## Paper to Soap, Perfumery and Cosmetics

"The difficulties of formulating naturally"

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### **INTRODUCTION**

The incorporation of natural materials into cosmetics and toiletries is not just the addition of "another ingredient" to the formulation. It is a serious responsibility that needs to be thoroughly researched and investigated.

Looking across many references one finds a fairly chaotic picture for any given plant, amongst which is buried a small core of benefits or effects that is common to nearly all of those references. However, there is also a high proportion of folk lore and gross exaggeration. For this reason it comes as no surprise that the medical fraternity views alternative medicine with a degree of scepticism.

There is a moral and ethical obligation for all technical people to justify the claims put on their packs. At the same time, the "Marketeers" are eager to make the product as tempting as possible to the consumer. It is, therefore, the responsibility of us all to achieve an honest balance between the claimed benefit, the active dosage, and the substantiating evidence.

Claim substantiation is a topic that is becoming increasingly relevant as the Food and Drug Administration (FDA) in the United States clamps down on "over-zealous" pack copy, especially when it sails close to the medical indications.

The list of natural materials prohibited by the Cosmetic Safety Act is the absolute minimum in terms of restriction. There are many extracts which do not appear on this list which as examples may be phototoxic, abortifacient or the potential to cause severe irritation.

### FORBIDDEN PLANT MATERIALS

# According to the 1989 Cosmetic Safety Act

Schedule No. Name of Substance Translation

- 11. Aconitine and its salts
- 12. **Aconitum napellus** Monkshood (leaves,roots and galenical preps)
- 13. **Adonis vernalis** and its preparations Adonis
- 43. **Ammi majus** and its galenical preparations Bishopsweed
- 51. **Anamirta cocculus** (fruit) \*\*\*\*\*\*\*
- 57. **Apocynum cannabinum** and its preparations Cannabis
- 63. **Atropa belladonna** and its compounds Belladonna
- 129. Calabar bean (see 547)
- 130. **Cantharis vesicatoria** and cantharides \*\*\*\*\*\*\*
- 144. **Chenopodium ambrosioides** American wormseed oil (essential oil) or Mexican goosefoot
- 145. Cherry laurel water (see 577)

180. Claviceps purpurea Ergot

its alkaloids and galenical preparations

187. Colchicum autumnale Autumn Crocus or

and its galenical preparations Meadow Saffron

193. **Conium maculatum** Hemlock

(fruit, powder, galenical preparations)

197. **Croton tiglium** (oil) Croton

198. Curare and curarine

212. **Datura stramonium** Thornapple or Jimsonweed (and its galenical preparations)

243. **Digitalis purpurea** Foxglove (digitaline and all of its heterosides)

379. **Hyoscyamus niger** (leaves, seeds powder Henbane

and galenical preparations)

386. Cephaelis ipecacuanha and related species

(roots, powder and galenical preps.)

396. **Juniperus sabina** Savine

(leaves, essential oil and galenical preparations)

397. Laurel oil

398. **Laurus nobilis** (oil from seeds) Laurel

402. **Lobelia inflata** Lobelia

and its galenical preparations

486. **Nux vomica** and its preparations Quaker Buttons

Poison nuts

547. **Physostigma venenosum** Calabar bean

549. **Phytolacca spp** and their preparations Poke Root

553. **Pilocarpus jaborandi** Holmes Jaborandi

and its galenical preparations

577. **Prunus laurocerasus** Cherry Laurel 579. **Pyrethrum album** 

Pyrethrum

and its galenical preparations

585. **Rauwolfia serpentina** Indian Snakeroot alkaloids and their salts

589. **Schoenocaulon officinale** Lind. Sabadilla

(seeds and galenical preparations).

