

Research

Amla (*Phyllanthus emblica*). (INCI: *Phyllanthus Emblica Fruit Powder*)

An ayurvedic medicine, Amla contains potent rejuvenating anti-aging properties including antioxidants, polyphenols, phosphorus, phenolic compounds, tannins, iron, calcium and vitamin C.

A clinical study published in the *National Library of Medicine* ⁽¹⁾ tested Amla along with minoxidil, a current popular hair loss drug, and discovered that *Amla promoted hair growth better than minoxidil.*

Amla **blocks DHT** by inhibiting the enzyme 5 α -reductase which converts testosterone into dihydrotestosterone (DHT). This conversion causes hair follicles to shrink which eventually leads to hair loss (androgenic alopecia). Recent *in vivo* studies confirm that amla **promotes hair growth** by effectively enlarging the size of hair follicles and prolonging the anagen phase. ⁽¹⁾⁽²⁾

Due to its antioxidants and amino acids, hair treated with Amla will have more volume and shine. And as a natural astringent with a preponderance of Vitamin C, Amla can **enhance natural hair color and help halt premature greying**.

Amla's combination of Vitamin C, anti-bacterial and anti-inflammatory properties can help stop dandruff.

⁽¹⁾ NIH National Library of Medicine

5 α -reductase inhibition and hair growth promotion of some Thai plants traditionally used for hair treatment
<https://pubmed.ncbi.nlm.nih.gov/22178180/>

⁽²⁾ Research Journal of Medicinal Plants

Amla Fruit Extract Promotes Proliferation in Dermal Papilla Cells of Human Hair Follicle

S. Luanpitpong, U. Nimmannit, V. Pongrakhananon and P. Chanvorachote, 2011. *Emblica* (*Phyllanthus emblica* Linn.) Fruit Extract Promotes Proliferation in Dermal Papilla Cells of Human Hair Follicle. *Research Journal of Medicinal Plants*, 5: 95-100.

DOI: 10.17311/rjmp.2011.95.100

URL: <https://scialert.net/abstract/?doi=rjmp.2011.95.100>

Bacopa Monnieri (*Bacopa Monnieri*) (INCI: *Bacopa Monnieri Leaf Extract*)

An important Ayurvedic herb used to treat hair loss and to help improve blood circulation to the scalp, enlarge the size of hair follicles, and prolongs the anagen phase of the hair growth cycle.

Research examining the benefits of *Bacopa Monnieri* for hair showed that its alkaloids content binds to keratin (hair protein) and promotes hair follicle growth, resulting in stronger and thicker hair. ⁽¹⁾

Examining the effects of *Bacopa Monnieri* on hair growth, a recent report ⁽²⁾ noted the following benefits of *Bacopa Monnieri* for the hair:

- Promotes and extends hair growth
- Treats thinning of hair follicles
- Prevents premature greying of hair
- Increases hair strand strength and thickness
- Alleviates dandruff
- Reduces hair fall

⁽¹⁾ Journal of Chemical and Pharmaceutical Research, 2009, 1(1): 261-267

R K Nema - <https://www.jocpr.com/articles/preparation-evaluation-and-hair-growth-stimulating-activity-of-herbal-hair-oil.pdf>

⁽²⁾ Brahmi (Bacopa Monnieri) For Hair

<https://skinveteran.com/brhmi-powder-benefits-for-hair/>

Bhringraj (*Eclipta Alba*) (INCI: *Eclipta Prostrata Leaf Extract*)

A traditional Ayurvedic medicine, Bhringraj has been popular for its natural properties for stopping hair loss. A study shows that Bhringraj extracts significantly improve hair growth by modulating the hair follicles' growth cycle. ⁽¹⁾

In another study, Bhringraj (*Eclipta alba*) was tested against Minoxidil, as the control. Bhringraj not only proved to be comparable but actually out-performed Minoxidil. Researchers cited it as a proven and effective natural alternative for treating hair loss. ⁽²⁾

