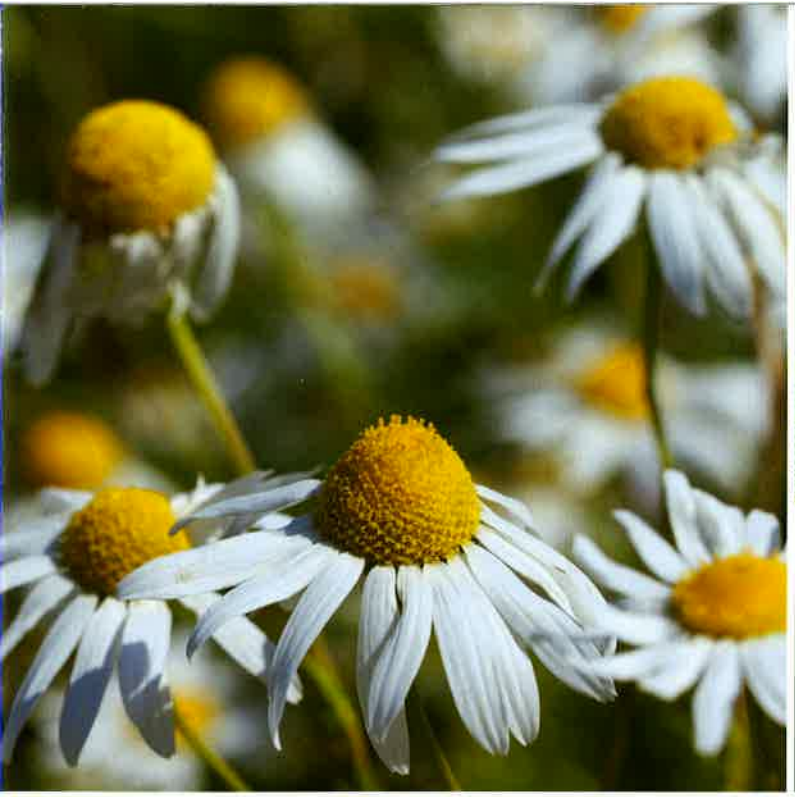
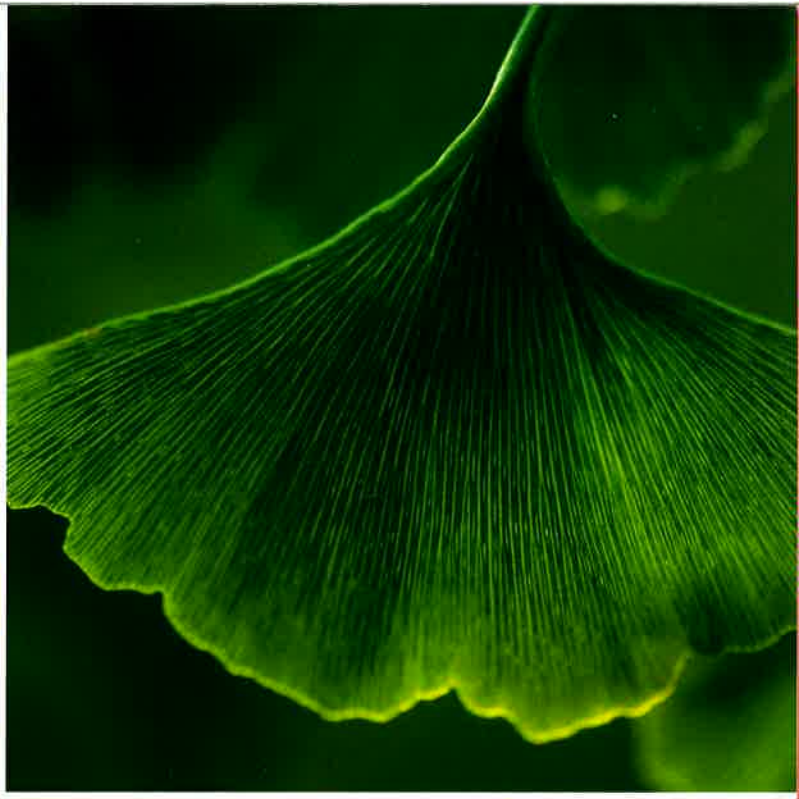

Is standardisation, standardised?

by Ian Breakspear, MHerbMed (USYD) ND DBM CertPhyto FNHAA

The Herbal Extract Company of Australia

THE landscape of herbal medicine today is quite different to herbal medicine as practiced a few centuries ago, or even a few decades ago. One of the most obvious changes in Western herbal medicine has been the introduction of more technology in the extraction of plant medicines resulting in new types of preparations – the most visible of which is the "standardised" herbal extract.

