleuca bracteata* F. Muell. **Not banned** as such, but the methyl eugenol chemotype of this essential oil contains >90% methyl eugenol, which is an experimental rodent carcinogen. It is difficult to see how this oil could be used to practical advantage in consumer product formulations, given the different but punitive restrictions on the methyl eugenol contents of fragranced cosmetics by IFRA & the EU.

[Melissa oil. From steam distillation of whole herb of *Melissa officinalis* L. ssp *officinalis*.

CAS No: 8014-71-9. EINECS-CAS: 84082-61-1. EC No: 282=007-0, Hazard symbol: Xi. Risk phrases: R(36/38-43-52/53).

Note: Initial IFRA prohibition converted to restriction, July 2009].

Mustard seed oil. Produced from seeds of *Brassica nigra* (L.) Koch (& often in practice, from brown mustard *Brassica juncea* L.).

CAS No: 8007-40-7, EINECS-CAS: 90064-15-6, EC No: 290-076-3

Hazard symbol: T + N, Risk phrases: R10-23/24/25-36/37/38-50/53.

Contains >97% allyl isothiocyanate, the latter constituent being banned IFRA for use in fragrances, on the grounds of its toxicity & severe irritant properties.

Peru balsam crude. Oleoresin obtained from *Myroxylon pereirae* (Royle) Klotzsch in El Salvador.

CAS No: 8007-00-9. EINECS-CAS: 8007-00-9.

Approved: FDA 21CFR §182.20; GRAS; FEMA GRAS 2116.

Prohibited IFRA for use in fragrances on skin sensitisation grounds.

Eventually, crude exudates of Peru balsam were correctly listed in Annex II of EU Cosmetics Directive 76/768/EEC, after a fiasco involving the previous wrongful listing of other permitted (but restricted) Peru balsam qualities, which damaged the Peru balsam producing industry.

Notes. Peru balsam crude is official in B.P.; Eu. Pharm., approved Canada DSL etc. Medical use includes applications to treat difficult-to-heal wounds, ulcers etc. Formerly used as scabicide.

Rosewood oil. Produced mainly by steam distillation of wood of morphological types of *A. rosaeodora* Ducke and *A. duckei* Koster. (syn. *A. rosaeodora* Ducke var. *amazonica*).

CAS No: 8015-77-8. EINECS-CAS: 83863-32-5. EC No: 281-093-7.

Hazard symbol: Xi. Risk phrases: R(38-43-52/53).

Not banned but a primary example (together perhaps with Sandalwood oil E.I.) of unethically traded commodities between essential oil suppliers & perfume industry buyers.

Status: Endangered (*IUCN Red List 2009. Version 2009.1*).

Salvia divinorum Epling & Játiva. Recently suggested by the popular UK press investigating “herbal highs” as a strong candidate for potential regulation. A strong infusion of *Salvia divinorum* Epling & Játiva (oil, extracts also commercially available), an uncommon Mexican species cultivated in Oaxaca, has hallucinogenic properties, which the Mazatec shamans use to foresee the future. The active principle has not been clearly identified but is thought to be the trans-neoclerodane diterpene salvinorin A.

References: Ortega A., Blount J.F. & Manchand P.S. (1982). "Salvinorin, a new trans-neoclerodane diterpene from *Salvia divinorum* (Labiatae)". *J. Chem. Soc., Perkin Trans. 1*, 2505–8.

Prisinzano T.E. (2005). "Psychopharmacology of the hallucinogenic sage *Salvia divinorum*". *Life Sci. 78* (5), 527–31.

Roth B.L., Baner K., Westkaemper R. *et al.* (2002). "Salvinorin A: a potent naturally occurring nonnitrogenous kappa opioid selective agonist". *Proc. Natl. Acad. Sci. U.S.A. 99* (18), 11934–9.

Valdes L.J. Butler W.M., Hatfield G.M., Paul A.G. & Koreeda M. (November 1984). "Salvinorin, a new trans-neoclerodane diterpene from *Salvia divinorum* (Labiatae)". *J. Org. Chem. 49* (24), 4716–8.

Sandalwood oil East Indian. Produced by lengthy steam distillation of the powdered wood of *Santalum album* L.

