



## IS NATURAL BEST?

Consumers are becoming more aware of the positive issues around natural and organic products. With ever-more natural and organic products for skin set to enter an already busy skin-care market, we need to be aware of the pros and cons of such products and compare them with the existing, conventional products. We need to be able to critically assess the value of a potential new product in our skin-care arsenal and decide what our criteria will be and whether that product meets them.

I searched for a firm definition of what is natural and had some difficulty. It is generally thought that a natural product will contain ingredients that are extracted directly from plants or animal products, rather than being produced synthetically. It would be reasonable for the natural product to undergo basic processing and still be called natural. That processing could include physical processing, simple chemical reactions and the like.

As a result, a natural ingredient would be considered to include plant, animal, mineral or microbial ingredients. The natural ingredients would be grown, harvested, raised and processed in an ecological manner, and be free of chemicals and synthetic production.

The natural ingredient would not be extracted or processed using anything other than natural ingredients as solvents. In addition, the natural product would neither be exposed to irradiation nor contain any genetically modified organisms. Natural products should not contain synthetic ingredients, artificial ingredients including colours, or synthetic chemical preservatives.

## What is 'Organic'?

With all that in mind, we are now interested in what defines 'organic'. Organic refers to the way that the natural product was grown and farmed. When it comes to agriculture, organic farming refers to the way the crop is grown, the way it is farmed and delivered to the consumer, and all the paperwork required.

This would mean that instead of pesticides and chemicals, the farmer would use manure, compost and forms of biological pest control. The farmer would also avoid modified organisms. In addition, organic agriculture is a production system that pays attention to sustaining the health of the soil, ecosystems and people.

So the philosophy of organic farming goes one step further than the production of natural ingredients, by paying attention to the environment and the sustainability of the soil. What I have read suggests that generally, but not necessarily, organic pesticides are safer and more environmentally friendly than synthetic ones.

The five main pesticides used in organic farming are a type of bacterial toxin called Bt®, pyrethrum, rotenone®, copper and sulphur. It is important to note that few organic farms manage to eliminate the use of pesticides entirely.

One source of information states that organic products stand out as having higher levels of secondary plant compounds and vitamin C. In addition, it states that organically grown produce has double the flavonoids, an important antioxidant. The interesting thing about organic farming is that avoiding herbicides and pesticides allow more biodiversity of weeds, plant and insect species, which improves the quality of the soil and therefore gives a better product. This in turn helps organic farmers produce much larger crop yields.

You might wonder about the process of organic certification and what that means for the consumer. In fact, requirements for this certification vary from country to country and generally involve a set of production standards for the growing, storage, processing, packaging and shipping of the organic product.

The requirements for certification include avoiding: synthetic chemicals like fertiliser, pesticides, antibiotics, additives; genetically modified organisms; irradiation; and the use of sewage sludge. They also require the use of farmland that has been free from chemicals for three years or more. On top of this, there are production and sales records that must be kept.

Organic certification exists to ensure sufficient quality of the product, to prevent fraud and to promote commerce of these products; the label 'certified organic' gives the consumer an assurance that the product is what it claims to be, similar to grocery labels like 'low fat', and 'no artificial preservatives'.

In some countries, but not all, organic certification and standards are overseen by the government. In Australia, where a good percentage of our organic ingredients come from, there are no domestic standards for organic produce and no system for monitoring the labelling of organic produce sold within Australia.

Australia's largest certifier of organic products is Australian Certified Organic, which is a subsidiary of Biological Farmers Australia, the largest organic farmers collective in the country.

In the United States, there is federal organic legislation which defines three levels of organics. The label '100% organic' means the product is made using only certified organic ingredients and methods. The label 'organic' means the product contains at least 95% organic ingredients, and the label 'made with organic ingredients' means the product contains a minimum of 70% organic ingredients. So, you see, you will have to look at where the product came from to know what the label 'organic' signifies.

So, someone else's idea of 'natural' might mean something different to your notion of 'natural', and similarly, you may have a different understanding of 'organic' than another person. Additionally, we have to look at the toxicity of cosmetics and at cosmetics that may be designed for vegans and vegetarians who don't want to use any animal products.

## Skin Care Priorities

Clearly, when we are looking at choosing products for our clinics, we normally think about the goals that we have for that product. Some of the goals may include the following:

1. Safety – we want to know that what we are advising our clients to use is not going to harm or irritate them in any way;
2. Results – our clients rely on our advice to get great results, or they may not return;
3. Shelf life – there is no point in having a natural or organic product if you must throw it away in a month;
4. Saleability – whether the product looks, feels and smells good, because we all know that these attributes improve the acceptability of a product.

