



SPECIAL REPORT

Safe sun fun

Just as plants wilt without sunlight, we decline in darkness. However, there's a balance between being burnt and sun-kissed. In this detailed special report on sun safety, discover your perfect sun supplement plus ways to shield yourself from sun damage while still enjoying the great outdoors.

Words CAROLINE ROBERTSON

Fifty years ago it wasn't a satisfying summer's day unless you got sunburnt and showed off your peeling skin later. Then in 1981 Sid Seagull swept in to slip, slop, slap some sun sense into us. Despite this, Australia still has the second-highest incidence of skin cancer in the world, with New Zealand claiming first place. In Australia there are around 2000 deaths from skin cancer annually, and according to Medicare reports there were a million treatments for non-melanoma skin cancer in 2020. Sun exposure isn't a black and white topic. Staying in the shade brings issues such as vitamin D deficiency. To have a healthy relationship with the sun it is vital to demystify solar effects.

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Shedding light

The sun emits the rainbow of visible light, infrared rays, ultraviolet (UV) light, microwaves and X-rays. UV rays, discovered by German physicist Johann Ritter in 1801, all have different wavelengths measured in nanometres — UVA 315–400nm, UVB 280–315nm and UVC 100–280nm. The higher the wavelength, the deeper the penetration, so UVB purple only skims the surface whereas infrared penetrates into the cell’s mitochondria.

Sunlight in which the Earth basks consists of 44 per cent visible light comprising UVA, UVB and infrared. Almost no UVC enters the Earth’s atmosphere as it’s blocked by ozone. The UV radiation level varies according to altitude, cloud cover, location, ozone, reflection, scattering, season, time of day and proximity to the equator. Summer days between 10am and 3pm is when UV generally peaks due to the sun’s angle.

UV index

In 1992 Canadian scientists devised the UV Index as an indicator of UV strength. The Australian Cancer Council states that the UV radiation index is measured as low risk (1-2), moderate risk (3-5), high risk (6-7), very high risk (8-10) and extreme danger (11 and above). According to the Fitzpatrick scale, someone fair-skinned can burn after about 30 minutes when the UV Index is six or in 15 minutes if it is 11.

Blue skies

Blue light, the shortest wavelength after violet, emanates from the sun during daylight. It increases alertness, elevates mood, increases beta endorphins, lowers systolic blood pressure and is antibacterial and anti-viral. Blue light is often used to treat acne and skin conditions. However, excessive artificial blue light in the evening from devices can disturb circadian rhythms of sleeping and waking by supressing melatonin secretion. Excessive blue light could

potentially damage the retina and distort vision according to research. To prevent this, limit screen time after sundown, wear blue-blocker glasses, use dim red lights in the evening and switch screens to night mode.

Code red

The sun radiates both invisible far infrared (FIR) and visible near infrared (NIR.) This long and deeply penetrating wavelength emits heat which has a therapeutic effect known as photobiomodulation. FIR and NIR are conducive for collagenesis, cognitive function, detoxifying, hair growth, healing, pain reduction, stimulating circulation and sweating. Far infrared is applied to regulate blood pressure, optimise endothelial function, improve mood, boost microcirculation, promote blood vessel formation, facilitate wound healing and reduce inflammation. Near infrared is connected with energy synthesis, melatonin production for relaxation, enhanced vitamin D, increased magnesium, greater sperm motility and thyroid health. Photobiomodulation has been found to positively impact allergies, cancer, cardiovascular disease, dementia, depression, diabetes, wound healing and sports injuries according to the Grassroots Health Nutrient Research Institute.

The popularity of infrared therapy in the form of saunas, panels or hand-held devices is growing as people benefit from the red light without the risk of UV damage associated with sunlight exposure. To mimic sunlight benefits it is ideal to get a full-spectrum treatment encompassing near, mid and far infrared.

D-day

Sun deprivation and over-protection has led to unprecedented vitamin D deficiency worldwide. “Shiftworkers, healthcare workers and indoor workers are at high risk to develop vitamin D deficiency,” according to research carried out

Ultraviolet ups and downs	
Pros	Cons
Promotes nitric oxide for more energy, enhanced heart health and balanced microbiome.	May damage DNA through free radicals and reactive oxygen species associated with cancer.
Provides therapeutic phototherapy for cutaneous T-cell lymphoma, eczema, psoriasis and vitiligo.	Can cause sunburn and skin damage.
Stimulates mood-enhancing endorphins and stabilising serotonin.	Over-exposure can cause cataracts, macular degeneration, pterygiums, snow blindness and solar retinopathy.
Keratinocytes synthesise vitamin D directly from the sun.	Escalates skin ageing signs such as keratosis, wrinkles and sunspots.
Increases melanin which can protect skin from direct and indirect DNA damage.	Can compromise the immune system.

