



The category known as anti-aging, in the Cosmetic Industry, is very broad in terms of specific target applications and problems. For this document we are focusing on the aging of skin in general.

Skin appearance and texture alters as we age, the changes are characterised by wrinkling, loss of elasticity, laxity, and a rough-textured appearance¹. These presentations are the result of changes in cutaneous cells, coupled with structural and functional variations in the extracellular matrix of the dermis. Factors affecting the rate and severity of skin aging can be divided into two categories:

- Intrinsic aging factors** - Intrinsic aging factors describe processes of physiological aging, and are predominantly determined by genetics³. Three major modifications to skin structure and function happen because of intrinsic aging. Firstly, the activation of cell senescence, whereby a gradual decrease of cell proliferation in the basal layer occurs (i.e. affecting keratinocytes, fibroblasts and melanocytes) resulting in a thinning epidermis⁴. Secondly, structural compounds such as collagen, elastin, fibrillin and oligosaccharides in the dermis alter in distribution, quality, and quantity. The consequence is increased wrinkle formation and a reduction in ability to retain water¹. Finally, the redistribution of subcutaneous fat thins the hypodermis and reduces skin tone⁵. The combination of these factors results in thin, dry skin with fine wrinkles and compromised wound healing.
- Extrinsic aging factors** - Extrinsic aging factors describe environmental exposures; the impact they impart on the skin is dependent on the period of exposure and can vary between individuals. Persistent UV radiation from the sun, referred to as photoaging, is the primary extrinsic aging factor.

- astoundingly, it is suggested to account for 80% of facial aging¹. The effects of long-term UV radiation exposure are numerous and include^{6,7}:
- Increased oxidative stress. UV radiation generates reactive oxygen and nitrogen species (ROS/RNS) in the skin, the presence of which activate several metabolic pathways that lead to cell injury and inflammation;
 - Telomere shortening which accelerates the decline in cell proliferation seen in intrinsic aging;
 - Inhibition of collagen synthesis and degradation of bound collagen, especially in the dermal-epidermal junction leading to weaken skin structure and increased wrinkle formation;
 - Accumulation of advanced glycation end products (AGEs) which reduce elasticity of skin;
 - Chronic inflammation, and;
 - Weaken barrier can lead to loss of hydration and dry skin.

Further extrinsic aging factors include pollution, poor nutrition and smoking tobacco⁸. The accumulative damage results in premature thickening of the epidermis, specifically the stratum corneum, and skin that is wrinkled, rough and with poor tone and colour. To varying degrees, targeting factors from both categories can reduce the impact and the rate of aging they impart on the skin. Intrinsic aging factors are genetic driven, and the effect of product lead treatment will be limited, extrinsic aging factors however, can be limited and the impact reduced with topical applications. The table below summarises the core treatment considerations for skin aging

prevention, including suggested extracts that contain phyto-compounds with scientific research outcomes to support the core considerations.

In pursuit to learn more about specific phyto-compounds and their potential applications, this information is compiled from publicly available peer reviewed literature. This is for educational purposes and to explore new botanical sources and their plant profiles. This information is not based on clinical trials of the Cellular Extract.

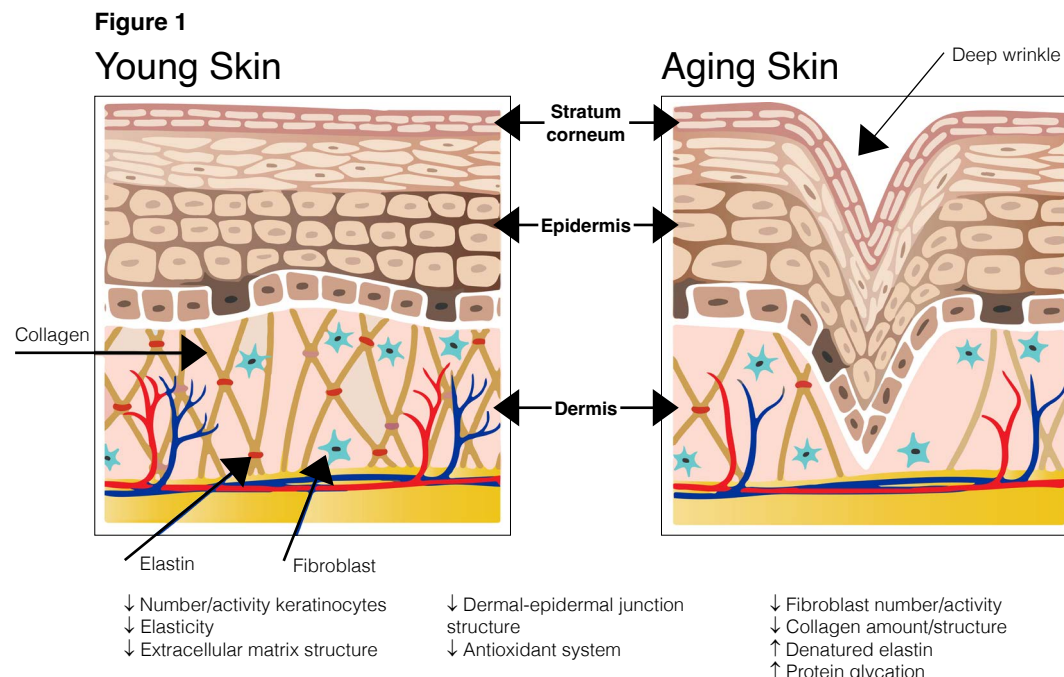


Figure 1: Comparison of Young and Aging skin¹. (Source: Ferdina;2019 https://doi.org/10.1007/978-3030-25650-0_9)