### Cosmeceuticals

Over the past few decades, a type of skin care called 'cosmeceutical' has emerged from the US, the term having been coined by an American, Professor Kingman. Cosmeceuticals are a marriage between cosmetics and so-called pharmaceuticals. The concept is that a cosmeceutical will be superior to a cosmetic in that it will give a definitively better skin-care result.

It is important to note that the skin-care marketplace is relatively unregulated. In the US, the term cosmeceutical is not recognised by the Federal Food, Drug and Cosmetic Act and they are not subject to review by the FDA (Food and Drug Administration). Although cosmetics and cosmeceuticals are tested for safety, testing to determine whether beneficial ingredients actually live up to the manufacturer's claim is not mandatory.

## Skin Care Goals

When it comes to getting therapeutic results from the products, I would suggest that our skin care goals should be divided into several categories. The first category might well be to protect the skin. For that, we use sunscreen, moisturisers and even antioxidants within skin care. The sunscreen is to protect UV radiation from hitting the skin and causing aging changes and the potential for skin cancer. The moisturiser is one of the things that helps to restore the integrity of the skin and its barrier function, which in turn reduces aging and protects the skin from

cancer. Antioxidant ingredients are present in much of the available skin care in order to protect the skin and reduce the impact of UV radiation .

The second category of treatment that will help our skin care goals for our clients is to treat and restore the skin. The par excellence products that have been with us for decades are the Retinoids that are known to protect the skin from skin cancer, normalise and regulate cell differentiation, and normalise pores and pigmentation.

Retinoids are derived from vitamin A, an intermediate being retinoic acid and the strongest of all being tretinoin. The Retinoids are the number one on our list of therapeutic ingredients.

Other treat and restore ingredients, number two on the list, are the **alpha hydroxyl acids** which exfoliate and hydrate the skin, therefore restoring skin barrier function. Alphahydroxy acids or glycolic acid are commonly part of the skin care arsenal. From time to time, betahydroxy acid or salicylic acid can be used on their own or in combination with alphahydroxy acids. Other acids that can be of some use include lactic acid.

**Salicylic acid** is a multifunctional ingredient that reduces inflammation and is keratolytic, thus reducing blemishes. It can also improve skin thickness, barrier functions and collagen production.

**Zinc oxide** is a safe physical sun-blocker which is thought to be an antioxidant, and safe to use.

De-pigmenting agents, used to treat and restore, can include hydroquinone, vitamin C, kojic acid, and sometimes botanical ingredients.

Antioxidant additives to skin care tend to be natural. Among the usual ones are vitamin C, vitamin E and co-enzyme Q10 (or ubiquinone). Another natural substance is alpha lipoic acid which, in addition to having anti-inflammatory and antioxidant properties, acts as an exfoliant.

When you look at the list so far, its largely natural...

## Botanicals

Then you have botanical antioxidants, which are generally made up of flavinoids, carotenoids and polyphenols – it is enough to know that these names are just descriptions of plant ingredients that have active actions. The carotenoids are related to vitamin A and include **astaxanthin**, lutein and lycopene, all of which can be found in tomatoes.

The polyphenols include rosemary, St John's Wort, pomegranate, blueberry leaf and olive leaf. The flavones include rutin and quercetin, found in apples and blueberries, and hesperitin and dooming (in lemons and oranges). However, as you will see later, putting some of these plant ingredients into skin care may cause more problems than it solves.

With some of these botanicals, we don't have any data on whether they help the skin, even though they help when swallowed – this can be the case with many botanicals. In addition, some of them actually irritate the skin – like St John's Wort, which causes light sensitivity.

A very important polyphenol is that of epigallocatechin-3-gallate (EGCG) which is found in **green tea**. This is one of the primary and most chemo-preventive constituents responsible for the pharmacological effect in green tea.

**Copper peptides** improve superoxide dismutase in the skin. The latter is an enzyme that destroys superoxide, which is a highly reactive free radical.

Additional botanical antioxidants include **soy**. Soybeans are a rich source of flavenoids called isoflavones, eg genistein and daidzein. When swallowed and eaten, these work like phytoestrogens, reducing the risk of heart disease and breast cancer. When placed on the skin, they have been found to increase skin thickness and produce collagen synthesis; they stimulate hyaluronic acid production in the skin.

Genistein functions as a potent antioxidant scavenging peroxide radicals and protecting against lipid peroxidation (fat going rancid).