Being in the Sun is like going to parties — too much ages your skin, too little can age inside you like your bones. ~ Bruce Y Lee

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in 2017. Vitamin D3 is an essential nutrient produced when UV shines on the skin. We need vitamin D for calcium metabolism, cardiovascular wellbeing, cognitive function, insulin secretion, strong bones, optimal immunity, balanced blood sugar, healthy skin, hormone regulation, muscle strength and thyroid function. Studies suggest that maintaining adequate amounts of vitamin D may protect one from developing multiple sclerosis and slow progress of some cancers. Higher vitamin D levels have been linked to lower risk of diabetes, heart disease and stroke.

Are you vitamin D deficient?

According to 2011-12 Australian Bureau of Statistics figures, 23 per cent of people were estimated to have vitamin D deficiency. Best get tested if you have any of these signs or symptoms:

- ✓ Arthritis
- ✓ Asthma
- ✓ Autoimmune disease

- ✓ Bone pain
- ✓ Cardiovascular disease
- ✓ Chronic pain
- ✓ Depression
- ✓ Dermatitis
- ✓ Developmental problems in infants and children
- ✓ Diabetes
- ✓ Eczema
- ✓ Fatigue
- ✓ Fractures
- ✓ Higher risk for certain types of cancer
- ✓ Insomnia
- ✓ Osteomalacia, osteopenia or osteoporosis
- ✓ Poor wound healing
- ✓ Psoriasis
- ✓ Recurrent infections
- ✓ Rickets

Risk factors for vitamin D deficiency

- ✓ Over 70 years old
- ✓ Compromised kidney function
- ✓ Constant sun protection
- ✓ Dark skin

- ✓ Diabetes
- ✓ Malabsorption
- ✓ Liver disease
- ✓ Nursing home or hospital resident
- ✓ Low exposure to sunlight
- ✓ Obesity
- ✓ Restricted diet
- ✓ Smoking
- ✓ Working indoors

Sun supplement

It is generally recommended to get about 10 to 15 minutes of direct sunscreen-free sun daily if you have fair to medium skin. Dark skin tones usually require more sun exposure for adequate "sunshine vitamin" D. This is a rough guide which should be adjusted for individuals. The more skin exposed, the more vitamin D is synthesised. Foods containing vitamin D include cod liver oil, eggs, dairy, fish such as salmon, tuna, sun-exposed mushrooms and fortified foods.



SAD is connected with decreased sunlight, less vitamin D and shorter days contributing to disturbed circadian rhythms which then unbalance the hormones melatonin and serotonin.

SAD

Dark days make many people gloomy and moody, but if wintry weather drags you down to a depressed state you may be suffering from seasonal affective disorder (SAD), now known as major depressive disorder with seasonal pattern. Women are four times more likely to have this disorder. You're also at higher risk if you have a family history of seasonal depression, suffer bipolar disorder, have pre-existing depression, are a young adult or live far from the equator such as in Scandinavia where they enlist giant mirrors, light-therapy clinics plus psychology to shift people's state. SAD is

connected with decreased sunlight, less vitamin D and shorter days contributing to disturbed circadian rhythms which then unbalance the hormones melatonin and serotonin. Serotonin is important for balanced mood, eating and sleeping. SAD symptoms include:

- ✓ Agitation
- ✓ Anxiety
- ✓ Depression daily
- ✓ Disinterest in usual pleasures
- ✓ Fluctuating appetite
- ✓ Low energy
- ✓ Poor concentration
- ✓ Restlessness
- ✓ Sleep issues

- ✓ Suicidal ideations
- ✓ Weight gain or loss
- ✓ Withdrawing and hibernating

Ways to combat SAD are to exercise outdoors, use a full-spectrum "happy light" for up to 30 minutes a day, stay socially active, reduce stress, enjoy saunas, seek psychotherapy, minimise alcohol, have a consistent sleep routine and eat a nutritious diet. Supplements for SAD worth considering in consultation with your healthcare practitioner include vitamins A, B3, B9, C and D, L- tryptophan, magnesium, melatonin, omega-3 fatty acids, SAM-e, St Johns wort and tyrosine.