596. **Solanum nigrum** Black Nightshade and its galenical preparations

600. Squill and its preparations (see 649)

603. **Stropanthus** species Strophanthus

and their galenical preparations

605. Strychnos species and their galenical preparations

649. **Thevetia neriifolia** Juss. Thevetia tree nut glycoside extract

696. **Urginea scilla** Stern. (see 600) Squill

and its galenical preparations

700. **Veratrum spp** and their preparations Hellebores

As an example Pennyroyal is an aromatherapy oil which in the correct hands is perfectly safe, however, used by the inexperienced or people ignorant of its properties it is abortive internally and can cause irritation externally.

#### **COMMON NAMES FOR PLANTS**

Technically we could argue a very strong and plausible case for Bladderwrack (*Fucus vesiculosis*), but the name is likely to conjure up an image of geriatric incontinence, or at least, a painful cure for it. The benefits of external application, cellulitis, skin soothing etc., might well be overlooked.

In many cases there are numerous alternatives for common names that could be used by Marketing. For reasons of simplicity let us consider Chamomile as a typical extract.

There are two distinct species, namely, *Anthemis nobilis* or sometimes *Chamaemelum nobile* which commonly is Common Chamomile, Spanish Chamomile, Belgian Chamomile, English Chamomile, Russian Chamomile, Garden Chamomile, Low Chamomile, Ground Apple or Whig plant.

Also *Matricaria Chamomilla* which strictly speaking should be referred to as *Matricaria recutita* or *Chamomilla recutita* which commonly is German Chamomile, True Chamomile, Sweet False Chamomile, Hungarian Chamomile, Single Chamomile, Scented Mayweed or Wild Chamomile.

There are other species

Anthemis cotula is the Stinking Chamomile.

Anthemis tinctoria - the Ox-eye Chamomile or Golden marguerite

Anthemis SanctiJohannis - the St.John Chamomile

Anthemis cuparicaria - the mat forming chamomile.

Anthemis arvensis - the corn chamomile.

It is unlikely that all these species of Chamomile have identical properties, and for brevity the list is not complete!

The CTFA (Cosmetic, Toiletry and Fragrance Association) Ingredient Dictionary has opted to use common names for its plant materials.

In the example chosen, the two names would be Chamomile extract and Matricaria extract.

This might be acceptable in one country, but when the system has to cater for global use, then the problems of language and the names themselves are open to misinterpretation and confusion.

e.g. Checkerberry - Mitchella repens or Gaultheria procumbens Blueberry - Vaccinium myrtillus or Oxycoccus quadripetalus Mayflower - Epigaea repens or Primula veris

The Latin name or Linnaeus classification is unique to the plant, albeit that a particular plant may have numerous sub species. The only other confusion might be that the plant has been re-examined botanically and reclassified. In any event this does not seem to present a major problem.

There are numerous occasions when one reads of a plant that is absolutely fascinating, but cannot identify it because it is only referred to only by its common name.

## **A TYPICAL PROBLEM**

There was a truly excellent series in one of the Observer Sunday colour supplement (The A-Z of Chinese Medicine), in which one of the topics was on baldness where Dr Song Ke mentions Wolfberry. Is this *Lycium barbarum* or *Lycium chinense*, indeed does it matter which sub species is used?

In a book by Tang and Palmer "Chinese Herbal Prescriptions", the authors used both English and Latin names except for a few extracts and needless to say it was *Lycium* that had no English name!

In Huxley's Book "The Mountain flowers of Europe" we learn that *Lycium barbarum* is one of the Nightshade family and also known as *Lycium halimifolium* Mill. or commonly the Box Thorn or Duke of Argyll's Tea Plant.

Fitter, Fitter and Blamey in their book "The Wild Flowers of Britain and Northern Europe" say that *L. barbarum* is an introduced shrub and is known as the Duke of Argyll's Tea-Tree which has pale purple flowers.

Regrettably there is no happy ending to this story and this plant (like many others) is on the "more information required" list. It illustrates the difficulties of accurate plant classification.

#### **USE OF THE PLANT**

We now find ourselves with a further dilemma, since it is important to accurately ascertain whether the benefit is achieved by taking the plant material internally or whether it is achieved by applying it externally, say as a salve or poultice.

