

Lecture to the Society of Cosmetic Scientists

"Naturals" 1992

I was going to talk today on the clinical study to investigate the aphrodisiac properties and sexual effects of alcoholic extract of damiana. I regret to say that I have not managed to finish this work, mainly because I was getting too tired and partly because I kept falling over. I will therefore give the sermon as printed on the hymn sheet.

Claim substantiation - 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.

It was with great pleasure that I accepted the invitation to speak at today's symposium. Now, I am not a botanist, nor a pharmacist, nor a pharmacognocist, I am not even a biologist - which makes me the ideal candidate to speak on plant extracts. But seriously! As a chemist working closely with a marketing team, it is vital to know and understand the materials that one is working with, and I am sure that many of the extract suppliers here today will remember some of our little chats on herbs and plant materials.

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, Culpeper, Discoriodes, Gerrard and gross exaggeration. For this reason it comes as no surprise that the medical fraternity views the alternative medicine with a degree of scepticism. One wonders at their thoughts on Aromatherapy or Bach Flower remedies.

But we digress. 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 all of us to achieve an honest balance between the claimed benefit, the active dosage, and the substantiating evidence.

So let us look at a typical product development and the types of problems that we could run into.

Technically we could argue a very strong and plausible case for Bladderwrack, but to Mrs. Smith of Stepney wrestling her screaming offspring and wonky trolley around the crowded supermarket, 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 for rheumatism or rheumatoid arthritis might well be overlooked because little Dwane has careered off and demolished the baked bean display, whilst Charlene has emptied the whole box of Napisan out into the frozen kippers.

The first encounter is usually with the marketing department, who know everything there is to know about anything, until about three months from the product launch date - when amnesia sets in.

Let us just suppose that we have chosen Chamomile as a good technical starting point for a hand cream and we are going to have a discussion with the marketing manager. He has forgotten to write his pack copy, the designer is waiting to do the artwork and the printer has his foot on the

clutch of an eight colour Gravure printing press which, to keep the engine running, costs more than a Jumbo jet. Panic has set in!

We start by running through alternative names and country names. He doesn't like the latin name **Anthemis nobilis** and he doesn't like **Chamaemelum nobile** because that would be too "Apothecary".

He doesn't like common chamomile, because Fortnum and Masons would not sell anything common, so why should we?

He dislikes the Spanish Chamomile, because of the fuss over Gibraltar.

He couldn't have Belgian Chamomile, because the French don't like the Belgians, and we cannot have English Chamomile, because the French don't like us either. Russian Chamomile is definitely out, because nobody but nobody likes the Russians - so much for Glaznost!

He doesn't like the idea of garden chamomile, because it conjures up compost and Percy Thrower and Low chamomile sounds so depressing. Ground Apple gives him the pip and Whig plant has him tearing his hair out. A double chamomile might have cheered him up a bit, but it didn't.

We propose **Matricaria Camomilla** or German Chamomile, but the French don't like the Germans either. He doesn't like Sweet False Chamomile, and anyway why should we tell lies? We explain that though it looks like chamomile, that it isn't really chamomile and should be really called **Matricaria recutita**.

The marketing man, by this time, looks confused, weary and quite cross. We considered it prudent not to mention Hungarian Chamomile, despite the fact that they seem to upset the Russians. He doesn't like single chamomile and Scented Mayweed doesn't seem to cheer him up very much.

He retorts (rather abruptly) that he is fed up with Stinking Chamomile, we respond (perhaps a little sarcastically) that this is **Anthemis cotula**.

It might well be that his hair awry and flaying arms suggest wild chamomile and we suggest it - an idea that is immediately accepted with delight.

Of course, we were by no means finished, we could have mentioned:-

Anthemis tinctoria - the Ox-eye Chamomile or Golden marguerite

Anthemis SanctiJohannis - the St.John Chamomile

Anthemis cuparicaria - the mat forming chamomile, or even

Anthemis arvensis - the corn chamomile, but there is no need for the technical department to appear smug...is there?

