

## MAKING SENSE OF THE COMMISSION E MONOGRAPHS

Jonathan Treasure , MNIMH

*ABSTRACT: A review of the ABC's English translation of The German Commission E Monographs. The essay critically examines the monographs and the publisher's extensive additions to the volume. The author disputes the publishers claims of scientific accuracy and contemporary therapeutic relevance of the Commission E Monographs. The reviewer concludes that healthcare professionals in North America needing accurate information regarding safety, efficacy and administration of herbal medicines will not find this book to be an appropriate or useful resource, and that it may in fact be misleading.*

No publisher should ever express an opinion of the value of what he publishes. That is a matter entirely for the literary critic to decide...

A publisher is simply a useful middleman.

It is not for him to anticipate the verdict of criticism

Oscar Wilde - letter in St James's Gazette, 28 June 1898.

When the English translation of The Commission E Monographs from The American Botanical Council (ABC) finally appeared after long delays and with much fanfare it boasted some lofty claims on its back cover. There, Professor Varro Tyler asserts that the "Commission E Monographs represent the most accurate information in the entire world on the safety and efficacy of phyto medicines" while Dr Andrew Weil adds "here is a reference book on botanical medicine that physicians can trust..Accurate, responsible and authoritative, it is a must for every health professional interested in practicing natural medicine. It is also a model I hope will be used for the review and evaluation of herbs in the US.<sup>1</sup>

The Commission E Monographs are a collection of official documents compiled over nearly two decades by a now defunct German government appointed committee composed of twenty four scientific experts that was set up in 1978 to evaluate the safety and efficacy of herbal medicines by reviewing the extant literature. In Germany, only those herbs with Commission E Approved status are (or will eventually become) legally available.

The Commission E Monographs are actually neither accurate nor reliable in any definitive sense. They require considerable experience and understanding to assess and interpret. They are limited in range, content and depth by cultural, historical and political

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<sup>1</sup> In fact , Dr Weil has recently revised his opinions of the usefulness Commission E, stating on his web site 'Ask Dr Weil' stating that they are "dated" and "unfortunately they are not very useful to physicians..and omit some of the most important herbs used in this country"  
([http://cgi.pathfinder.com/drweil/qa\\_print/0,3008,1546,00.html](http://cgi.pathfinder.com/drweil/qa_print/0,3008,1546,00.html): dated 6/23/99)

constraints that hamper any simple application to the contemporary North American context. It is quite arguable that the entire volume may generate more confusion than clarity for those without prior familiarity with modern herbal therapeutics and certainly hard to see how physicians and health care professionals seeking accessible and straightforward therapeutic information about herbal medicines today could benefit from them at all. The overinflation of this flawed collection of dull official documents as if they were the Lost Ark of all herbal wisdom itself constitutes a tour de force of spin-doctoring by the publishers which requires that the reader first untangle the product from the packaging before trying to make sense of the Monographs themselves.

Taking quantity rather than quality first - the claimed figure of "three hundred and eighty monographs" is misleading. Around eighty of the *Commission E Monographs* are on "Fixed Combinations" that relate specifically to German commercial products, which are irrelevant to the US marketplace. Repetition and duplication are a recurring feature of the monographs, with the inclusion of several duplicates that inflate the total count - for example hawthorn has no less than four monographs - flower, leaf, flower and leaf, and berry. Predictably, the herbs included are largely drawn from the established North European and North East American materia medica. Even for those familiar with these traditions, there are some surprises in the roll call - the inclusion of little used remedies such as loofa, uzara root, and sanicle herb may pique the curiosity of some herbalists, and might be interesting additions were it not for numerous major omissions. Several important herbs originating from non-western materia medica are missing, (e.g., astragalus, gotu kola, schizandra, reishi, and ashwaganda) but the list of absentees from the traditional North European materia medica belies any claim to comprehensiveness. Missing entirely are standards such as *Asclepias tuberosa* (pleurisy root), *Baptisia tinctoria* (wild indigo), *Bellis perennis* (daisy), *Chelone glabra* (balmony), *Chionanthus virginicus* (fringe tree), *Daucus carota* (Queene Anne's lace), *Eupatorium perfoliatum* (boneset) and *E. purpureum* (Joe Pye weed), *Geranium* spp. (cranesbill, herb Robert), *Geum urbanum* (avens), *Hydrangea arborescens* (hydrangea), *Hydrastis canadensis* (goldenseal), *Lactuca virosa* (wild lettuce), *Leptandra virginica* (Culver's root), *Lobelia inflata* (pukeweed), *Medicago sativa* (alfalfa), *Mitchella repens* (partridge berry), *Parietaria diffusa* (pellitory of the wall), *Phytolacca decandra* (poke root), *Piscidia erythrena* (Jamaican dogwood), *Prunella vulgaris* (self-heal), *Prunus serotina* (wild cherry), *Rumex crispus* (yellow dock), *Scrophularia nodosa* (figwort), *Stachys betonica* (betony), *Trifolium pratense* (red clover), *Viburnum* spp. (cramp bark, black haw), *Xanthoxylum americanum* (prickly ash) and *Zea mays* (cornsilk) to name but a few.