I say "standardised" in inverted commas because there is not much which is standard about "standardisation", and there is considerable confusion surrounding the term.

What are Standardised Herbal Extracts?

Standardised extracts seem to be everywhere. Many over the counter products are standardised, as are a number of practitioner-only products. But what does it mean?

Currently, in the Australian context, the definition of standardisation is far from clear. *The Australian Regulatory Guidelines for Complementary Medicines*[1], published by the Therapeutic Goods Administration (TGA), indicates that a standardised extract has a defined amount of a constituent (or a group of similar constituents). You often see this when you pick up a product and read something like:

> *Hypericum perforatum* extract equivalent to 1800mg of dry herb standardised equivalent to 990mcg of hypericin.

It is quite acceptable for some manufacturers to blend raw material batches, blend different extracts of the same herbal material, or even add different amounts of excipients in order to achieve this level of hypericin. In reality this situation would probably be more accurately described as "quantification" rather than standardisation, yet confusingly the term standardisation is used on product labels and information.

Quantification to one chemical, or group of chemicals, can be misleading in terms of the therapeutic benefit of the product. Looking at the Hypericum example, there is evidence that the antidepressant activity of St John's Wort is due to more than just hypericin. Research indicates that various flavonoids (see figure 1), and also hyperforin[2,3], contribute to the efficacy of this herb.

As one journal paper states ...

> "It would seem, then, that to standardize extracts against hypericin content would be truly meaningful only if the ratios of the other bioactive compounds to hypericin remain relatively constant from batch to batch."[2]

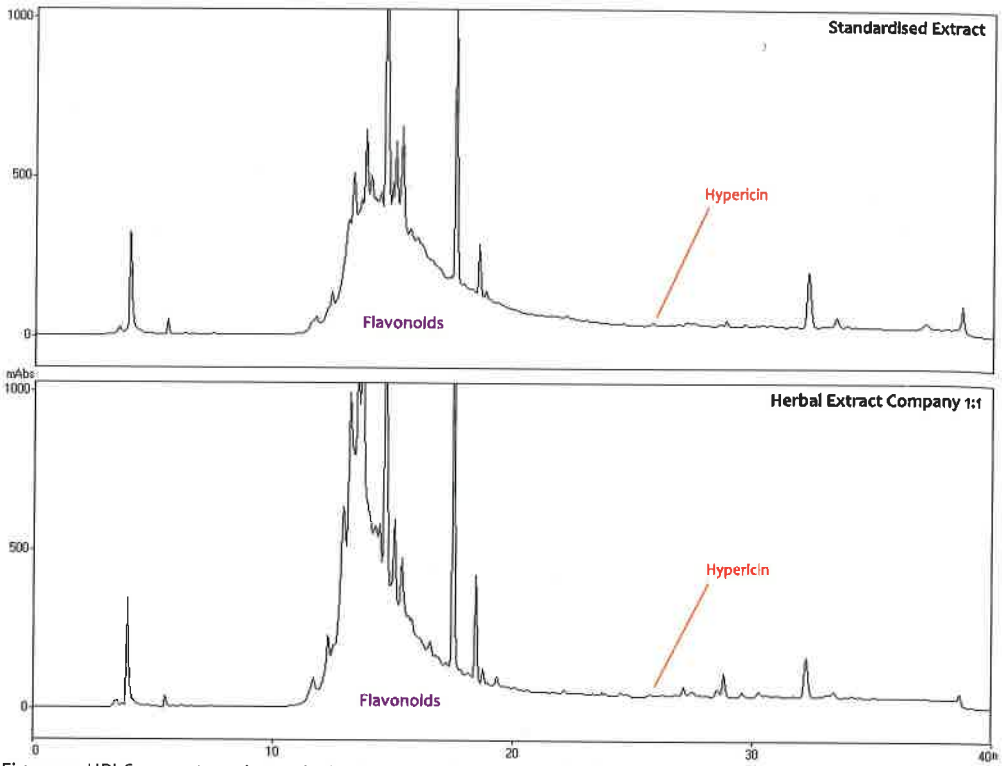

Figure 1: HPLC comparison of a standardised extract of St John's Wort (top) with the Herbal Extract Company's 1:1 full spectrum extract of St John's Wort (below). The chromatogram shows how processing to achieve the desired hypericin content has had a subtle effect on the natural flavonoid balance.