CAS No: 8006-87-9, EINECS-CAS: 84787-70-2, EC No: 284-111-1.

Hazard symbol: - - -, Risk phrases: - - -.

Status: Vulnerable (*IUCN Red List of Threatened Species 2009. Version 2009.1*). Endangered (Maharashtra): CAMP meeting Prune Feb. 2001. Priority spp. for in situ conservation: FAO (1984). Critically endangered in Timor Leste.

Not banned but one of two primary examples (together with Rosewood oil) of unethically traded commodities between essential oil suppliers & perfume industry buyers.

Santolina oil. syn Lavender cotton oil. From steam distillation of seeds of *Santolina chamaecyparissus* L.

CAS No: 84961-58-0. EINECS-CAS: 84961-58-0. EC No: 284-647-6

Hazard symbol: Xn. Risk phrases: R(10-43-52/53-65).

Prohibited IFRA (last amended July 2008), due to 'presence of structural alerts as defined in the Human Health Criteria Document (Ford *et al.*, 2000)' or other undisclosed information. **Cropwatch considers ban may possibly relate to fears over alleged toxicity of santolina alcohol content.**

Reference: Ford *et al.* (2000) *Human Health Criteria Document, Reg. Tox & Pharm.*, **31**, 166-181.

Sassafras Oils.

1. *Sassafras albidum* (Nutt.) Nees.

CAS No: 87006-80-2, EINECS-CAS: 84787-72-4, EC No: 284-113-2

Hazard symbol: T, Risk phrases: R(45-22-68).

Safrole & sassafras oils, being precursors of illicit drugs MDA, MDEA & MDMA (ecstasy) are designated as controlled substances in many countries, and safrole is listed as a Table 1 precursor under the United Nations Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances. The US Drugs Enforcement Agency has made safrole a List 1 substance under the under the Chemical Diversion and Trafficking Act, and it is unlawful to trade safrole & safrole-rich substances (sassafras oils, brown camphor oil etc.) for illicit drug-manufacturing purposes. The FDA made sassafras a prohibited ingredient for food & beverages in 1960, since it is a weak experimental animal carcinogen (rats, mice) – see Daimon *et al.* (1998).

2. *Ocotea pretiosa* (Nees) Mez. the Brazilian Sassafras tree has been over-exploited as a safrole-source. Mors and Rizzini (1996) noted that *O. pretosia* was becoming scarce in Santa Catarina due to uncontrolled exploitation and the natural slow growth of the tree (the tree is listed as Vulnerable in the *IUCN Red List 2009. Version 2009.1*).

Cropwatch comments: *Ocotea cymbarum* is frequently mis-identified as Brazilian Sassafras oil in spite of not having any safrole content.

3. *Cinnamomum parthenoxylon* (Jack) Meisn. is exploited to distill hundreds of tons of sassafras oil Vietnamese annually. Cropwatch

(2007) declared the tree as now being critically endangered in Northern & Central Vietnam, and the *IUCN Red List 2009* also declares the tree as critically endangered (Vietnam). The Chinese authorities moved against safrole production from *C. parthenoxylon* trees in 2007 to protect local resources.

References: Daimon H., Sawada S, Asakura S. & Sagami F. (1998) "In vivo genotoxicity and DNA adduct levels in the liver of rats treated with safrole." *Carcinogenesis* **19**, 141-146.

Mors & Rizzini (1966) *Useful Plants of Brazil* pub. Holden & Day, 1966.

Savin oil. From steam distillation of twigs, leaves & shoots of *Juniperus sabina* L. (Cropwatch comments: Savin oil is wrongly identified as *J. phoenicia* in IFRA-IOFI labelling manual 2009, EFFA CoP 2008 v2 & CHIP List 2009 published by BEOA).

CAS No: 8024-00-8.

Savin essential oil (from *J. sabina*) is prohibited IFRA (see note in IFRA standard), who note that 'Savin oil' from *J. phoenicia* is not prohibited).

Leaves, essential oil & galenical preparations listed in Annex II of EU Cosmetics Directive 76/768/EEC (No 294).

Leaves, essential oil & galenical preparations on List of Prohibited & Restricted Ingredients (Health Canada) Mar 2007.

