

Cosmeceuticals

The term “cosmeceutical” was introduced by dermatologist Dr Albert Kligman in 1984 and is derived from a combination of the words **cosmetic** and **pharmaceutical**.

What are cosmeceuticals?

Cosmeceuticals are products that have both cosmetic and therapeutic (medical or drug-like) effects, and are intended to have a beneficial effect on skin health and beauty. Like cosmetics, they are applied topically as creams or lotions but contain active ingredients that have an effect on skin cell function. In some cases, their action is limited to the skin surface (such as exfoliants), while others can penetrate to deeper levels, either enhancing or limiting normal skin functions. Cosmeceuticals are available “over-the-counter” (without prescription) and are generally used as part of a regular skin care regime to help improve skin tone and texture, pigmentation and fine lines.

Most moisturisers restore barrier function and water content to the skin, improving the appearance of aged or dry skin. Cosmeceuticals should ideally deliver the active ingredient in a biologically effective form to the skin and reach the target site in sufficient quantity to have an effect.

What are some common ingredients in cosmeceuticals?

- Sunscreens

These are probably the most important ingredient in cosmeceuticals because they protect against sun damage, photo-ageing and skin cancers.

- Antioxidants

External factors such as ultraviolet (UV) radiation, pollution and smoking, as well as internal factors including normal cellular metabolism, can generate molecules called free radicals which are damaging to the skin. Antioxidants “mop up” these free radicals thereby reducing inflammation and protecting the skin against sun damage and skin cancers. Some studies suggest that combinations of antioxidants can be more effective than single ingredient formulations. Examples of antioxidants include:

- Alpha-lipoic acid: Has anti-inflammatory and exfoliating effects.
- Vitamin C (L-ascorbic acid): Stimulates collagen repair and can improve fine lines, reduce inflammation and pigmentation. Although it is found in a number of cosmeceutical products, many are not effective because the vitamin C is unstable when exposed to air, heat or light, is in too low a concentration or in a form that cannot be absorbed or metabolised by the skin.
- Nicotinamide (vitamin B3): An antioxidant that improves skin barrier function. It can reduce fine lines, wrinkles and hyperpigmentation and improve skin texture. It may also play a role in skin cancer prevention.
- Vitamin E (alpha tocopherol): Another antioxidant that reduces UV damage and skin cancer. It also works synergistically with vitamin C in reducing collagen break down.
- N-Acetyl-Glucosamine (NAG): May help fade pigmentation and prevent sun damage (photo damage).
- Ubiquinone (CoQ10): A naturally occurring antioxidant that reduces collagen breakdown due to sun exposure.

- Hydroxy acids

These can be classified according to their molecular structure into alpha hydroxy acids (AHAs), poly hydroxy acids (PHAs) and beta hydroxy acids (BHAs). Hydroxy acids improve skin texture and reduce the skin signs of ageing by hydrating the skin and promoting the shedding of dead skin cells from the outer layer of the skin (epidermis).

- AHAs are often called “fruit acids” as many are derived from natural fruit sources. AHAs include glycolic acid, lactic acid, citric acid, mandelic acid, malic acid, tartaric acid and lactobionic acid.
- PHAs include gluconolactone and lactobionic acid.
- The main BHA used is salicylic acid which is particularly useful in people with oily or acne prone skin because of its fat solubility and ability to penetrate pores.

- Retinoids (vitamin A)

These are natural or synthetic forms of vitamin A that can partially reverse skin changes induced by sun exposure. Common retinoids include tretinoin or retinoic acid, retinol and retinaldehyde. They act as antioxidants, protecting cells from free radicals, as well as activating specific genes and proteins. Topical tretinoin has been shown to improve the appearance of photo damaged skin by reducing fine lines and wrinkles, skin looseness (laxity) and excess pigmentation, as well as improving skin texture. Tretinoin can cause side effects such as burning, stinging, redness and flaking.

- Skin lightening agents

These help inhibit the production of melanin (the main skin pigment) to reduce skin discolouration and pigmentation. Examples include:

- Hydroquinone. This has been the agent of choice for skin lightening for many years. Concerns regarding skin darkening, loss of pigmentation and possible carcinogenicity have resulted in it being banned from over the counter products in some countries. However, these concerns have mainly arisen from animal studies using long term, high doses and are probably not relevant to topical application in humans.
- Ascorbic acid (vitamin C)
- Kojic acid
- Azelaic acid
- Licorice extract (glabridin).

- Botanicals

These include plant extracts from leaves, roots, fruits, berries, stems, bark and flowers. Botanicals may have antioxidant, anti-inflammatory and/or skin soothing properties, however, their effects remain largely untested or unproven. Examples include soy, curcumin, silymarin, pycnogenol, ginkgo biloba, green tea extract, grape seed extract, aloe vera, witch hazel, allantoin and ferulic acid.

- Sunscreens (*see also A-Z of Skin Sun protection and sunscreens*)

- Peptides and proteins

Peptides are short chains of amino acid sequences that are the building blocks of larger proteins. Cellular “messengers” formed from amino acids can imitate normal biological signals that either stimulate repair or inhibit processes that accelerate skin ageing. Examples include the pentapeptide Pal-KTTKS.

- Growth factors

These proteins help control chemical signals between and within cells. They are important in wound healing and repair of damaged tissue, and may help to repair skin damage from sun exposure. Studies suggest that the use of multiple growth factors can stimulate collagen and elastin production and improve the appearance of photo-damaged skin.

Do cosmeceuticals really work?

Ideally cosmeceuticals should be clinically tested to ensure they have a proven benefit and can substantiate their claims, however, the cosmeceutical industry is largely unregulated. Unlike medicines, cosmeceuticals are not subject to review by the Food and Drug Administration (FDA) in the United States or the Therapeutic Goods Administration (TGA) in Australia. Although they are usually tested for safety, they do not have to undergo testing to ensure the claims they make regarding efficacy (effectiveness) are accurate. Unfortunately, many creams do not live up to their advertised hype.

What is the future for cosmeceuticals?

Research is continuing into new delivery systems (such as liposomes) and new active ingredients.