A monographed herb is either *Approved* or *Unapproved* by the Commission. There is however a curious limbo category (where herbs otherwise *Unapproved* may pop-up) called *Approved Component Characteristic*. The monograph format changed somewhat over the years and additional sub-categories appear in some monographs without much rhyme or reason. The monographs themselves are strangely terse and truncated, and unsatisfyingly lacking both depth and detail. They contain no information on botany, pharmacognosy, pharmacology, or pharmacopoeial standards - these categories are largely absent, some being covered up to a point in other German official publications such as the DAB (German Pharmacopoeia). Since the monographs are described as therapeutic guides, the absence of information on differential therapeutics, specific indications or useful combinations and formulae is more serious for prospective clinical users.

A few monographs are much longer than most, and with apparent inconsistency, include pharmacological information. Closer examination reveals that these particular

monographs relate to popular commercial German products such as *ginkgo*, *St John's Wort*, *hawthorn* and *echinacea* preparations. A two paragraph monograph on brewers yeast (not a herb at all) is immediately followed by a two page monograph on a proprietary strain of yeast, *brewers/Hansen CBS 5926*. The inclusion of such detail on this unusual product is not readily understandable. Representations from commercial manufacturers were apparently made to the Commission - but details of these or of the consultancy interests and research funding sources of the Commission members are not disclosed. Such disclosures are today considered routine and necessary in scientific publications to allay suspicion of commercial bias.

The brevity of the monographs is compounded by the complete absence of any citations or references to the sources that formed the basis of the Commissioners deliberations on the herbs. These sources are apparently only accessible when legal cases are brought under the German Medicines Act. **The failure to include verifiable scientific primary sources necessarily places the entire Commission E Monograph corpus irredeemably outside the most elementary accepted standards of academic requirements for rigorous scientific publications.** The uninformed reader is thus obliged to accept as an article of faith the veracity of the information in the text. Professor Varro Tyler reassures us in his forward that safety data were reviewed by the Commissioners according to a "doctrine of absolute proof" and efficacy according to a "doctrine of reasonable certainty". Skeptics, reasonably, might prefer to look at a few *Commission E Monographs* on well-known herbs with a solid record of safety and established therapeutic efficacy to test their "accuracy and reliability" for themselves..

Presumably anticipating the need to divert criticism from obvious errors in several key monographs, the editorial Introduction contains lengthy equivocations regarding the monograph entries for *chamomile*, *echinacea*, *eleutherococcus* (*Siberian ginseng*) *ginger*, *ginkgo*, *hawthorn*, *horse chestnut seed*, *sarsaparilla* and *valerian*. The alert reader may wonder why monographs on these much studied popular herbs require such extensive editorial commentary and correction; in fact a closer look at these commentaries highlights the disorienting quagmire of contradictions and interconnected non-sequiturs that in fact characterize the whole volume.

*Chamomile* for example has two Monograph entries, one for *German chamomile* (*Matricaria recutita*), which is *Approved* for gastro-intestinal spasms and inflammatory disease of the GI tract but not for its well known sedative effects and one entry for *Roman chamomile* (*Anthemis nobilis*) which is *Unapproved*. From the point of view of traditional Western herbal medicine, these two remedies are virtually identical and interchangeable. The *Anthemis* monograph describes the risks of Asteraceae allergenicity, but the *Matricaria* monograph does not. Contact sensitivity to daisies, including *chamomile*, has indeed been documented but is not a major medical problem although one much quoted by writers presumably unaware that *chamomile*, due to its well established anti-inflammatory activities is more likely to be a useful treatment for eczema and dermatitis than a cause of it. The point here is that both remedies have similar minimal toxicity and activities, yet Commission E describes one as safe/effective and the other as unsafe/ineffective. This sort of contradiction is a recurrent feature of the monographs. The editorial speculates that the reason *Matricaria* was not approved for its sedative qualities was the lack of available studies at the time of evaluation (1990) by the Commission, and suggests that recent pharmacological studies on apigenin binding to benzodiazepine receptors (BDZ-R)