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THE CORE ISSUES

Core Treatment Consideration	Potential Extracts *Based on plant profiles achieved by Cellular Extraction, verified by 3rd party analytical laboratories, we have identified botanical species with constituents that publicly available research shows may target the core treatment considerations. References are not based on clinical trials of the Cellular Extract. Analytical testing is done on the Glycerine/Water Cellular Extract Concentrate format. ▲ Australian Natives ▲ Australian Oil ▲ Australian Grown ▲ Non-Natives ▲ Non-Australian Oil ▲ Australian Raw Material / Non-Australia Oil	Water-soluble Cellular Extracts	Oil-soluble
Antioxidants	Antioxidants are powerful anti-aging agents due to their ability to neutralise reactive oxygen and nitrogen species (ROS/RNS). ROS and RNS are generated by intrinsic and extrinsic aging factors, but at a greater rate by the latter. The result is oxidative stress, which activates metabolic pathways such as the mitogen-activated protein kinase (MAPK) pathway to alter cell proliferation, cell differentiation and initiate inflammation; additionally, matrix metalloproteinase (MMP) production is stimulated to degrade collagen ¹ . The application of antioxidants can impede reactions related to oxidative stress.	▲ Davidson Plum Cellular Extract; Desert Lime Cellular Extract; Kakadu Plum Cellular Extract; Lemon Myrtle Cellular Extract; Mountain Pepper Berry Cellular Extract; Mountain Pepper Leaf Cellular Extract ▲ Aloe Vera Juice; Ginger Cellular Extract; Queen Garnet Cellular Extract; Pineapple Cellular Extract; Strawberry Cellular Extract ▲ Gotu Kola Cellular Extract; Green Tea Cellular Extract; Olive Leaf Cellular Extract	▲ Hemp Seed Oil; Native Sandalwood Seed Oil; Snowflower Oil ▲ Kangaroo Flower Infused In Sunflower Oil; Rosella Flower Infused In Sunflower Oil; Wattleseed Infused in Grapeseed Oil
Anti-glycation	Advanced glycation end products develop in the dermis as a result of extrinsic aging factors. They are formed by a non-enzymatic process called glycation, during which proteins (collagen, elastin), lipids, or nucleic acids are covalently bound to sugar molecules such as glucose or fructose. The accumulation of these products form cross-links that stiffen the tissue and reduced elasticity in the skin ¹³ . Advanced glycation end product formation can be reduced by compounds that feature anti-glycation activity.	▲ Aniseed Myrtle Cellular Extract; Davidson Plum Cellular Extract; Emu Apple Cellular Extract; Emu Bush Cellular Extract; Mountain Pepper Berry Cellular Extract; Native Snowflower Cellular Extract; Rosella Cellular Extract; Tasmanian Blue Gum Cellular Extract ▲ Queen Garnet Cellular Extract; Tasmanian Lavender Cellular Extract ▲ Olive Leaf Cellular Extract; Witchhazel Cellular Extract	
Collagen support	Quantity and density of collagen decreases due to intrinsic and extrinsic aging factors; studies indicate that collagen distribution in the dermis reduces from 69% to 46% and collagen density can decrease from 81% to 58% ⁵ . Applications for collagen support can be approached by four means: <ul style="list-style-type: none"> • Stimulation of collagen synthesis; • Inhibition of collagen degradation; • Protection of collagen from UV radiation; • Reductions in oxidative stress By supporting collagen, skin structure can improve, and the progression of wrinkles reduced.	▲ Aniseed Myrtle Cellular Extract; Emu Bush Cellular Extract; Flame Tree Cellular Extract; Kakadu Plum Cellular Extract; Kangaroo Paw Cellular Extract; Rosella Cellular Extract; Wattleseed Cellular Extract ▲ Banana Cellular Extract; Gotu Kola Cellular Extract; Olive Leaf Cellular Extract	