A study published in the **National Institute of Health** (NIH) tested four herbal remedies: Bhringraj (*Eclipta Alba*), *Asiasarum sieboldii*, *Asiasari radix*, and *Panax ginseng*. Of the herbs tested, Bhringraj presented the fastest hair growth, length, and density. Its results also out-performed the control, Minoxidil, once again proving Bhringrajs' effectiveness as a treatment for hair loss. ⁽³⁾

⁽¹⁾ Hindawi - International Scholarly Research Notices

Citation: Rownak Jahan, Abdullah Al-Nahain, Snehal Majumder and Mohammed Rahmatullah

URL: <https://www.hindawi.com/journals/isrn/2014/385969/>

⁽²⁾ Roy, R. K., Thakur, M., & Dixit, V. K. (2008, May 14). Hair growth promoting activity of *Eclipta alba* in male albino rats. Retrieved from <https://link.springer.com/article/10.1007/s00403-008-0860-3>

⁽³⁾ Begum, S., Lee, M. R., Gu, L. J., Hossain, M. J., Kim, H. K., & Sung, C. K. (2014). Comparative hair restorer efficacy of medicinal herb. From <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4247959/>

Burdock Root (*Arctium lappa*). (INCI: *Arctium Lappa Root Powder*)

Rich in essential fatty acids, phytosterol compounds, antioxidants, arctiin and amino acids which are necessary for building keratin, Burdock root reverses hair loss, protect hair against oxidative stress and damage, and extends the anagen phase of the hair growth cycle, which helps promote hair growth. ⁽¹⁾⁽²⁾⁽³⁾⁽⁴⁾

In summary, the benefits of Burdock root include:

- Reverses hair loss
- Extends the anagen phase of the hair growth cycle
- Relieves scalp irritation and dandruff
- Helps nourish the scalp and strengthen the hair
- Silky, smooth and shinier hair

[?] Antibacterial nutrients help reduce folliculitis (inflammation of the hair follicles)

⁽¹⁾ Asian Journal of Beauty and Cosmetology

<https://www.e-ajbc.org/journal/view.php?number=809>

⁽²⁾ Chan YS, Cheng LN, Wu JH, et al. A review of the pharmacological effects of *Arctium lappa* (burdock). *Inflammopharmacology*. 2011;19(5):245-254. doi:10.1007/s10787-010-0062-4

⁽³⁾ Dr. Rachel Nazarian, Schweiger Dermatology Group, board-certified dermatologist. URL:

<https://www.byrdie.com/burdock-root-for-hair-5217635>

⁽⁴⁾ Gretch Friese, Bosly MD certified trichologist

<https://www.byrdie.com/burdock-root-for-hair-5217635>

Dong Quai (*Angelica sinensis*) (INCI: *Angelica Polymorpha Sinensis* Root Extract)

A major cause for thinning hair is hormonal imbalance this occurs when the body produces an excess level of dihydrotestosterone (DHT). As a result, hair follicles on the scalp become weak which contributes to both hair thinning and hair loss.

Dong Quai, possesses anti-DHT properties that provide nutrients which helps rebalance hormone levels and boost circulation of blood to the scalp which can extend the growth phase of the hair.

Fenugreek (*trigonella foenum graecum*) (INCI: *Trigonella Foenum-Graecum* Seed Extract)

Fenugreek contains B vitamins, antioxidants, saponins, and flavonoids that **helps prevent hair loss, increase hair thickness, strength and volume.** ⁽¹⁾

Fenugreek has been found to be anti-inflammatory, antioxidant, antifungal, and antibacterial. This herb contains alkaloids, saponins, polyphenols, protein, iron, flavonoids, lipids, carbohydrates, and amino acids which **induces hair growth, combats dandruff, strengthens hair, and prevents hair fall, brittleness and breakage.** ⁽²⁾

Fenugreek powder is a rich source of vitamins A, K & C, folic acid, potassium, calcium, iron, and protein, which are essential nutrients for hair growth. Additionally, fenugreek powder **promotes a healthy scalp environment which contributes to hair growth.** ⁽³⁾

Based on a multitude of DHT blocking phytohormones, **the main hair benefits of Fenugreek are stopping hair loss and increasing hair growth.** ⁽⁴⁾

⁽¹⁾ ResearchGate

January 2006 *Kosmetische Medizin* 27(4)

https://www.researchgate.net/publication/251923543_Fenugreekmicronutrients_Efficacy_of_a_food_supplement_against_hair_loss

⁽²⁾ NIH - National Library of Medicine

A small plant with big benefits: Fenugreek

<https://pubmed.ncbi.nlm.nih.gov/28266134/>

⁽³⁾ Trüeb RM, Henry JP, Davis MG, Schwartz JR. Scalp condition impacts hair growth and retention via oxidative stress. *Int J Trichology*. 2018;10(6):262-270.