Dark side of the sun

Sun lovers relish bright days but it's easy to get too much of a good thing. Sun damage is glaringly obvious when you compare chronically UV-exposed skin to covered skin in an elderly person. It's like crocodile skin next to baby skin. The sun causes cosmetic effects such as collagen loss, freckles, keratosis, moles and wrinkling, but deeper damage is the major concern. Excess UV is even insidiously injurious on cool, overcast days or in solariums. Despite the increased education regarding sun safety, a 2022 survey of 1000 people by the American Academy of Dermatology revealed 27 per cent said they thought having a base tan decreased the risk of developing skin cancer — it doesn't — and another 38 per cent said tanning was safe as long as they didn't burn — another fallacy.

Black mole sun

In 2022, "Australian women were estimated to have a 1 in 21 chance of being diagnosed with melanoma before the age of 85, whereas men were estimated to have a 1 in 14 risk," according to the Cancer Council Australia. Australia's skin cancer rate is linked to equator proximity, a high percentage of fair-skinned residents and a love of the outdoors. Other risk factors include a family history of skin cancer and previous sun damage.

There are three main types of skin cancer: basal cell carcinoma (BCC), squamous cell carcinoma (SCC) and melanoma, the deadliest one. In 2017 skin melanoma of the skin was the fourth-commonest cancer in Australia. If addressed early, skin cancer treatment is often effective, but damage can take decades to become apparent.

Spot surveillance

The Cancer Council advises one should get spots checked if they're new, bleeding, itchy, scaly, raised or weeping or look different from others. Be aware of the ABCDE spot signs:

- A** Asymmetrical borders
- B** Border with an irregular edge
- C** Colour that's blotchy, black, blue, grey, red or white
- D** Diameter that's enlarging
- E** Evolving into a different appearance

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Photography Getty Images





Sun-sensitive

If you're burning more easily or experiencing red, sensitive skin it's smart to check that you're not using anything that's creating photosensitivity. Medications, medical conditions, essential oils and skincare products can increase sun sensitivity, potentially raising the risk of skin cancer. A photoallergic reaction can also occur when antibodies are produced to protect against UV that may result in bumps, blisters, lesions or a rash. Be aware of the following possible contributors to photosensitivity:

- ✓ Acids for skin care such as glycolic acid
- ✓ Antibiotics
- ✓ Antihistamines
- ✓ Essential oils such as angelica, bergamot, grapefruit, lemon, lime, orange and tagetes
- ✓ Lupus erythematosus
- ✓ Non-steroidal anti-inflammatory drugs
- ✓ Retinoids
- ✓ Skin conditions such as rosacea and solar urticaria
- ✓ Statins
- ✓ St John's wort



7 steps to sun safety



01 Slip

Slip on protective clothing such as dark, long and tightly woven fabrics. Cotton, elastane, hemp, lycra, polyester and silk that is unstretched offer some protection. Seek clothing with a high ultraviolet protection factor (UPF).



07 Supplement

Supplement antioxidants that can decrease sun damage from inside out including astaxanthin, berries and selenium. Chaga mushroom, Polypodium leucotomos and nicotinamide have proven protection against UV. A Cancer Council study found that those taking nicotinamide reduced non-melanoma skin cancers by 23 per cent and precancerous lesions by 13 per cent.



02 Slop

Slop on a suitable water-resistant, broad-spectrum sunscreen with an SPF of at least 30+, half an hour prior to UV exposure for chemical sunscreens, reapplying every two hours.



05 Slide

Slide on some sunnies to protect your precious peepers in strong sun. UV 400 (aka 100 per cent UVA/UVB) glasses offer almost 100 per cent protection from UV. Polarised glasses give you a clearer picture, reduce glare and ease eye strain; however, they don't offer more protection than standard UV lenses. Green-tinted polarised lenses reduce glare best. Close-fit wraparound ones that meet the mandatory Australian Standard AS 1067 are ideal.



06 Stay away

Stay away from solariums, sun lamps, sunbeds and high-UV sun times.



03 Slap

Slap on a shading hat. Forget caps, visors and chapeaus made from thin material or loose weave. Model and skin-cancer survivor Deborah Hutton launched UPF50+ Canopy Bay hats certified by ARPANSA in collaboration with Australian company Rigon Headwear. After realising her usual hats offered negligible protection, Hutton unveiled a line of health-conscious hats with style and substance. A sun-safe hat shades your whole head, ears and neck.