Exfoliation	A feature of the aging process is thickening of the stratum corneum resulting from retardation of the desquamation process ⁹ . This is a protective feature that compensates for a decline in lipid production as we age, however excess dead skin cells on the surface of the stratum corneum can result in a rough and dry skin appearance. The use of AHA's and BHA's are reported to provide a gentle exfoliation to remove oil, dirt, and dead skin cells, their use in anti-aging products could aid in restoring skin texture ^{10,11} .	▲ Davidson Plum Cellular Extract; Finger Lime Caviar Cellular Extract ▲ Sweet Cherry Blossom Cellular Extract ▲ Willow Bark Cellular Extract	
Inflammation	Inflammation results from many of the considerations above if they are not addressed. Sustained inflammation damages cells, impacts normal metabolic pathways and reduces barrier function. It creates a cycle that exacerbates the contributing factor and stimulates further inflammation; in some case progression to a chronic inflammation can occur ¹⁴ . Inflammation accelerates aging and applications with anti-inflammatory properties are indicated to decrease the progression of skin aging.	▲ Desert Lime Cellular Extract; Mountain Pepper Berry Cellular Extract; Strawberry Gum Cellular Extract ▲ Queen Garnet Cellular Extract; Pineapple Cellular Extract; Yuzu Fruit Cellular Extract ▲ Gotu Kola Cellular Extract; Green Tea Cellular Extract; Olive Leaf Cellular Extract; Red Clover Cellular Extract; Willow Bark Cellular Extract	▲ Hemp Seed Oil; Macadamia Oil; Native Sandalwood Seed Oil ▲ Kangaroo Flower Infused In Sunflower Oil; Rosella Flower Infused In Sunflower Oil; Snowflower Oil ; Wattleseed Infused in Grapeseed Oil ▲ Grapeseed Oil
Lipid dry skin and hydration	Processes of skin aging decreases barrier function, reduces ability to produce lipids and alters the skins' capacity to retain water via reduced natural moisturising factors. The result is dehydrated skin and skin deplete of lipids. These aspects of aging can be alleviated by replenishing skin with moisturising oils and extracts with hydration properties.	▲ Desert Lime Cellular Extract; Emu Bush Cellular Extract ▲ Ginger Cellular Extract; Pineapple Cellular Extract ▲ Gotu Kola Cellular Extract; Green Tea Cellular Extract	▲ Hemp Seed Oil; Macadamia Oil; Native Sandalwood Seed Oil ▲ Kangaroo Flower Infused In Sunflower Oil; Rosella Flower Infused In Sunflower Oil; Snowflower Oil; Sunshine Gold Oil; Wattleseed Infused in Grapeseed Oil ▲ Grapeseed Oil
UV radiation	Prolonged UV radiation exposure leads to accelerated extrinsic aging. Prevention is by far the best means of protecting the skin from UV radiation; this includes limiting sun exposure and the use of sunscreens ¹ . Applications can support recovery and reduce effects of UV radiation. Major actions to consider include sun protection factor, antioxidant, collagen support and anti-inflammation ¹² .	▲ Davidson Plum Cellular Extract; Desert Lime Cellular Extract; Emu Bush Cellular Extract; Mountain Pepper Berry Cellular Extract; Tasmanian Blue Gum Cellular Extract ▲ Ginger Cellular Extract; Queen Garnet Cellular Extract ▲ Green Coffee Bean Cellular Extract; Green Tea Cellular Extract; Licorice Cellular Extract; Milk Thistle Cellular Extract; Olive Leaf Cellular Extract; Red Clover Cellular Extract; Yerba Mate Cellular Extract	▲ Hemp Seed Oil; Macadamia Oil; Native Sandalwood Seed Oil ▲ Kangaroo Flower Infused In Sunflower Oil; Rosella Flower Infused In Sunflower Oil; Snowflower Oil ; Wattleseed Infused in Grapeseed Oil