⁽⁴⁾ International Journal of Exercise Science <https://digitalcommons.wku.edu/ijesab/vol2/iss1/13/>

Ginkgo Biloba (*Ginkgo Biloba*) (INCI: *Ginkgo Biloba* Leaf Powder)

Research has confirmed that Ginko Biloba increases blood flow and improves circulation, which is necessary for hair follicles to grow.^(1,2)

Conversely, when hair follicles have an inhibited blood flow they cannot maintain the anagen (growth) phase of the hair cycle, which leads to hair loss. These studies, together with substantial anecdotal evidence of successful hair regrowth, strongly support Ginkgo's hair growth benefits.

A 2019 study published in the National Library Medicine found that two components isolated from Ginko biloba, Ginkgolide B and bilobalide, can promote the growth of hair follicles.⁽³⁾

A study published by the National Institute on Health reports that Ginkgo Biloba is a recognized blood flow simulator. The study was conducted on cerebral blood flow (CBF) on healthy men and results confirmed signs of increased blood flow on all men.⁽⁴⁾

As these studies have confirmed, blood circulation is a major factor when it comes to healthy hair – both in preventing hair loss and creating new, vibrant hair.

(1) NIH National Library of Medicine
(<https://pubmed.ncbi.nlm.nih.gov/15549661/>)

(2) NIH National Library of Medicine
{<https://pubmed.ncbi.nlm.nih.gov/8254481/>}

[3] NIH National Library of Medicine
<https://www.ncbi.nlm.nih.gov/pubmed/31520488/>

(4) NIH National Library of Medicine
Effects of Ginkgo biloba on cerebral blood flow assessed by quantitative MR perfusion imaging: a pilot study
Mashayekh A, Pham DL, Yousem DM, Dizon M, Barker PB, Lin DD. Effects of Ginkgo biloba on cerebral blood flow assessed by quantitative MR perfusion imaging: a pilot study. *Neuroradiology*. 2011 Mar;53(3):185-91. doi: 10.1007/s00234-010-0790-6. PMID: 21061003; PMCID: PMC3163160.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3163160/>

Gotu Kola (*Centella Asiatica*) (*INCI: Centella Asiatica Leaf/Stem Powder*)

Gotu Kola is a medicinal herb containing powerful antioxidant and anti-inflammatory properties which have shown to neutralize oxidative stress and counter inflammatory processes which compromise the health of hair follicles. It also helps protect hair follicles from accelerated aging processes, inhibits hair shedding and **loss of hair, particularly male pattern baldness while promoting re-growth of hair.**⁽¹⁾

In addition, a 2018 study found that Gotu Kola induced hair growth by scavenging harmful free oxygen radicals and stimulating the gene responsible for promoting hair growth.⁽²⁾

Researchers studied individuals suffering from androgenic alopecia and found that they have much more serious free radical damage than average.⁽³⁾ In another study, scientists noted that Gotu Kola resolved the oxidative damage present and increased the body's own production of glutathione and catalase.⁽⁴⁾ Glutathione acts as a free-radical fighting antioxidant and catalase is an enzyme that protects cells from oxidative stress.

Dermal papilla (DP) is a pivotal part of hair follicle and the smaller size of the DP is related to hair loss. A study showed that Gotu Kola upregulated the genetic expression of hair growth proteins in derma papilla cells, which enables the body to produce more hair inductive compounds, encouraging the formation of new hair follicles resulting in healthy hair follicles.⁽⁵⁾

(1) Pharmacological Review on Gotu Kola (*Centella asiatica*): A Potential Herbal Cure-all

NIH National Library of Medicine

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3116297/>

(2) Chiang Mai University Journal of Natural Sciences

Enhanced VEGF Expression in Hair Follicle Dermal Papilla Cells by *Centella asiatica* Linn.