04 Seek

Seek shade indoors or under a tree, especially from 10am to 3pm. Consider a beach tent or umbrella that is certified UPF50+ if you're outside for long. Remember to use other precautions as the sun's reflection is still taking effect.

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In the USA, the FDA has classified zinc oxide and titanium dioxide, both barrier sunscreens for UVA and UVB, to be the only “safe and effective” sunscreens.

Think zinc

The recent recall of sunscreens due to the potential carcinogen benzene highlights the importance of using safe sunscreen. Chemical sunscreens are not only potentially harmful to humans, but 5000 tonnes of it washing off swimmers each year is toxic to algae, sea urchins, fish and mammals. This has led Hawaii to ban chemical sunscreens oxybenzone and octinoxate. These chemicals have also been found to cause allergies and disrupt hormones according to the US Food and Drug Administration (FDA). Other common chemical sunscreen ingredients under scrutiny from the FDA include avobenzone, octisalate, octocrylene and homosalate.

The FDA has classified zinc oxide and titanium dioxide, both barrier sunscreens for UVA and UVB, to be the only “safe and effective” sunscreens. Mineral barrier sunscreens work by shielding from the sun’s rays. Zinc oxide is the only option approved for babies under six months. Non-nano zinc oxide or titanium dioxide is preferable to nano or micronised as, though smaller particles absorb into skin seamlessly, it can damage marine life and may be absorbed into the bloodstream. This isn’t such a concern with zinc oxide as toxicity is very rare and includes nausea and stomach ache. On the other hand, titanium dioxide has been declared by the European Union as a possible carcinogen in concentrations over 1 per cent and isn’t light stable, so can “create free radicals that in turn ravage

your skin, causing skin irritations, acne, rosacea and all sorts of skin conditions,” according to MG Naturals, one of the few 100 per cent titanium dioxide-free cosmetic brands. Alternatively, zinc oxide is a non-comedogenic, non-irritating and water-resistant sunscreen that’s actually a skin tonic for acne and rashes. Mineral sunscreens can be applied as a cream, oil, powder or spray.

SPF facts

What does the sun protection factor (SPF) on a sunscreen mean? SPF is an indication, not a guarantee, of the degree of protection from UVB radiation. Only broad-spectrum sunscreen provides protection from UVA and UVB. SPF is based on how long it took the test case to burn, so technically the higher the SPF the slower you’ll burn. However, the difference is negligible as a SP50+ sunscreen filters out 98 per cent of UVB while SPF 30 filters out 96.7 per cent.

Resources

To view the UV forecast in Australia go to bom.gov.au/uv/index.shtml, or for a world view see earth.nullschool.net. For a full rundown of chemical sunscreen ingredients and their potential side effects go to ewg.org/sunscreen.

References available on request.

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DIY recipe

Today there are abundant options for a pure mineral sunscreen. However, common complaints about non-nano mineral sunscreens is that they’re oily, sticky and thick and leave a white cast. Claims about the SPF of natural oils are still not scientifically substantiated. However, there is evidence that natural oils provide some skin protection. According to a study in 2016, “Avocado oil is SPF 15 and contains high levels of healthy monounsaturated fats, phytosterols and antioxidants like vitamin-E.” Olive oil has an SPF of 7.549, slightly higher than coconut oil at 7.119 according to a 2010 study. Also, avocado and olive oils are abundant in antioxidants, tocopherols, β-carotene, lutein, squalene and lipophilic and hydrophilic phenols to stop free radical damage when zinc oxide is exposed to UV.

The benefit of making your own sunscreen is that you know what’s in it, it’s cheaper and you can modify it for your skin. After much trial and error this is the best home-made vegan sun-saver I’ve discovered. It’s approximately SPF 25 and expires in six months. Remember to patch test, don’t apply to broken skin, keep away from eyes, don’t inhale particles and store in a cool, dark, dry place in a sealed glass container. To make a non-oily sunscreen for the face simply mix 22 per cent non-nano zinc oxide powder from a compounding chemist with 78 per cent your favourite facial moisturiser or foundation (two shades darker than your skin as zinc lightens it). Add a little extra oil if needed to compensate for the drying effect of zinc.

Body Beautiful Blend

½ cup avocado oil
¼ cup olive or coconut oil
¼ cup shea butter
2 tbs pure non-nano zinc oxide powder
Optional cacao powder to tint

Melt ingredients in a double boiler. Pour into a white ceramic vessel. Add the zinc oxide and mix well. Blend in optional cacao gradually for the desired colour.