Phyto-compounds Connected to the Core Treatment Considerations for Aging Skin

Based on plant profiles achieved by Cellular Extraction, verified by 3rd party analytical laboratories, the table below summarises phyto-compounds that have supporting research in peer reviewed scientific journals of the core treatment considerations discussed. References are not based on clinical trials of the Cellular Extracts. Cellular Extracts delivers the natural molecules in their entourage, maintaining their integrity as they exist in the cell. Analytical testing is done on the Glycerine/water Cellular Extract concentrate format.

Phyto-compound	Compound Action	Cellular Extracts Containing Compound <small>🟡 Australian Native 🟢 Non-Native 🔵 Australian Grown</small>
AHA: Tartaric acid; Citric acid	Exfoliation: assists in gentle exfoliation to remove oil, dirt and dead skin ⁵⁰	🟡 Davidson Plum Cellular Extract; Finger Lime Caviar Cellular Extract
Anthocyanins	Antioxidant: works to reduce oxidative damage ⁵⁸ Anti-inflammatory: shown to down regulate inflammatory pathways ⁵⁸ UV protection: demonstrated to protect against the oxidative damaged caused by UV radiation ⁵⁹	🟡 Davidson Plum Cellular Extract; Lilli Pilli/Riberry Cellular Extract; Mountain Pepper Berry Cellular Extract; Rosella Cellular Extract 🔵 Queen Garnet Cellular Extract
Apigenin	Antioxidant: works to reduce oxidative damage ³⁶ Anti-inflammatory: inhibits the release of pro-inflammatory cytokines Hydration: demonstrated to maintain hydration of the skin ³⁶ Collagen support: induces collagen synthesis ²⁷	🔵 Tasmanian Lavender Cellular Extract 🟢 Chamomile Cellular Extract; Jacaranda Cellular Extract
Ascorbic acid	Antioxidant: works to reduce oxidative damage ⁵¹ Collagen support: stimulates collagen synthesis ⁵² UV protection: demonstrated to protect against the oxidative damaged caused by UV radiation ⁵³	🟡 Kakadu Plum Cellular Extract
BHA: Salicylic acid	Exfoliation: assists in gentle exfoliation to remove oil, dirt and dead skin ⁵⁰	🟢 Willow Bark Cellular Extract
Caffeine	Antioxidant: works to reduce oxidative damage ⁵¹ UV protection: demonstrated to protect against the oxidative damaged caused by UV radiation ⁶²	🟢 Green Coffee Cellular Extract; Green Tea Cellular Extract; White Tea Cellular Extract; Yerba Mate Cellular Extract
Catechins-ECGC epicatechin	Antioxidant: works to reduce oxidative damage ⁴⁰ Anti-inflammatory: inhibits the release of pro-inflammatory cytokines ⁴¹ Hydration: demonstrated to enhance hydration of skin ⁴⁰ UV protection: demonstrated to protect against the oxidative damaged caused by UV radiation ⁴²	🟡 Aniseed Myrtle Cellular Extract; Emu Apple Cellular Extract; Lemon myrtle Cellular Extract; White Cypress Cellular Extract 🔵 Grapeseed Cellular Extract; Queen Garnet Cellular Extract 🟢 Green Tea Cellular Extract; White Tea Cellular Extract; Willow Bark Cellular Extract
Chlorogenic acid	Antioxidant: works to reduce oxidative ⁶⁰ Anti-inflammatory: down regulates inflammatory markers ⁶¹	🟡 Emu Bush Cellular Extract; Flannel Flower Cellular Extract; Kangaroo Apple Cellular Extract; Mountain Pepper Berry Cellular Extract; Mountain Pepper Leaf Cellular Extract; Native Orange Pearl Cellular Extract; Quandong Cellular Extract; Rosella Cellular Extract 🟢 Gardenia Cellular Extract; Gotu Kola Cellular Extract; Green Coffee Bean Cellular Extract; Witchhazel Cellular Extract; Yerba Mate Cellular Extract
Citral	Antioxidant: works to reduce oxidative damage ³⁹ Anti-inflammatory: down regulates inflammatory gene expression and signaling pathways ³⁸	🟡 Lemon Myrtle Cellular Extract; Silky Oil Grass Cellular Extract
Ferulic acid	Antioxidant: works to reduce oxidative damage ⁴⁷ Anti-inflammatory: down regulates inflammatory markers and oxidative stress in skin ⁴⁸ Hydration: demonstrated to enhance hydration of skin ⁴⁶ UV protection: demonstrated to protect against the damage caused by UV radiation ⁴⁹	🟡 Desert Lime Cellular Extract; Emu Bush Cellular Extract 🟢 Ginger Cellular Extract
Gallic acid	Antioxidant: works to reduce oxidative damage ⁶⁶ Anti-inflammatory: shown to down regulate inflammatory pathways ⁶⁷ Hydration: demonstrated to alleviate dryness of the skin ⁶⁵ UV protection: demonstrated to protect against the oxidative damaged caused by UV radiation ⁶⁸	🟡 Davidson Plum Cellular Extract; Kakadu Plum Cellular Extract; Lemon Myrtle Cellular Extract; Strawberry Gum Cellular Extract; Tasmanian Blue Gum Cellular Extract 🟢 Manuka Honey Cellular Extract
Gingerols	Antioxidant: works to reduce oxidative damage ⁷⁷ Anti-inflammatory: shown to down regulate inflammatory pathways ⁷⁸	🟢 Ginger Cellular Extract