Saansoomchai, Pahol - Limmongkon, Apinun - Surangkul, Damratsamon - Chewonarin, Teera - Sri, Metawee

https://www.researchgate.net/publication/322833300_Enhanced_VEGF_Expression_in_Hair_Follicle_Dermal_Papilla_Cells_by_Centella_asiatica_Linn

(3) Oxidative stress in androgenetic alopecia

NIH National Library of Medicine

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5152608/>

(4) Myung-Joo Choi, Hong-Mei Zheng, Protective effects of *Centella Asiatica* leaf extract on dimethylnitrosamine-induced liver injury in rats, *Mol. Med Rep*, 2016 Nov;14(5):4521-4528

(5) Yeong Min Choi, Sungkwan An et al. Titrated extract of *Centella Asiatica* increases hair inductive property through inhibition of STAT signaling pathway in three-dimensional spheroid cultured human dermal papilla cells, *Biosci Biotechnol Biochem*, 2017 Dec;81(12):2323-2329

<https://pubmed.ncbi.nlm.nih.gov/29032741/>

Hibiscus (*Hibiscus syriacus*) (INCI: *Hibiscus Syriacus* Flower Extract)

Hibiscus is rich in vitamin C, flavonoids, amino acids, mucilage fiber, moisture content, and antioxidants. Topical application of Hibiscus was found to **promote hair growth and activate hair regrowth from dormant follicles and bald patches**.⁽¹⁾

The naturally occurring amino acids produce keratin, which is the building block of hair. Keratin binds the hair which makes them less prone to breakage, promotes the overall thickness of hair strands and makes hair more manageable.

In a study published in the *International Journal of Pharmacy and Life Sciences* found that a topical application of Hibiscus stimulated hair growth, thereby validating use of this plant for hair loss treatment, to enhance hair thickness and volume, treat dandruff, prevent split ends and decrease hair loss.⁽²⁾

Researchgate recently published an article that showed that Hibiscus helped increase hair thickness and **reduce hair loss and is effectively used for the treatment of baldness**.⁽³⁾

Hibiscus is rich in natural pigments, antioxidants, and vitamins that can give a crimson tinge to grey hair and bring out darker shine to natural hair color. The natural pigments, antioxidants, and vitamins present in Hibiscus are said to help in producing melanin, the natural coloring pigment in our body.

With anti-microbial properties, Hibiscus acts like an astringent to curb the growth of dandruff-causing fungus on the scalp, reduces excess oil secretion by the sebaceous glands, unclogs dandruff flakes from your hair follicles and prevents dandruff recurrence.

Hibiscus acts as an ultra-emollient that traps moisture in your hair shafts and restores elasticity in your hair strands. Its mucilage fiber prevents breakage and conditions your hair to make it silky and smooth.

(1). Punasiya R., Verma R., Pillai S. In vitro hair growth promoting activity of various leaves extract of *Hibiscus syriacus* L. on albino rats. *International Journal of Pharmacy and Life Sciences*. 2014;5(5):3565-3569.

(2) Punasiya R., Verma R., Pillai S. In vitro hair growth promoting activity of various leaves extract of *Hibiscus syriacus* L. *International Journal of Pharmacy and Life Sciences*. 2014;5(5):3565-3569. [Google Scholar][Ref

list] <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5733167/>

(3)https://www.researchgate.net/publication/326972460_Chemical_constituents_pharmacological_effects_and_therapeutic_importance_of_Hibiscus_rosa-sinensis-_A_review

Horsetail (*Equisetum arvense*) (INCI: *Equisetum Arvense Extract*)

Containing natural benefits for thinning hair and hair growth due to its rich content of selenium, Horsetail provides a mineral that promotes the production of selenoproteins that can influence the production of keratin, the hair's structural protein. ⁽¹⁾⁽²⁾