would justify the sedative effect of *German chamomile*, although it admits that the Commission would in any event have been obliged to not approve it since these studies were not human clinical trials. Resisting the temptation to wonder if these contortions aren't all a bit absurd given hundreds of thousands of people are daily using *chamomile tea* as a mild relaxing nervine without serious anaphylactic complications, the real question that emerges is precisely how were the actions and uses of herbs established by the Commission?

Without citations we are left with an interlocking series of conundrums. Although we are assured that between 100-200 references were reviewed for each herb, it is a well known fact that outside of the top twenty or so herbs clinical trials are lacking for the vast majority of the hundreds of medicinal herbs in the modern materia medica. On the one hand it seems that established clinical indications, and herb actions with significant supportive pharmacological data are variously omitted, overlooked, or *Unapproved*. On the other hand, an action of some description is by definition assigned to each *Approved* herb, most of which *de facto* cannot have been supported by human clinical trials - the stated Commission E gold standard.

For example, dandelion leaf is known by every neophyte herb student as a diuretic. The leaf is considered by herbalists to be significantly more diuretic than the root and is designated as a separate diuretic remedy by various authoritative sources (1). However dandelion leaf is not *Approved* as a diuretic by the Commission but only as a bitter remedy for loss of appetite and dyspepsia. Interestingly the dandelion leaf monograph has an additional section (not in most of the monographs) entitled *Pharmacological Properties*, which are listed as *None Known* - despite the existence of studies on the leaf as a diuretic dating from 1974. The very next monograph (still in the single herb section) is for *Dandelion Herb and Root* combination for which the action is given (therefore approved) as - diuresis. Assigning diuresis to the *herb and root* combination as opposed to *herb* is inexplicable, and unfortunately there is no separate monograph for dandelion root alone, (but it probably would only add to the confusion). This begs the question of why the approved *dandelion leaf* use ignored both established traditional use and putative pharmacological evidence for diuresis, and how the anti-dyspeptic activity was approved in the first place since clinical trials on dandelion leaf are totally lacking. One possible solution that seems to check out after a closer reading of several monographs is that that approved herb actions were often simply derived "theoretically" from the properties of the isolated constituents listed under *Composition of the Drug*.

Constituent compounds are not really detailed by Commission E, except as broad generic classes like tannins, bitters, and saponins. If a herb contains bitters it is simply assigned the action of antidyspeptic. Similarly herbs containing tannins are listed as astringents. Well tannins do astringe, and bitters are anti-dyspeptic in the widest sense of that word but such dissimilar remedies as *bogbean*, *sage*, *dandelion*, *ginger*, *horehound*, *Iceland moss*, *devil's claw*, *yarrow* and many other herbs with a bitter quality are all reduced by the Commission E to the same lowest common denominator - antidyspeptics. Reducing the complexity, variety and number of herb activities and indications to these almost useless generic categories is the inevitable result of applying what might be called a "doctrine of absolute oversimplification". It results in a misleadingly monochromatic picture of diverse remedies, and one which is of no conceivable help to those seeking accurate information on their differential therapeutic usage, whilst violating the foundational viewpoint of

herbalism that considers medicinal plant activities to be a synergistic gestalt that is greater than the mere sum of their isolated constituents.