Phyto-compound	Compound Action	Cellular Extracts Containing Compound <small>🔥 Australian Native 🌿 Non-Native 🌊 Australian Grown</small>
Glutamyl-cysteine	Antioxidant: precursor to Glutathione, works to reduce oxidative damage ⁶⁰ Anti-inflammatory: shown to down regulate inflammatory pathways ⁶⁰ Hydration: recorded to enhance skin moisture and condition ⁷⁹	🌊 Pineapple Cellular Extract
Hesperidin	Antioxidant: works to reduce oxidative ⁷² Anti-glycation: demonstrated to inhibit AGE formation ⁷⁵ Anti-inflammatory: shown to down regulate inflammatory pathways ⁷⁴ UV protection: demonstrated to protect against the oxidative damaged caused by UV radiation ⁷³	🌊 Australian Lime Caviar Cellular Extract; Kaffir Lime Cellular Extract; Yuzu Fruit Cellular Extract
Isoflavones	Anti-inflammatory: shown to down regulate inflammatory pathways ⁸³ UV protection: demonstrated to protect against the oxidative damaged caused by UV radiation ⁸⁴	🌿 Red Clover Cellular Extract
Kaempferol	Anti-glycation:- demonstrated to inhibit formation of AGE intermediates ⁷⁶	🔥 Emu Apple Cellular Extract; Flame Tree Cellular Extract; Native Snowflower Cellular Extract 🌿 Bitter Orange Cellular Extract; Gardenia Cellular Extract; Gotu Kola Cellular Extract; Red Clover Cellular Extract; Witchhazel Cellular Extract ; Yerba Mate Cellular Extract
Leptosperin	Antioxidant: works to reduce oxidative damage ⁴⁵	🌿 Manuka Honey Cellular Extract
Luteolin	Antioxidant: works to reduce oxidative damage ²⁵ Anti-glycation: demonstrated to inhibit AGE formation ²⁶ Anti-inflammatory:- down regulates inflammatory signaling pathways ²⁴ UV protection: demonstrated to protect against the oxidative damaged caused by UV radiation via antioxidant action ²³	🌿 Olive Leaf Cellular Extract
Myricetin	Antioxidant: works to reduce oxidative damage ²⁰ Anti-inflammatory: down regulates inflammatory markers and oxidative stress in skin cells ²¹ Collagen support: slows down collagen breakdown ²²	🔥 Flame Tree Cellular Extract; Snake Vine Cellular Extract 🌿 Banana Cellular Extract; Bilberry Cellular Extract; Willow Herb Cellular Extract
Naringin	Antioxidant: works to reduce oxidative damage ⁶² Anti-inflammatory: shown to down regulate inflammatory pathways ⁶² UV protection: demonstrated to protect against the oxidative damaged caused by UV radiation ^{63,64}	🔥 Desert Lime Cellular Extract; Finger Lime Caviar Cellular Extract 🌿 Bitter Orange Cellular Extract
Oleuropein	Antioxidant: works to reduce oxidative damage ¹⁵ Anti-inflammatory: down regulates inflammatory markers and oxidative stress in skin cells ¹⁶ UV protection: demonstrated to protect against the oxidative damaged caused by UV radiation ¹⁷	🌿 Olive Leaf Cellular Extract
Phloroglucinol derivatives	Antioxidant: works to reduce oxidative damage ⁶⁹ Anti-inflammatory: shown to down regulate inflammatory pathways ⁷⁰ UV protection: demonstrated to protect against the oxidative damaged caused by UV radiation ⁷¹	🔥 Lilli Pilli Cellular Extract; Mountain Pepper Berry Cellular Extract; Tasmanian Blue Gum Cellular Extract
Polyhydroxy flavones (common polyhydroxy flavones include- Baicalein, Apigenin, Srutellarein, etc)	Antioxidant: works to reduce oxidative damage ³⁰ Anti-inflammatory: down regulates inflammatory signaling pathways ³¹ Collagen support: stimulates collagen synthesis and keratinocytes differentiation ^{27,28} UV protection: demonstrated to protect against the oxidative damaged caused by UV radiation via antioxidant activity ²⁹	🔥 Aniseed Myrtle Cellular Extract; Rosella Cellular Extract; Wattleseed Cellular Extract 🌊 Jacaranda Cellular Extract; Tasmanian Lavender Cellular Extract 🌿 Chamomile Tea Cellular Extract
Procyanidins	Antioxidant: works to reduce oxidative damage ⁴³ Anti-inflammatory: shown to down regulate inflammatory pathways ⁴⁴	🔥 Aniseed Myrtle Cellular Extract; Blue Cypress Cellular Extract; Lemon Myrtle Cellular Extract; Mountain Pepper Leaf Cellular Extract; White Cypress Cellular Extract 🌊 Grapeseed Cellular Extract; Starfruit Cellular Extract 🌿 Banana Cellular Extract; Willow Bark Cellular Extract