In addition to Selenium, Horsetail contains high levels of Silicon ⁽³⁾ which has shown to:

- Promote hair thickening
- Healthier hair growth and rate
- Decrease hair fall out
- Stimulate hair follicles
- Strengthen and lubricate hair strands
- Increase hair elasticity and brightness
- Prevent greying hair

(1) <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3509882/>

(2) <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0012249#s2>

(3) <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4938278/>

Nettle Leaf (*Urtica dioica*) (INCI: *Urtica Dioica Leaf Powder*)

Nettle or stinging nettle is an herbal plant with a rich resources of terpenoids, carotenoids and fatty acids, as well as of various essential amino acids, chlorophyll, vitamins, tannins, carbohydrates, sterols, polysaccharides, isolectins and minerals, extracts of polyphenols, oleanol acid, sterols and steryl glycosides.

The leaves of the plant contain high concentrations of vitamins A, C, D, E, F, K, and P, as well as of vitamin B-complexes. They also contain notable amounts of selenium, zinc, iron, and magnesium. ⁽¹⁾

The use of Nettle Leaf extract in treating hair growth include the fact that nettle leaf extract can help to:

- Reduce inflammation in the scalp
- Neutralize free radicals in the scalp
- Block DHT topically and internally

One of the hallmark causes of androgenetic alopecia (AGA) is inflammation in the scalp. ⁽²⁾ This can be due to tissue damage or the presence of harmful foreign substances in the hair like free radicals and bacteria. One of the responses of the body to these foreign materials is inflammation. The whole process of inflammation is a response to destroy or remove foreign cells before they cause any major damage.

A study conducted by Nahata et al found that the stinging nettle contains constituents that can markedly inhibit 5a-reductase enzyme activity. **They also found that the stinging**

nettle may match the benefits of finasteride while avoiding undesirable side effects. ⁽³⁾

Some scientific studies have linked severe inflammation in the scalp with hair loss. Chronic inflammation in the scalp activates a self-destructive mechanism. This leads to the damage of hair strands and follicles. However, studies have also shown that nettle leaf can have a positive effect on the inflammatory process.

Another major factor that has been strongly linked with hair loss, especially in male pattern baldness is Dihydrotestosterone (DHT). DHT is a sex steroid that is majorly a byproduct of testosterone, the principal male sex hormone. This is why DHT is a major risk factor for hair loss in men. About 5-10% of the total circulating free testosterone in men eventually becomes DHT.

DHT handles several masculine features including; deep voice, chest hairs, etc. Some studies have also linked the sex steroid with the formation of prostate cells. Nettle leaf extracts significantly inhibit the activity of this steroid. It achieves this through the inhibition of an enzyme required for the steroid to carry out its effects. **Some scientific studies have compared the effects of finasteride and nettle leaf extract. The result showed some similarities in the positive effects of nettle leaf extract in treating hair loss and its ability to inhibit 5AR,** which makes it great for men with AGA.

(1) *Urtica* spp.: Ordinary Plants with Extraordinary Properties - <https://www.mdpi.com/1420-3049/23/7/1664/htm>

(2) <https://www.karger.com/Article/Abstract/484530>

(3) Andrologia - <https://onlinelibrary.wiley.com/doi/full/10.1111/j.1439-0272.2011.01197.x>

Reetha (*Sapindus mukorossi*) (*INCI: Sapindus Mukorossi Fruit Extract*)

Reetha (soapnut) is a natural source of saponins that can help make the hair shiny, soft, and manageable. Reetha contains anti-fungal, anti-bacterial, and anti-inflammatory properties that may prevent scalp infections and dandruff, reduce hair loss, and promote hair growth. ⁽¹⁾
⁽²⁾ ⁽³⁾

(1) Research Gate

https://www.researchgate.net/publication/236632198_Multifacetious_Uses_of_Soapnut_Tree_-_A_Mini_Review

(2) Research Gate

Sapi[https://www.researchgate.net/publication/267698560_Sapindus_mukorossi_areetha_An_overviewndus_mukorossi_\(areetha\):_An_overview_\[Internet\]._\[cited_2022_Mar_17\].](https://www.researchgate.net/publication/267698560_Sapindus_mukorossi_areetha_An_overviewndus_mukorossi_(areetha):_An_overview_[Internet]._[cited_2022_Mar_17].)