The Commission E characterization of the important and popular *Echinacea* spp. is extraordinarily confusing. Three species of *echinacea* are commonly used in herbal medicine, *E. angustifolia*, *E. purpurea*, and *E. pallida*. Of these, the Commission approves only the aerial parts of *E. purpurea* and the roots of *E. pallida*. *E. purpurea* root is in the limbo class Unapproved Component Characteristic, while *E. angustifolia* herb and root is Unapproved in the **single** herb section although the actual Monograph is titled "*Echinacea Angustifolia herb and root/Pallida herb*". The muddling of different plant parts and different species of *echinacea*, approving some and not others is simply absurd, not to mention the quixotic logic of claiming that "ineffective" (unapproved) *echinacea* parts or species have the same side effects and contraindications as the "effective" (approved) ones, apparently implying that a herb can be contraindicated as a result of not doing something. It is hard to know what the inexperienced reader is expected to make of this mess, particularly since the only two Approved *echinacea* monographs refer to those preparations least available in North America, where popular usage traditionally centers on *E. angustifolia* and *E. purpurea* root. It seems that Commission E was obliged by its own criteria to approve only aerial *E. purpurea* (historically the favored species in Germany mainly for economic and horticultural reasons and hence the only preparation that has been extensively studied there). But it is patently not true that *E. angustifolia* root is ineffective or unsafe, and nonsensical to maintain that only the aerial parts of *E. purpurea* are safe and efficacious as opposed to the root of the same plant. It is equally obscure to claim that *E. pallida*, generally regarded by Western herbalists as the minor player of the *echinacea* trio, is the only acceptable root preparation in opposition to *E. purpurea* and *E. angustifolia*.

The information on *echinacea* therapeutics is also misleading. For a start, confusion is compounded by the fact that parenteral preparations of *E. purpurea* were available in Germany at the time of monograph publication. Hence we are warned about side effects due to intravenous use of the herb which do not apply even in Germany today since this use is now illegal there also - although presumably this does explain why the pharmacological action of *echinacea* in the appendix is bizarrely listed as "temperature elevation". The Duration of Administration for *echinacea* is given as "not to exceed eight weeks. This much repeated fallacy, often parroted by "expert" publications on herbs (2), appears to have its origins in a misinterpretation of a single study - critically reviewed by Bone (3) - and is unfortunately now gaining currency amongst orthodox physicians citing the authority of the Commission E position. *Echinacea* use is also stated to be contraindicated in "progressive systemic diseases" (*E. purpurea*) and autoimmune conditions (*E. angustifolia*); examples given being "collagenosis" (ie the connective tissue disorders or CTD's - such as lupus and rheumatoid arthritis), multiple sclerosis and tuberculosis. **The contraindication of *Echinacea* spp. with autoimmune conditions has no published basis in the medical literature nor in databases of pharmacovigilance or in adverse reaction reports.** This fact was emphasized by leading *echinacea* researchers, including Dr Rudi Bauer, at two recent *echinacea* conferences in the USA (4). It is presumably deduced from a simplistic conception of CTD's resulting from "hyperactivity" of the immune system which therefore should not be further "stimulated". In fact *echinacea* is used for extended periods with great effect in many long term chronic and autoimmune conditions by professional herbalists. Whether there will emerge in future specific instances in which certain immune mediated conditions might

be contraindications for *echinacea* is unknown - the current status of medical literature and clinical experience to date overwhelmingly suggests the opposite is true (3). The contraindication in tuberculosis is also unjustifiable. *Echinacea* was an established effective treatment for tuberculosis used effectively by the Eclectics prior to the discovery of streptomycin. Ellingwood's "monograph" on *Echinacea* (5) runs to nine pages of dense clinical detail - the Eclectic physicians were meticulous clinical observers and they would have documented any problems if they had seen them. Finally, and of more contemporary relevance, the Commission E suggestion that *echinacea* is contraindicated in HIV and AIDS is also without published foundation. *Echinacea* has been used by practitioners for both opportunistic infections and the primary pathology in HIV although published clinical studies are limited (6). Overall, the Commission E claims of limitations of use for *echinacea* are based on errors and speculation without any clinical relevance or foundation.

It would be fruitless to continue analyzing each monograph in the same vein - the same issues recur throughout. The essential point is that the Commission E Monographs simply do not measure up to the claims made about their accuracy or relevance. It is of course quite possible that the former Commission members themselves might consider the publisher's claims about this edition to be inappropriate. Most revealing in this connection are the candid personal communications from Professor Heinz Schilcher quoted in the introduction. Prof. Schilcher was the Vice-president of the Commission and in response to a query from the editors regarding the apparent lack of scientific substantiation for the Commissions' claimed risks of *sarsaparilla* use, Schilcher replied that the cautions made by the Commission were actually based on **"a theoretical standpoint and we have in Germany little experience with Sarsaparilla"**. This extraordinary admission leaves one wondering how many other conclusions the Commission made based on theoretical speculation as a surrogate for the "doctrine of absolute certainty".