Phyto-compound	Compound Action	Cellular Extracts Containing Compound <small>🔥 Australian Native 🟡 Non-Native 🔵 Australian Grown</small>
Protocatechuic acid	Antioxidant: works to reduce oxidative damage ¹⁸ Anti-inflammatory: demonstrated to down regulate many different types of inflammation in in vivo mice studies ¹⁹	🔥 Aniseed Myrtle Cellular Extract; Emu Apple Cellular Extract; White Cypress Cellular Extract 🔵 Grapeseed Cellular Extract; Queen Garnet Cellular Extract 🟡 Green Tea Cellular Extract; White Tea Cellular Extract; Willow Bark Cellular Extract
Quercetin	Antioxidant: works to reduce oxidative ⁵⁵ Anti-glycation: demonstrated to inhibit AGE formation ²⁶ Anti-inflammatory: shown to down regulate inflammatory pathways ⁵⁴ UV protection: demonstrated to protect against the oxidative damaged caused by UV radiation ⁵⁶	🔥 Aniseed Myrtle Cellular Extract; Davidson Plum Cellular Extract; Emu Apple Cellular Extract; Emu Bush Cellular Extract; Mountain Pepper Berry Cellular Extract; Mountain Pepper Leaf Cellular Extract; Native Snowflower Cellular Extract; Rosella Cellular Extract; Snake Vine Cellular Extract; Tasmanian Blue Gum Cellular Extract; Waratah Cellular Extract; Wild Orange Cellular Extract 🔵 Queen Garnet Cellular Extract 🟡 Bilberry Cellular Extract; Elderflower Cellular Extract; Gotu Kola Cellular Extract; Horsechestnut Cellular Extract; Red Clover Cellular Extract; Rosehip Cellular Extract; White Tea Cellular Extract; Willow Herb Cellular Extract; Witchhazel Cellular Extract; Yerba Mate Cellular Extract
Rutin	Anti-glycation: demonstrated to inhibit AGE formation ²⁶ UV protection: demonstrated to protect against the damage caused by UV radiation ⁵⁷	🔥 Desert Lime Cellular Extract; Kangaroo Paw Cellular Extract; Mountain Pepper Berry Cellular Extract; Mountain Pepper Leaf Cellular Extract; Quandong Cellular Extract; Rosella Cellular Extract 🔵 Queen Garnet Cellular Extract 🟡 Witchhazel Cellular Extract; Yerba Mate Cellular Extract
Silymarin	Anti-inflammatory: down regulates inflammatory signaling pathways ³²	🟡 Milk Thistle Cellular Extract
Verbascoside	Antioxidant: works to reduce oxidative damage ³⁵ UV protection: demonstrated to protect against the oxidative damaged caused by UV radiation ³⁴	🔥 Emu Bush Cellular Extract

Oil-soluble Compounds

Phyto-compound	Compound Action	Oils Containing Compound <small>🔥 Australian Oil 🟡 Non-Australian Oil 🔴 Australian Raw material / Non-Australia Oil</small>
α-Linolenic acid : Omega 3	Anti-inflammatory: down regulates inflammatory markers and oxidative stress in skin ⁸³ Lipid replenishment: demonstrated to improve skin condition and improve barrier function ⁸⁴	🔥 Hemp Seed Oil; Native Sandalwood Seed Oil
γ-Linolenic acid : Omega 6	Anti-inflammatory: down regulates inflammatory markers and oxidative stress in skin ⁸³	🔥 Hemp Seed Oil
Linoleic acid : Omega 6	Lipid replenishment: demonstrated to improve skin condition and improve barrier function ⁸⁸	🔥 Hemp Seed Oil; Macadamia Oil; Native Sandalwood Seed Oil 🔴 Kakadu Plum Seed Oil; Kangaroo Flower Infused in Sunflower Oil; Rosella Infused in Sunflower Oil; Sunshine Gold Oil; Wattleseed Infused in Grapeseed Oil 🟡 Grapeseed Oil
Oleic acid : Omega 9	Anti-inflammatory: down regulates inflammatory markers and oxidative stress in skin ⁸⁵	🔥 Hemp Seed Oil; Macadamia Oil; Native Sandalwood Seed Oil 🔴 Kakadu Plum Seed Oil; Kangaroo Flower Infused in Sunflower Oil; Rosella Infused in Sunflower Oil; Snowflower Oil; Sunshine Gold Oil; Wattleseed Infused in Grapeseed Oil 🟡 Grapeseed Oil
Squalene	UV damage protection: limits oxidative damage from UV exposure ⁸⁹	🔥 Macadamia Oil
Ximenynic acid	Antioxidant: works to reduce oxidative damage ^{90,91}	🔥 Native Sandalwood Seed Oil