(3) Lodha G. Formulation and Evaluation of Polyherbal Shampoo to Promote Hair Growth and Provide Antidandruff Action. *Journal of Drug Delivery and Therapeutics* [Internet]. 2019 Aug 30 [cited 2022 Mar 21];9(4-A):296–300.

https://www.researchgate.net/publication/335843667_Formulation_and_Evaluation_of_Polyherbal_Shampoo_to_Promote_Hair_Growth_and_Provide_Antidandruff_Action

Rosemary (*Rosmarinus officinalis*) (*INCI: Rosmarinus Officinalis Leaf/Stem Oil*)

Rosemary is an aromatic evergreen herb with antioxidant, antibacterial, antifungal, and anti-inflammatory properties. ⁽¹⁾

Rosemary has shown to be as good as a 2% minoxidil for treating androgenetic alopecia. ⁽²⁾

In a head to head clinical trial, rosemary oil and a 2% minoxidil solution were used on both men and women subjects with androgenetic alopecia (AGA). Results showed that rosemary

was just as effective as 2% minoxidil. During the process, rosemary oil helped relieve the side effect of itchy scalp more successfully than minoxidil. ⁽³⁾

Rosemary oil has proven to promote hair growth, protect against hair loss and relieve the symptoms of dandruff. ^{(4) (5) (6)}

Carnosic acid, an active ingredient in Rosemary oil, has proven to heal tissue and nerve damage and in turn, possibly restore hair growth. ⁽⁷⁾

1. Ribeiro-Santos R, Carvalho-Costa D, Cavaleiro C, Costa HS, Albuquerque TG, Castilho MC, et al: A novel insight on an ancient aromatic plant: the rosemary (L.). Trends Food Sci Technol 2015; 45: 355–368.
2. NIH National Library of Medicine- Rosemary oil vs minoxidil 2% for the treatment of androgenetic alopecia: a randomized comparative trial
<https://pubmed.ncbi.nlm.nih.gov/25842469/>
3. Panahi Y, Taghizadeh M, Marzony ET, Sahebkar A: Rosemary oil vs minoxidil 2% for the treatment of androgenetic alopecia: a randomized comparative trial. Skinmed 2015; 13: 15–21.
4. NIH National Library of Medicine - Promotion of hair growth by Rosmarinus officinalis leaf extract
<https://pubmed.ncbi.nlm.nih.gov/22517595/>
5. BMJ https://www.bmj.com/bmj/section-pdf/186632?path=/bmj/341/7766/Clinical_Review.full.pdf
6. ScienceDirect <https://www.sciencedirect.com/science/article/abs/pii/S0021967311002755>
7. ScienceDirect - <https://www.sciencedirect.com/science/article/abs/pii/S0168010211000022>

Safflower (*Carthamus tinctorius L.*) (*INCI: Carthamus Tinctorius Flower Powder*)

Safflower powder contains oleic acid, flavonoids, alkaloids, polyacetylenes, spermidine, lignans, sesquiterpenes, organic acids, sterols, alkyldiols, and polysaccharides.

Oleic acid, which is moisturizing and beneficial for the scalp and hair, is thought to increase circulation on the scalp, stimulating hair growth and strengthening the follicles. Safflower is potent 5 α -reductase inhibitor and hair growth promoter. ⁽¹⁾

Studies have examined safflower floret extract benefits on its role in hair growth. ^(2, 3, 4, 5) Additionally, some studies also examine the possibility of using safflower floret extract for hair loss due to androgenic alopecia. ^(6, 7)

Research published in the Journal of Ethnopharmacology tested seventeen (17) plants traditionally used for hair restoration ⁽⁵⁾. Safflower (*Carthamus tinctorius*) extract proved the most potent 5 α -reductase inhibitor while Amla (*Phyllanthus Emblica*) was the second most potent 5 α -reductase inhibitor - this enzyme is responsible for converting testosterone into its androgen byproduct, dihydrotestosterone (DHT) which is widely known as the main instigator of male pattern balding. ⁽⁸⁾