Dosage is a crucial matter in administering herbal medicines safely and effectively. The *Approved* monographs contain dosage information, which in line with German practice, is mostly given in terms of dried herb for aqueous infusions or decoctions - generally in the range of 2-10 gms daily. For certain herbs with more potent drug-like constituents (such as *Ephedra*) maximum daily doses are given appropriately in terms of mg calculated "as mg active constituent", such as "total ephedrine alkaloid". The problem for potential users of the Commission E in the US is that hydroethanolic extracts, (usually tinctures, or solid preparations derived from such extracts) often derived from *fresh* rather than *dried* herb material, are the form of herbal remedies commonly used in clinical practice - not teas. Unfortunately conversion between dried herb infusion and fresh plant tincture data is not straightforward. Equally, the trend in North America toward use of standardized herbal material is not easily related to the infusion based dose data in the monographs. Finally where figures are occasionally given for tinctures and fluid extracts, they do not always correlate. For example the single dose for valerian tincture (herb/menstruum ratio not stated, but usually 1:5 in Europe) is given as 1-3ml, but the single dose for a fluid extract (Fluid extracts are 1:1 and hence more around 5 times more concentrated) is given 2-3ml whereas it should obviously be less rather than more.

Finally, some mention should be made of the numerous cross referenced appendices added by the publishers apparently "to make this publication as useful as possible, particularly to health professionals and researchers". The Commission E Monographs could easily have been

published in less than 200 pages. Prof. Schilcher's *Phytotherapy in Paediatrics* (7) reproduces 100 of them quite legibly in 40 pocket size pages, yet the present edition weighs in at the coffee table heavyweight category of over 650 pages without a single illustration due to the copious introductory and end matter (an astonishing total of eight therapeutic indices, four chemical and taxonomic indexes, eleven appendices, lengthy excerpts from regulatory literature and a long editorial introduction). Most of the appendices underline the inappropriateness of the text as a practical reference manual for health professionals. For example, searching under pharmacological actions for something useful such as *Prostaglandin Synthesis Inhibitors* - one finds the sole entry of nutmeg! (In fact *Unapproved* because of side effects of "psychic disturbances"). Under *high blood pressure* the only herbs listed as *Approved* anti-hypertensives are onion and two cardiac glycoside containing remedies, lily of the valley and squills. Disregarding the medically bizarre suggestion that cardiac glycosides are indicated for hypertension, and ignoring the failure to include any of the documented herbal hypotensives, one could conceivably do worse than use onion and nutmeg to treat a hypertensive headache - there is after all a long folk tradition of using "kitchen remedies" in herbal medicine - but this hardly amounts to authoritative scientific information on herbal therapeutics for modern healthcare professionals.

More disturbing is the Appendix of interactions of herbs with conventional drugs. The information here omits potentially important interactions such as concurrent use of PAF interactors and fibrinolytic herbs like *garlic* and *ginkgo* with warfarin/coumadin. The index of chemical constituents is *de facto* uninformative since the monographs only contain rudimentary constituent information in the first place. The general glossary, including medical terms, provides reassurance for the healthcare professional presumably by now disoriented by grappling with the book. There they can confirm that antifungal means "destroying or combating fungi" , and a laxative is an "agent having the property of loosening the bowels." The publishers have even included a weights and measures conversion table - almost unbelievably, even this offering is useless for practitioners needing that crucial conversion of US fluid ounces to Metric Liquid measures which is missing from the tables. The final addition is a section of excerpts from the European Regulatory literature. While these may be of some interest to a minority of herbalists, they are hardly relevant to busy clinicians who are usually more preoccupied with treating the patient in front of them than with studying comparative regulatory bureaucraties.

What does all this mean? Ultimately, the German Commission E Monographs themselves are, by any considered judgement, a marginal contribution to western herbal therapeutic literature, adding little to our knowledge and understanding. They are out of date, containing errors, omissions and speculations as well as biases due to cultural factors that render them the least useful of any of the monograph collections currently proliferating in the literature. Official herbal monographs are invariably produced for political reasons, usually as a result of regulatory pressures by governments and related agencies interacting with scientific authorities, industrial manufacturers, relevant professional associations, often with a wary regard to the groundswell of popular public support for the right to use herbal medicines (voters). The German Commission E was no exception.