We now find ourselves with a dilemma, indeed a whole series of dilemmas, which are best summarised by the Old Chinese saying:-

"Man who eat suppository in morning, have more than a sore bottom in the evening".

This wise saying applies to any herb or plant extract, and 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.

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.

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 the vine leaves, though I understand that the Irish are working on it.

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. Perhaps the remedy called for a tisane or tea to be brewed.

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 we must consider the source of our chamomile very carefully, because there are some unscrupulous suppliers who adulterate their oils with cheaper oils such as cedar or turpentine oils or with copaiba or milfoil oil. Of course, you can purchase some real bargain basement rubbish by distilling a mixture of turpentine and lemon oil over chamomile. The sensible solution is to be certain of a good certificated grade of oil and we might well consider looking for the AROMARK grade of material.

Our search for the truth has had a great number of preconditions before we could start to look at the properties of chamomile. So now let us see what chamomile does.

From a marketing point of view 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 her lungs up 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 marketing manager might take some comfort from the folk lore of the Romanian gypsies who used it to prevent nightmares.

I confess that I was surprised to find 108 different claims from some 24 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. I don't want to read the list, you will find it in the preprint.

If one looks closely at the number of times a particular property was mentioned and ranks the different claims then a definite pattern emerges. I would hasten to add that some references make no distinction between the two varieties of chamomile.

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, when 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 96 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.

As a matter of interest, if one looks at the degree of accuracy, then it is those books heavily biased towards the serious herbal or medicinal areas that score most highly. Books that claimed dozens of attributes that were not substantiated in other texts, tended to score less successfully in the overall ranking.

Though the evidence of cheating or cribbing from each others' books has been noticed in some cases, the data on chamomile is enormous, and therefore there is less need to "borrow" information. In an attempt to avoid any duplicity, information was selected from the USA, Holland, France, Great Britain and Germany.

There is no doubt in my mind that chamomile 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:-

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

I would also recommend to you some excellent studies carried out by Dragoco on the efficacy of bisabolol.

At the time that I was putting this lecture together (over coffee this morning) I wrote down that chamomile would not stop convulsions, nor would it be much help as an insect repellent. On the subject of convulsions, I was surprised to read in the *Pharmaceutical Journal* July 1984, an article by Drs. Philipson and Anderson which quoted this piece of folk medicine though it did recommend the core groups selected by this study for pharmaceutical use.

This places us in a bit of a quandary, since if a piece of folklore is unchallenged by pharmacognocists - is it because they are filling in the historical background or is it because they believe the statement as fact? Their reference was part 1 of the 1979 *British Herbal Pharmacopoeia*, and yet in the 1983 edition of this book, the reference to convulsions has disappeared. The reference to convulsions in Mrs. Grieve for example appear for German Chamomile and not for Roman Chamomile as just discussed. I think you will agree that the search for the absolute truth is very difficult.

Speaking from personal experience I have found that Chamomile as an aid to giving up smoking to be of negligible value and I am still an antisocial member of that dying breed of smokers. BUT say that I had found chamomile to help and reported the fact in today's preprint - how long would it be before that personal opinion became not so much a personal experience but a reported scientific fact, distorted by the Chinese whispers effect - i.e. from not going back to the original scientific paper as a reference.

It is through authors gilding the lily or reporting their own personal findings as if it were corroborated scientific fact, that the truth becomes distorted. The end result is a complex tangle of facts, fiction and legend (from Dioscorides to Culpeper) that destroys the confidence and value of plant extracts, taking the knowledge out of the hands of experts and into those of quacks and crackpots.

I would just like to give you an example or two of other herbs and plant extracts, in order that you can assess how difficult it is to main credibility.

Horse Chestnut - In European folk lore, carrying a conker around in one's pocket is thought to prevent and cure arthritis. No comment.

Celandine - The gypsies mentioned in the *Concise Herbal by Law*, put celandine in their shoes and kept it there while they walked to keep their feet fresh. In the *Healing power of herbal teas*, one is warned that celandine is corrosive. In John Lust's *Herb book*, we read that we can get skin poisoning from handling the crushed plants and Mrs. Grieve tells us that the plant is an acrid and powerful irritant. One can only conclude that these gypsies either have the skin of Desperate Dan or some of the worst limbs going.