# **SPECIES OF THE PLANT**

It is also vital to know the exact species of the plant, since like a good wine, much depends on the vine. There is a vast difference between a Cabernet Sauvignon and a Puille Fuisse, and let's face it, wine is no more than a fermented plant extract.

### PART OF THE PLANT

The part of the plant used also plays an important role, whether it is the flowers, the leaves, the young shoots, the fruit, the seeds, the roots or, indeed, the whole plant. Not many of us would rush out to buy a wine made from vine leaves.

#### **EXTRACTION OF THE PLANT**

The method and type of extraction will also have an effect, and the chemical composition will vary greatly depending on whether the extract is a steam distillate, an alcoholic extraction, an aqueous solution, a glycolic extraction, an expressed oil from pressing, or the dried herb.

Some plants are best infused, but even this seemingly simple act can destroy vital chemicals if, for example, a hot infusion is prepared instead of carrying out the process cold.

## **SOURCE OF THE PLANT**

Finally, where was the plant grown? Today, we can buy a Cabernet Sauvignon from Bulgaria, New Zealand, California and South Africa, they all have the same familiar taste, but in addition they all have their own distinctive characters brought about by differences in trace elements.

The soil, the climate, the weather conditions and time of harvesting, how the crop was stored and handled, will all affect the complex chemical balance and final quality. It might be argued that all of these factors are unimportant if the extract still performs.

But the reliability of the source is important and in the example of chamomile we should choose very carefully. There are some unscrupulous suppliers who adulterate their oils with cheaper oils such as cedar, turpentine, copaiba or milfoil oils. Indeed, for lowest quality, there is available a mixture of turpentine and lemon oil that has been distilled over chamomile. The rule is to know your supplier and his products.

# **AVAILABILITY OF PLANT MATERIAL**

Plant material is not always available the whole year, especially if the flowers or fruit are required. In some cases the extract supplier must arrange for the plant to be specially grown and harvested.

Many plants are protected species, for example, Edelweiss (*Leontopodium alpinum* or *Gnaphalium leontopodium*), Carline thistle (*Carlina acaulis*), Lady's Slipper (*Cypripedium pubescens*), Columbine (*Aquilegia vulgaris*) and Early Purple Orchid (*Orchis mascula*) to name but a few. In reality, protected species are so rare that there is usually insufficient material to gather locally, and so has to be cultivated artificially anyway.

#### **PLANT CLAIMS**

From a marketing point of view, using our chosen example, Chamomile is lacking in the "ripping yarns" department. People with consumption were often left sitting amongst beds of chamomile to strengthen their lungs - but the thought of putting your dear old wheezing granny out in all weathers to cough furiously in the herb patch does not have an aesthetic ring to it, and is unlikely to do much for your product's image. It probably won't do very much for your poor old granny either.

The fact that the Egyptians dedicated the herb to their gods might be useful - one should never turn down divine assistance, and if the product launch goes seriously wrong, then the marketeers might take some comfort from the folk lore of the Romanian gypsies who used it to prevent nightmares.

Sorting out the truth can be a problem in itself. There are over a hundred different claims from some 150 references for chamomile. These ranged from the treatment of schizophrenia to epilepsy. If all the claims were to be believed, it would make this herb one of the greatest panaceas known to man, and we would need no other medicines.

If one looks closely at the number of times a particular property was mentioned and ranks the

different claims then a definite pattern emerges. (Incidentally, some references make no distinction between the two varieties of chamomile, and these were ignored).

Chamomile was most cited as an antispasmodic (which is an agent that relieves or checks spasms or cramps). Equally it was cited for its antiseptic and wound healing properties. Chamomile also had sedative qualities when taken internally and externally it acted as an anti-inflammatory. More than half the references mentioned these properties.