**Curcumin** is a polyphenol antioxidant that comes from turmeric. The hydrogenated form of curcumin is Tetrahydrocurcumin, which is an off-white colour and can be added to skin care products to function as an antioxidant and to protect the lipids in the moisturiser from going rancid. Cosmetic chemists report the antioxidant effect of tetrahydrocurcumin to be greater than that of vitamin E.

**Resveratrol**, a chemical related to curcumin and found in red wine, also has antioxidant properties. But does it safely do anything for the skin?

**Silymarin** is an extract of the milk thistle plant and is generally known as being an internal detoxifier. However, it is a strong antioxidant and protects lipid peroxidation by scavenging free radicals.

Pycnogenol is an extract of French marine pine bark (pinus piaster) which, when sold for oral consumption, is used to prevent cardiovascular disease. It also is a topical skin antioxidant because it is a potent free radical scavenger that can reduce the vitamin C radical, thus returning vitamin C to its active form. The active vitamin C in turn regenerates vitamin E in its active form. I have noticed that pycnogenol has been added to one of the vitamin C serum products I use. Pycnogenol is the ideal anti-ageing additive because it demonstrates no long term toxicity, no cellular changes and no allergenicity.

**Pomegranate** contains a lot of vitamin C, as well as vitamin B5, potassium and antioxidant polyphenols. These substances have been demonstrated to protect against UVA and UVB induced cell damage in experiments using human skin fibroblasts.

In addition to vitamins C and E, vitamins that may have benefit include panthenol, the alcohol analogue of vitamin B5. It is converted in the skin to pantothenic acid, an important component of co-enzyme A, which is important for normal cellular metabolism – without good cellular metabolism, the skin cells do not work efficiently.

Some natural products may be antioxidants but may also cause irritation or cancer, as is the case with **bergamot oil** – it causes photosensitivity, and can also cause malignant cell changes.

**Chamomile** might be relaxing when taken orally, but if you are allergic to the daisy family, you can be allergic to this too. **Bitter orange** is an antioxidant, but causes skin irritation. **Clove oil** on the skin causes cell death.

## Hormones

Hormones have been touted as being useful for skin rejuvenation, one of which could be melatonin, which is known to have cancer-reducing actions. It has been shown to suppress UV radiation-induced erythema.

Other hormones that find their way into some skin-care products include oestradiol and testosterone. But do we really want hormones on our skin? What if it rubs off on our male partners?

Although, wherever possible, consumers generally like to have products that are as natural or organic as possible, sometimes these botanicals can cause unwanted side effects. Below I list a few that have good and bad actions.

## Other Skin Care Ingredients

**Niacinamide**, a member of the vitamin B group and similar to vitamin B3, has been shown to have an anti-tumour effect on keratinocytes and to suppress UVB photocarcinogenesis in the test tube.

**Dimethylaminoethanol (DMAE)** has been touted for its ability to lift the skin and improve skin firmness. It is able to diminish the cross-linking of proteins that occurs during aging, probably acting as a free radical scavenger.

**Emu oil** – there may be a push from Australia for this. It is a good emollient, but does it do anything else? As a doctor, I have been taught through my training, to 'first do no harm'. As a result, I am always

scrutinising any new treatment with care, to ensure my client does not end up with an unwanted side effect. One of the issues that has been circulating for at least a decade has been the effect of preservatives and chemicals in skin-care products used on the body, face and even in the armpits, and their relationship with breast cancer and perhaps other health problems.

Researchers around the world are working to see whether some of these chemicals may stimulate abnormal oestrogens in the skin and fat of the breast, which may adversely contribute to the production of breast cancer.

To my knowledge, nothing is yet proven; however, it is worth being aware of the impact of chemicals, pesticides, preservatives, plastics and other chemicals that maybe found in skin care. So, this is why going more natural, and even organic, is generally a good thing.

How do natural substances compare with our old favourites? Is natural always best? After all, some of the naturals can irritate. In addition, there is no solid or consistent definition of natural and organic across the world.

There are going to be some products that are largely natural and organic that cannot be categorised as such, because they don't quite meet the criteria. If they work very well, you might want to keep them. The only necessity is to be well-informed and vigilant in relation to skin-care ingredients and their actions.

You need to continue to be critical of new products and remember your priorities. On the one hand, natural and organic is best; we want to avoid chemicals, preservatives and pesticides. On the other hand, how well do some of our current ingredients work, and do we need to replace them?

I believe my priorities will always be - safety, results, shelf life and saleability.