REFERENCE

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- Zhang S, Det al. Cell Transplantation. 2018;27(5):729-738.
- Kusumawati W. Reviews on Biomarker Studies in Aging and Anti-Aging Research Advances in Experimental Medicine and Biology. 2022.
- Makrantonaki E, et al. Dermatendocrinol. 2012;4(3):280-284.
- Tobin D. J. Journal of Tissue Viability. 2017;26(1)
- Blair M, et al. Advances in Wound Care. 2019;doi:10.1089/wound.2019.1021
- Buckingham E, et al. Experimental Dermatology. 2011;20(4):297-302.
- Brand R, et al. Frontiers in Pharmacology. 2018;9:920. doi:10.3389/fphar.2018.00920
- Vierkötter A, et al. Journal of Investigative Dermatology. 2010;130(12):2719-2727.
- Tagami H. Archives of Dermatological Research. 2007;10-30 2007;300(1):1-6. doi:10.1007/s00403-007-0799-9
- Yamamoto Y, et al. The Journal of Dermatology. 2006;33(1):16-22.
- Saxena V, et al. International Journal of Research in Engineering, Science and Management. 2020;3(10):54-55.
- Biniek K, et al. Proceedings of the National Academy of Sciences of the United States of America. 2012;109(42):17111-17116.
- Gkagkolou P, et al. Dermato Endocrinology. 2012;4(3):259-270.
- Osseiran S, et al. Biomedical Optics Express. 2018;9(12)
- Perugini P, et al. International Journal of Cosmetic Science. 2008;30(2):113-120. doi:10.1111/j.1468-2494.2008.00424.x
- Impellizzeri D, et al. Clinical nutrition. 2011;30(4)doi:10.1016/j.clnu.2011.02.004
- Katlyar S, et al. Photochemistry and Photobiology. 2008;84(2):266-271.
- Son JH, et al. Biomedical Dermatology. 2018-02-10 2018;2(1):1-5. doi:10.1186/s41702-017-0018-z
- Lende AB, et al. Inflammopharmacology. 2011-07-12 2011;19(5):255-263. doi:10.1007/s10787-011-0086-4
- Semwal DK, et al. Nutrients. 2016;8(2)
- Cho B, et al. Bioscience, biotechnology, and biochemistry. 2016 Aug 2016;80(8)doi:10.1080/09168451.2016.1171697
- Jung SK, et al. Biochem Pharmacol. 2010;79(10)
- Gendrisch F, et al. BioFactors. 2021;47(2):170-180.
- Aziz N, et al. The Journal of Ethnopharmacology. 2018;225:348-352.
- Kang KA, et al. International Journal of Oncology. 2021;51(4):1169-1178. doi:10.3892/ijo.2017.4091
- Wu C-H, et al. 2005;53(8):3167-3173. doi:10.1021/jf048550u
- Zhang Y, et al. European Journal of Histochemistry. 2015;59(2):2467.
- Lee HY. Journal of Cosmetic Dermatology. 2018;18(1)doi:10.1111/jocd.12521
- Seok J, et al. Phytotherapy research : PTR. 2016 Mar 2016;30(3)doi:10.1002/ptr.5534
- Park C, et al. Internation Journal of Medical Science. 2019;16:8-16.
- Tsai C, et al. Journal of ethnopharmacology. 04/11/2014 2014;153(1)doi:10.1016/j.jep.2014.02.010
- Han M, et al. International Immunopharmacology. 2007;7(13):1651-1658. doi:10.1016/j.intimp.2007.08.019
- Vostálová J, et al. Molecules. 2019-03-14 2019;24(6):1022. doi:10.3390/molecules24061022
- Korkina L, et al. Cosmetics. 2018-05-02 2018;5(2):32. doi:10.3390/cosmetics5020032
- Lee HY, et al. Journal of Cosmetics, Dermatological Sciences and Applications. 2015;5(1)
- Arterbery VE, et al. Journal of Clinical Cosmetic Dermatology. 2014 2018;2(2)
- Park C-H, et al. International Journal of Molecular Sciences. 2020-06-29 2020;21(13):4620. doi:10.3390/ijms21134620
- Han X, et al. Biochimie Open. 2021;4:107-111. doi:10.1016/j.biopen.2017.03.004
- Baschieri A, et al. Food Chemistry. 2021;232:656-663. doi:10.1016/j.foodchem.2017.04.036
- Kim E, et al. International Journal of Molecular Sciences. 2018-01-06 2018;19(1):173. doi:10.3390/ijms19010173
- Tedeschi E, et al. Molecular pharmacology. 2004 Jan 2004;65(1)doi:10.1124/mol.65.1.111
- Gensler H, et al. Nutrition and cancer. 1996 1996;26(3)doi:10.1080/01635589609514488
- Li S, et al. PLOS ONE. 2015;10(10)
- Martinez-Micaelo N, et al. BioFactors. 2012;38(4)doi:10.1002/biof.1019
- Alvarez-Suarez JM, et al. Journal of Functional Food. 2016;25:38-49.
- Milani M, et al. Clinical, cosmetic and investigational dermatology. 05/29/2019 2019;12doi:10.2147/CCID.S204905
- K Z, et al. Skin pharmacology and physiology. 2018 2018;31(6)doi:10.1159/000491755
- ZN Y, et al. Biomedical and environmental sciences : BES. 2019 Jan 2019;32(1)doi:10.3967/bes2019.002
- Saija A, et al. International journal of pharmaceutics. 04/10/2000 2000;199(1)doi:10.1016/s0378-5173(00)00358-6