In the USA, the situation is very different. Interested parties are jockeying for position in a regulatory flux dominated by untrammelled pursuit of profit by manufacturers large and small in the current Klondike like explosion of the herbal market place. The absence of a coherent and effective professional herbalist practitioner lobby in the situation is conspicuous. Meanwhile mainstream orthodox medicine intensifies its attacks on the dangers of popular herbalism whilst ersatz sub-factions such as pharmacists are arrogating their own "scientific" version of herbs as pharmaceuticals. The American Botanical Council clearly considers it has a role to play as an authoritative "independent" pro-herb voice in this scenario, acting as a mediator between the industry, regulatory authorities and sections of the medical community, whilst assuming an authoritative "educational" stance to its members and the general public. It is hard not to conclude that the inflated presentation and packaging of *The Commission E Monographs* in this ABC edition has much to do with the agenda of lending an aura of credibility to their self appointed role. The introduction to the book concludes that the "*Commission E system can provide an excellent model for regulatory reform, in the United States and possibly other countries, by providing a rational process for reviewing herbs and phytomedicines for their safety and efficacy*". Let us hope not. Unfortunately some physicians and pharmacists are already beginning to cite Commission E myths as immutable truths (8); the specter of the monographs being used to justify malpractice litigation may yet materialize. But the real problem facing herbal medicine which will become critical in the new millennium will be its capacity to maintain its core philosophical principles in the face of mainstream attempts to incorporate its materia medica and therapeutics within a reductionist biomedical framework. Herbal products may be a huge market in the US, but paradoxically knowledge of herbal medicine is almost non existent. The charge has to be laid against the publishers that despite their best intentions their elaborate packaging of the *Commission E Monographs* as the last word on safety and efficacy of herbal therapeutics may well do more harm than good to the cause of promoting herbal medicine in the United States. Time will tell.

Are the *Commission E Monographs* in fact "a must for every health professional interested in practicing natural medicine"? Those readers prepared to pay the heavy cover price can decide for themselves, but the answer here is a resounding negative. Whilst the international "monograph marketplace" is rapidly expanding, the prize for both pharmacopoeial and therapeutic detail among the crop of current monographs should probably go to the American Herbal Pharmacopoeia series (9) although physicians and other healthcare professionals seeking a comprehensive work on herbal medicine may do better with the excellent new textbook by Mills and Bone, two accomplished practitioners of modern phytotherapy (10). For a two hundred dollar addition to the library this reviewer's choice would still be *King's American Dispensary* (11). The 1898 edition was updated by Eclectic clinician Harvey Felter and the brilliant pharmacist John Uri Lloyd - over 2000 pages with a wealth of experience and therapeutic information that is of continuing relevance to modern clinical practice and which also represents one of the main strands of vitalist herbal therapeutics which from which publications such as the *Commission E Monographs* are far removed.

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- (1) For example, in Bradley P (ed.) *British Herbal Compendium*, Vol.1, BHMA, Bournemouth.1992, where *Taraxaci folium* is identified as "diuretic and choloretic" and *Taraxaci radix* as "bitter, cholagogue and laxative". pp73-77
- (2) For a recent particularly tendential example of this genre, see Miller LG, Murray WJ, eds. *Herbal Medicinals, A Clinician's Guide*, Pharmaceutical Products Press, NY, 1999
- (3) Bone K, *Echinacea: When should it be used?* *Modern Phytotherapist*, 1997. 3(3):17-21.
- (4) Personal communications: Cascade Anderson Geller ; Ed Smith, Oregon, 1999.
- (5) Ellingwood F, *American Materia Medica, Therapeutics and Pharmacognosy*, Eclectic Medical Publications, Portland 1983.
- (6) Berman S et al. Dramatic increase in immune mediated HIV killing activity induced by *Echinacea angustifolia*. *Int Conf AIDS*. 1998;12:582 (abstract no. 32309).
- (7) Schilcher H, *Phytotherapy in Paediatrics*. Medpharm, Stuttgart, 1997
- (8) See for example, Lawrence Review of Natural Products (passim) and Miller LG, op. cit.
- 9 The American Herbal Pharmacopoeia: POB 5159, Santa Cruz, CA. 95063.
- (10) Mills S, Bone K. *Principles and Practice of Phytotherapy*, Churchill Livingstone, Edinburgh, 2000.
- (11) Felton HW, Lloyd JU, *King's American Dispensatory*, 2 vols, Eclectic Medical Publications, Portland 1983.