Standardisation Does Not Always Equal Consistency

It is very informative to quickly survey the ingredients, and label declarations, of various similar herbal products on the Australian market. Continuing with the example of St John's Wort, you can find a product containing extract equivalent to 1800mg of dry herb and standardised to 990mcg of hypericin, per tablet. You can then continue looking and find a different – but also "standardised" – tablet containing extract the equivalent of 2700mg of dry herb and 1370mcg of hypericin.

Looking at another commonly standardised herb – *Silybum marianum* – we can pick up a tablet containing extract equivalent to 14700mg of dry fruit standardised for silybin 168mg, or a different tablet containing extract equivalent to 7200mg of dry fruit and standardised to silymarin 140mg.

It is quite obvious that standardisation does not mean consistency between products. The same herb can be "standardised" for different amounts of constituents between different product brands, and even different constituents.

"Standardisation" Does Not Always Equal Clinical Efficacy

Here we enter another minefield. Many people equate standardisation with clinical efficacy. Yet the TGA does not consider clinical efficacy in the context of standardisation. Few standardised products on the Australian marketplace have clinical trials to support their claims – they "borrow" their claims of efficacy from research done on other standardised extracts of the same herb, or "borrow" it from the traditional use of the herb.

If I wanted to bring a standardised St John's Wort product to market, I would need to look for evidence to support the therapeutic claims I want to make. A very good paper was published by the *British Medical Journal* in 2000 which concluded that ...

> "This *Hypericum perforatum* extract is therapeutically equivalent to imipramine in treating mild to moderate depression, but patients tolerate Hypericum better."[4]

I could claim that my standardised Hypericum product was useful for stress and mood disturbances by making reference to this research paper. Yet this clinical trial was done on a very specific extract of Hypericum called Ze117. In essence I am using evidence from research done on one very specific extract, and applying it to another type of extract where the only real similarity is that both products came from the same plant species.

It could easily be argued that, given the quite different extraction process required to produce some standardised extracts, "borrowing" from the traditional evidence is not really evidence at all. For example most standardised St Mary's Thistle extracts are highly concentrated, with a strength between 40-70 times the original herb. The result of concentrating to this level is a chemical profile which is significantly different to the original dry seeds. Yes some constituents remain the same, but the broad chemical profile is quite different. Traditional evidence on the activity of simple alcohol and water extracts of the seed is arguably not applicable to such a highly concentrated and selective extract.

The Applicability of Standardisation

Medicinal plants are chemically complex medicines. They cannot be compared directly with other types of medicines such as isolated vitamins, or isolated pharmaceutical chemicals, which are far simpler both chemically and pharmacologically. Indeed it is one of the tenets of modern herbalism that chemical complexity is what confers the clinical benefits we see in practice – especially with chronic and complex diseases.

It is this very complexity which makes it difficult to determine therapeutically active constituents. Whilst we may know quite a bit about the natural chemicals found in herbs like Meadowsweet or Dandelion, it is a whole different matter trying to determine which are the most important therapeutically. And without this, it makes it next to impossible to standardise an extract for actual active chemicals. Even if we look at St John's Wort, where it was thought that the primary active constituents responsible for the antidepressant action were hypericin and hyperforin, we now find that an extract with both these chemicals removed is still active[5].

Full Spectrum Extracts – Galenical Herbal Medicine

The beauty, and the benefit, of the chemical complexity of herbal medicines brings us back to the origins of herbal medicine. The recognition that the whole is greater than the sum of the parts. When extracted in a balanced way, the synergistic activity of all the constituents allows the key compounds to work effectively.

When we talk about the whole, we need to think of not only the final chemistry of the herbal extract, but also the quality of the original raw material. It looks impressive to declare certain constituents, but if it takes a lot more herb to yield the desired level of standardised chemicals, then one needs to question either the quality of the raw material or the efficiency of the extraction.

Quality should be about starting with consistently good material, then consistently applying an efficient extraction method which itself is consistent with the evidence for that medicine – traditional or scientific. It should be about ensuring an extract which has a total chemical profile similar to the starting material, so that they truly mirror the complex matrix of chemical compounds in the original plant material.