Sage - We read that it should be taken one month before childbirth in order to help relieve labour pains. We also read in three references that it helps to stop lactation once the child is weaned. This is contradicted by another reference saying it is toxic and another saying that it should be avoided during pregnancy because it stimulates the muscles of the uterus.

Lavender - Dr. Valnet states that internally it is antispasmodic, analgesic, antiseptic, bactericide, pulmonary antiseptic, cholagogue, choloretic, diuretic, sudorific, tonic, restorative, cardi tonic, and calmative for nerves of the heart, antirheumatic, increases gastric secretion, intestinal

stimulant, antimigraine, vermifuge, emmenagogue, hypotensive.

Externally, it is cicatrising, antiseptic, disinfectant, parasiticide, insecticide, antivenemous, regulator of nervous system.

Internal use, the indications are for irritability, spasm, insomnia, eruptive fevers, infectious diseases, melancholia, general physical and mental debility, anxiety, respiratory ailments, asthma, spasmodic cough, whooping cough, influenza, bronchitis, tuberculosis, pneumonia, oliguria, rheumatism, infantile debility, gastric atony (sluggish digestion), intestinal atony (flatulence), migraine, vertigo, hysteria, after effects of paralysis, nervous crises, enteritis, diarrhoea, typhoid, intestinal spasm, cystitis, gonorrhoea, scrofulosis, chlorosis, intestinal parasites, scanty menstrual periods, leucorrhoea, hypertension (high blood pressure).

Externally the indications are for wounds and sores of all descriptions, simple, atonic (leg ulcers), infected, gangrenous, syphilitic, chancres and anal fistulas, chronic perineal and peri-anal eczema, leucorrhoea, burns, pulmonary diseases, sinusitis, influenza, bronchitis, acne, insect bites, animal and adder bites (first aid). Lice, scabies and alopecia.

Potter has a slightly less complicated view, and I quote "stimulant, carminative. Seldom used in medicine." He does, however, go on to say that it was made into sachets as a moth repellent and that in 1387 some cushions stuffed with lavender were made for King Charles VI of France.

Finally, Dr. Valnet states that "the essence has a bactericidal power stronger than that of pure eucalyptol, this is probably due to the presence of a small quantity of ozone produced by the oxidation of the phellandrenes and aromadendrenes."

1979 Mr. Tisserand states that "its antiseptic efficacy is partly due to the formation of ozone which takes place on oxidation of some of its terpenes."

1931 Mrs. Grieve states "the medicinal eucalyptus oil is probably the most antiseptic of its class, especially when it is old, as ozone is formed in it on exposure to the air."

The possibility of producing ozone from any terpene be it phellandrene or aromadendrene by a process of oxidation is chemically unrealistic. Ozonolysis requires very stringent conditions and these are not to be found by simply exposing the product to air.

None of the three books that I have mentioned refer to an original reference and it is therefore impossible to study the mechanism in any detail. In fact, one wonders where the ozone rumour started.

So to **conclude**

I have no doubt that there is a lot of truth written about herbs and plant extracts. It is common knowledge that there is aspirin in willow, digitalis in foxgloves, mucilage in acacia (or gum arabic) and azulene in chamomile.

We have looked at the parameters that influence the efficacy of the plant extract and stressed the

importance of separating fact from folklore.

It is a great worry that man is destroying the natural habitat of many of these plants and with the spread of "westernisation" there is a great danger that most of the folklore and many of the local remedies will be lost, before they can be evaluated by pharmacognocists and the medical profession.

Who knows what wealth and other wonders Nature has provided in her great wisdom.

Judging by the interest that we, as a group of people, are showing today and the growing movement towards a more "green" and environmental philosophy. I believe that we will discover more of Nature's secrets and that there will be greater collaboration between all disciplines in order to establish the truth.

I don't think that I have answered many questions, I may have created more questions than answers, whatever the outcome, I thank you for listening.