In the second group of benefits, where a third of the references made a claim, one finds a series of properties that can be considered as being more speculative, namely, a tonic, a soothing preparation for conjunctivitis and sore eyes, good for flatulence, stomachic (an agent that stimulates, strengthens or tones the stomach), helpful in cases of diarrhoea, helpful in menstrual problems, helpful in cases of neuralgia, and useful in cases of insomnia and sleep related problems.

Of the other claims, there is insufficient evidence or correlation to have a high degree of confidence. In many cases the main core claim may have been expanded, for example, sedative has been amplified to cover tantrums in children.

Chamomile does possesses beneficial properties. Indeed, the very actives of bisabolol and azulene are sufficient to support many of the claims.

Other components of chamomile may justify some of the other properties, though the question of synergy (i.e the interaction of one component with another to give an effect that is greater than either component would have alone) is impossible to evaluate at the present time.

## (OPTIONAL SECTION)

Proazulene, chamazulene, coumarin or umbelliferone (7-hydroxycoumarin) and its methyl etherherniarin or methoxycoumarin, camphor, borneol, terpenes and sesquiterpenes, esters of caproic and nonylic acids, isadol, mucilage, flavone glycosides, flavonoids, anthemic acid, anthemidine, anthemol, anthemene, malic acid, salicylic acid, quinic acid, fatty acids, tannins, furfural, paraffinic hydrocarbons, sesquiterpene alcohols, choline, farnesene, palustrine, quercetrol, apigenin, apigetrin, (apigenin-7-\beta-D-glucoside), apiin (apigenin-apiosyl-glucoside), phytosterol, triacontane, rutin (quercitin-3-rutinoside), matricin, matricarin, polysaccharide containing D-galacturonic acid, amino acids, potassium and calcium malate, vitamins B and C, en-yn-dicycloether.

#### **NEW EXTRACTS FROM OTHER SOURCES**

There are an increasing number of Japanese plant materials becoming available. A few that have come to notice recently are :-

Cnidium officinale - antiphlogistic and analgaesic, Forsythiae suspensa - antibacterial and antiphlogistic, Uncaria gambir - haemostatic and astringent, Ganoderma lucidum - cell activating properties, Gardenia jasminoides - antiphlogistic, sedative, Glehnia littoralis - promotes the blood stream,

Houyttuyniae cordata - antibacterial, Isodon japonicus - promotes hair growth. Phellodendron amurence - astringent and antiphlogistic Sasa veitchii - antiphlogistic, cell activating

In addition, there is a great increase in the interest of Chinese Herbal medicine, and it would be impossible to give anything more than one or two examples from the vast repertoire of plants available.

Morus nigra or Mulberry - whitening agent, scalp stimulant

Astragalus membranaceus or Milk Vetch, also Astragalus gummifer or Tragacanth - promotes cell growth, reduces skin itching, anti-allergic.

Coptis chinensis or Chinese Golden Thread - helps the healing process.

From India and the knowledge of Ayurvedic medicine comes another source of fascinating plants such as:-

*Vetiveria zizanioides* or Khus - allergies, skin diseases and skin blemishes. *Ocinum sanctum* or Tulsi - skin diseases, skin softener and anti-inflammatory. *Eclipta alba* or Maka - skin diseases and hair darkener.

Extensive literature surveys will have to be completed, before many of these materials are considered suitable for cosmetic use.

#### **CONCLUSION**

It has been shown that the choice of plant material is complex. The selection of the best herbal material should not be restricted by whether it has a pretty name or a glamorous flower, but rather that it should be chosen because it has the required benefit.

The question of dosage has been deliberately avoided, since there is no hard and fast rule that can be applied generally to all plant materials whatever their form or source.

There is growing scientific evidence to suggest that natural materials do have beneficial effects. The benefits are not rapid like modern synthetic medicines, and any person who judges herbal preparations in this way is using the wrong yardstick with which to make the comparison.

Formulating with natural materials is easy, finding new materials and justifying their usage can be another matter. Incidentally, if anyone can clarify the question on Wolfberry, please drop me a line!