As a herbalist I believe this to be the basis of efficacious herbal medicine. It is the principle which should guide the production, and the analysis, of all herbal medicines. To simplify the discussion to single chemicals and whether a product is "standardised" or not, is to ignore the weight of both scientific and traditional evidence which tells us that herbs are not simple. Herbs are complex and should be respected and valued for that complexity, whether they yield their secrets to phytochemical analysis or not.

Are standardised extracts bad?

Not necessarily. Some herbalists argue that anything which alters the natural chemistry of the plant is bad but any extraction, even the simplest extraction of making a herbal tea, alters the chemical profile to some degree. This is the nature, and indeed the definition of extraction, and it is not inherently "bad". If you know exactly which chemicals provide the majority of the therapeutic activity, and they are relatively few in number, then standardisation by chemistry may be useful. However for the vast majority of commonly used herbs, such as Dandelion root, Meadowsweet, Astragalus, Hawthorn, and many more, this is simply not the case. The least amount of processing of a natural material will give a better outcome.

Standardisation can introduce many more handling, and processing, steps which alter the natural character of the original natural material. Keep in mind that a common side effect of some methods of standardisation is the inadvertent concentration of impurities such as heavy metals, pesticides and aflatoxins.

Are standardised extracts better?

Not necessarily. When you boil down all of the jargon, and claims, and marketing hype, the end point should be about helping the patient. Giving them a herbal medicine which is going to get the job done. And whilst the perception is that "standardised" extracts are more efficacious, there are very few cases where the evidence supports that perception. Standardisation is not a marker of quality or a guarantee of potency.

If I don't use standardised extracts am I being irresponsible?

Not at all. Herbal medicine is far older than the modern concept of "standardised" extracts. To claim that if you don't use standardised extracts you are not giving your patient the best care is to ignore the rich history and tradition that is herbal medicine. The vast majority of the history, and traditional use of herbal medicine, is based on herbal extracts with a full spectrum phytochemical profile, not the use of extracts quantified or "standardised" for specific chemicals.

I'm sure the herbalists of yore, the Culpeper's, the Ellingwood's, the Felter's, and all of those who have gone before us, would take issue with the idea that "standardised" extracts are the only way to provide quality herbal care.

If a herb isn't "standardised" then how can it's quality be determined?

Measuring for one single chemical in a plant is relatively easy. Looking at the overall chemical profile, the balance of a number of different constituents, can sometimes be a bit harder. But it is this method which can better convey whether an extract is full spectrum – whether it carries a chemical profile which is close to the original material.

Quality is reliant on the herbal extracts being manufactured to a consistent standard. This means the entire manufacturing process is controlled, "or standardised", and there are consistent and documented processes, and standards, throughout every step, including adherence to Good Manufacturing Practice and Good Laboratory Practice. In this framework, The Herbal Extract Company of Australia ensure quality through evaluating the chemical profile of each extract, and comparing it from batch to batch, to achieve a very high degree of consistency.

And taking a step back in history, to before the advent of modern industrial analytical chemistry, quality was determined by factors such as where the plant was grown, when it was harvested, and the smell, taste, colour and texture of the raw material. These factors are just as important today as they ever were.

Summary

The quality argument goes far deeper than just "standardisation" or the quantitative declaration of certain chemicals. Would you be impressed if you went into a fruit shop and suddenly found a tub of bananas with labelling saying they were standardised for 480mg/kg of isoamyl acetate? Probably not, because you are quite aware that there is far more to a banana tasting good, and smelling good, than just isoamyl acetate.

Quality in herbal medicine is a full spectrum concept, and needs to reflect and honour the chemical complexity that are our herbal medicines.

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Biography

Ian is a herbalist with 17 years of clinical experience and 15 years of teaching experience. He holds a Masters of Herbal Medicines from the University of Sydney's Herbal Medicines Research & Education Centre, as well as his clinical qualifications in herbal medicine and naturopathy.

Ian is currently the Program Manager – Natural Therapies, at Australasian College of Natural Therapies, and prior to this headed up the Herbal Medicine faculty at the University of Western Sydney for 6 years. He lectures at postgraduate seminars around Australia and internationally, is published in Australian and overseas herbal medicine journals, and sits on the peer-review panel of the *Australian Journal of Herbal Medicine*.

Ian's passion for real herbal medicine led him to join the Board of Directors of the National Herbalists Association of Australia (NHAA) in 2001 and he spent 8 years serving in a voluntary elected capacity, culminating in the position of Vice-President from 2005-2009. In 2006 Ian was nominated and accepted for a Fellowship of the NHAA in recognition of his contribution to the Association and herbal medicine in Australia.

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