Prohibited for resale to the public under the UK Medicines Act (1968).

Notes: Allegedly toxic/embryotoxic in rodents, due to its sabinyol acetate content.

Styrax gum. From the American tree *Liquidambar styraciflua* L. var. *macrophylla* or from Asian styrax trees including *Liquidambar orientalis* Mill., all species with rare or threatened species concerns (see Styrax sub-section under <http://www.cropwatch.org/Threatened%20Aromatic%20Species%20v1.11.pdf>).

CAS No: 8024-01-9.

Gum prohibited IFRA for use in fragrances; IFRA allows Styrax extracts & distillates only to be used in skin contact/non-skin contact fragranced consumer products, but the concentration is restricted to 0.6%. IFRA's Standard is apparently based on evidence contained in a private communication submitted to RIFM, and therefore, presumably, not in the public domain..

Spikenard oil. From *Nardostachys grandiflora* (Jones) DC.

CAS No: 8022-22-8, EINECS-CAS: 90064-28-1

Hazard symbol: Xn, Risk symbol: R65.

Status: Plant under threat from habitat destruction & over-exploitation. Is supposedly protected under Appendix II CITES (1997) but poor implementation & enforcement of CITES rules previously prompted protest during the CITES Plants Committee meeting in 2006. Trading in oil & extracts not affected by these developments.

Tea leaf absolute.

In practice, prepared from solvent extraction of the leaf-buds & adjacent leaves of *Camellia sinensis* (L.) Kuntze (**syn. *Thea sinensis***). Previously prohibited IFRA (Tisserand & Balacs 1995) because of severe sensitising properties - now changed to IFRA restriction. Black & green tea CO₂ **extracts** solubilised in ethanol, have become popular perfumery ingredients in the new millenium.

Reference: Tisserand R. & Balacs T. (1995) *Essential oil Safety* Churchill-Livingstone.

Verbena oil. Steam distilled from leaves of *Lippia citriodora* Kunth.

CAS No: 8024-12-2. EINECS-CAS: 85116-63-8. EC No: 285-515-0.

Hazard symbols: Xn + N. Risk phrases: R(38-43-51/53-65).

Prohibited IFRA (see *FCT* (1992) **30** (Suppl.), 137S.

N.B. Verbena oil is listed in Annex II of Cosmetics Directive 76/768/EEC (see below), but SCCNFP 0320/00 Opinion recommended that Verbena (*Lippia citriodora* Kunth.) essential oils and derivatives including the concrete and absolute should not be used as fragrance ingredients, based on their sensitizing potential. The contradiction has been recognized and the SCCP has been asked to clarify the position (see SCCP/1073/06).

Verbena absolute (included for completeness since status may change), From alcohol extraction of concrete, itself produced by solvent extraction of leaves of *Lippia citriodora* Kunth.

CAS No: 8024-12-2 EINECS-CAS: 85116-63-8 EC No: 285-515-0

Hazard symbols: Xn + N. Risk phrases: R(43-51/53).

The absolute (but not the concrete) was recommended to be limited to 0.2% in finished cosmetic products in SCCNFP/0392/00, now under review following questions asked of the SCCP (see SCCP/1073/06). The current IFRA standard shows a restriction (0.2% in both leave-on & wash-off products; 2.0% in non-skin products).

Wormwood oil: Not banned, but historically important...

From steam distillation of leaves & dried tops of *Artemisia absinthium* L.

CAS No: 8008-93-3, EINECS No: 84929-19-1, EC No: 284-503-2

Hazard symbols: Xn, Risk symbols: R22, 52/53.

Notes. Formerly used together with Roman Wormwood (*A. pontica*) in the manufacture of aromatic bitters, especially the neurotoxic liqueur absinthe. Sale of the latter was notoriously prohibited by the French government France in 1915 - eight years after it was banned in Switzerland, and 3 years after being prohibited in the USA - because of the neurotoxic effects of thujone (in reaction to this, Pernod subsequently removed the wormwood from its formulas and increased the aniseed content!. Thujone (as α - & β -thujone) is one of thirteen biologically active principles having limits in foods e.g. under the UK's *Flavourings in Food Regulation 1992*.