- Saxena V, et al. International Journal of Research in Engineering, Science and Management. 2020;3(10):54-55.
- Pullar JM, et al. Nutrients. 2017-08-12 2017;9(8):866. doi:10.3390/nu9080866
- Mohammed B, et al. International wound journal. 2016 Aug 2016;13(4)doi:10.1111/iwj.12484
- Lin JY, et al. Journal of the American Academy of Dermatology. 2003;48(6):866-74. doi:http://dx.doi.org/10.1067/j.jaad.2003.425
- AW B, et al. Nutrition 2008;24(7-8)doi:10.1016/j.nut.2008.03.023
- Limanto A, et al. Molecular and Cellular Biomedicine. 2019-09-01 2019;3(2)doi:https://cellbiopharm.com/cjs/index.php/MCBS/article/view/60
- Choquet B, et al. Journal of natural products. 2008 Jun 2008;71(6)doi:10.1021/np7007297
- Tomazelli L, et al. International journal of pharmaceutics. 12/01/2018 2018;552(1-2)doi:10.1016/j.ijpharm.2018.10.015
- P P, et al. Toxicology and applied pharmacology. 10/01/2014 2014;280(1)doi:10.1016/j.taap.2014.06.028
- Tarozzi A, et al. Photochemistry and photobiology. May-Jun 2005 2005;81(3)doi:10.1562/2004-06-14-RA-200
- Bhattacharyya S, et al. Journal of photochemistry and photobiology B, Biology. 01/05/2014 2014;130doi:10.1016/j.jphotobiol.2013.11.020
- Liang N, et al. Nutrients. 2016;8(1):16.
- Chen R, et al. Pharmaceutical biology. 2016 Dec 2016;54(12)doi:10.1080/13880209.2016.1216131
- Badea G, et al. New Journal of Chemistry. 2016/11/22 2017;(2)doi:10.1039/C6NJ02318E
- Ren X, et al. Journal of dermatological science. 2016 May 2016;82(2)doi:10.1016/j.jdermsci.2015.12.008
- Hwang E, et al. Phytotherapy research : PTR. 2014 Dec 2014;28(12)doi:10.1002/ptr.5198
- Silva S, et al. Polymers. 2017;9(9):391. doi:http://dx.doi.org/10.3390/polym9090391
- BenSaad L, et al. BMC complementary and alternative medicine. 01/14/2017 2017;17(1)doi:10.1186/s12906-017-1555-0
- Subramanian V, et al. Food and chemical toxicology : an international journal published for the British Industrial Research Association. 2014 Apr 2014;66doi:10.1016/j.fct.2014.01.017
- Im A, et al. Photochemistry and photobiology. Jan-Feb 2016 2016;92(1)doi:10.1111/php.12549
- Kim M, et al. Food and chemical toxicology : an international journal published for the British Industrial Research Association. 2010;48(10)doi:10.1016/j.fct.2010.07.029
- Kim K, et al. Photodermatology, photoimmunology & photomedicine. 2012 Dec 2012;28(6)doi:10.1111/photoderm.12010
- Parhiz H, et al. Phytotherapy research : PTR. 2015 Mar 2015;29(3)doi:10.1002/ptr.5256
- Li M, et al. Journal of photochemistry and photobiology B, Biology. 2016 Dec 2016;165doi:10.1016/j.jphotobiol.2016.10.037
- Zhao T, et al. Phytotherapy research : PTR. 2019 Aug 2019;33(8)doi:10.1002/ptr.6385
- Li D, et al. Pharmaceutical biology. 2012 Dec 2012;50(12)doi:10.3109/13880209.2012.694106
- Yang B, et al. Applied Biological Chemistry. 2017-01-07 2017;60(1):57-62. doi:10.1007/s13765-016-0251-y
- Semwal R, et al. Phytochemistry. 2015;117:554-568.
78. Aktan F, et al. Planta medica. 2006 Jun 2006;72(8)doi:10.1055/s-2006-931588
- Watanabe F, et al. Clinical, cosmetic and investigational dermatology. 10/17/2014 2014;7doi:10.2147/CCID.S68424
- Braidly N, et al. Frontiers in aging neuroscience. 08/08/2019 2019;11doi:10.3389/fnagi.2019.00177
- JM B, et al. International journal of cosmetic science. 2006 Oct 2006;28(5)doi:10.1111/j.1467-2494.2006.00346.x
- Rosado C, et al. Molecules. 2020;25(15):3535.
- Li H, et al. Scientific Reports. 2018;8(1):1-13. doi:10.1038/s41598-018-24726-z
- Huang Z-R, et al. International Journal of Pharmaceutics. 2008;364(1):36-44. doi:https://doi.org/10.1016/j.ijpharm.2008.08.002.
- Trombino S, et al. Molecules. 2020;25(15):3535.
- Hartop P, et al. British Journal of Dermatology. 1976;95(3):255-264.
- Cardoso C, et al. Immunobiology. 2011;216(3)doi:10.1016/j.imbio.2010.06.007
- Lin TK, et al. International journal of molecular sciences. 2017;19(1)doi:10.3390/ijms19010070
- Fernando IPS, et al. Journal of Food Biochemistry. 2018;42(5)doi:10.1111/jfbc.12628
- Shivatare R, et al. International Journal of Pharma and Bio Sciences. 2019;10(4)doi:http://dx.doi.org/10.22376/ijpbs.2019.10.4.p93-99
- Shivatare R, et al. International Journal of Pharma and Bio Sciences. 2019;10(4):93-99.



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