A study published in the Journal of Pharmaceutical Sciences supported the idea of Safflower floret extract reducing the likelihood of premature grayness. According to their research, safflower increases melanin levels and that effectively wards off gray hair. ⁽⁹⁾

(1) 5 α -reductase inhibition and hair growth promotion of some Thai plants traditionally used for hair treatment
<https://pubmed.ncbi.nlm.nih.gov/22178180/>

(2) European Food Safety Authority Panel on Dietetic Products, Nutrition, and Allergies. Scientific Opinion on the substantiation of health claims related to *Carthamus tinctorius L.* and maintenance of skin (ID 2748) and maintenance of hair (ID 4242) pursuant to Article 13(1) of Regulation (EC) No 1924/2006. EFSA Journal 2009;7(9):1284.

- (3) Junlatat J, Sripanidkulchai B. Hair growth-promoting effect of *Carthamus tinctorius* floret extract. *Phytother Res* 2013 Dec 11. DOI: 10.1002/ptr.5100. [Epub ahead of print]
- (4) Junlatat J, Sripanidkulchai B. Hair growth promotion, cytotoxicity and skin permeability evaluations of *Carthamus tinctorius* floret extract. *Isan Journal of Pharmaceutical Sciences* 2013;9(1):221.
- (5) Kumar N, Rungseevijitprapa W, Narkkhong NA, et al. 5 α -reductase inhibition and hair growth promotion of some Thai plants traditionally used for hair treatment. *J Ethnopharmacol* 2012;139(3):765-71.
- (6) Böhles H, Bieber MA, Heird WC. Reversal of experimental essential fatty acid deficiency by cutaneous administration of safflower oil. *Am J Clin Nutr* 1976;29:398-401.
- (7) Skolnik P, Eaglstein WH, Ziboh VA. Human essential fatty acid deficiency: treatment by topical application of linoleic acid. *Arch Dermatol* 113(7):939-41.
- (8) Sanusi Umar, Marissa J. Carter, "A Multimodal Hair-Loss Treatment Strategy Using a New Topical Phytoactive Formulation: A Report of Five Cases," *Case Reports in Dermatological Medicine*, vol. 2021, Article ID 6659943, 12 pages.
- (9) Junlatat J, Sripanidkulchai B. Stimulation of melanogenesis by *Carthamus tinctorius* floret extract in B16F10 murine melanoma cells. *Isan Journal of Pharmaceutical Sciences* 2013;9(1):221.**

Saw Palmetto (*Serenoa repens*) (INCI: Saw Palmetto)

Saw palmetto contains phytosterols, fatty acids, carotene, and polysaccharides that have collectively shown to inhibit the enzyme 5-alpha reductase, which is primarily responsible for converting testosterone to dihydrotestosterone (DHT), which is associated with testosterone-related hair loss or thinning. ^{(1) (2) (3) (4)}

By blocking the conversion of testosterone to DHT and decreasing DHT binding to androgen receptors by approximately 50%, saw palmetto effectively reduces hair loss, promotes hair growth and reduces inflammation. ^(2, 4)

Further research performed by Indian researcher Sundaram Murugusundram and published in 2009 in the *Journal of Cutaneous and Aesthetic Surgery* found that topical application of Saw Palmetto extract in lotion for three months led to 35% increase in hair density. ⁽⁵⁾

Another study involving 50 men with androgenetic alopecia (AGA) evaluated the hair growth effect of topical Saw Palmetto. The study demonstrated that the men increased average and terminal hair counts at 12 and 24 weeks. ^[6]

Inflammation is the primary cause of many scalp-related issues and hair growth problems. A healthy scalp is the key to new growth and less inflammation can result in improvement of hair growth and prevention of hair loss in both men and women. ^{(7) (8)}

A 2002 double-blind and placebo-controlled study for the Treatment of male androgenetic alopecia with topical Saw Palmetto, which was published in the *Journal of Alternative and Complementary Medicine*, showed that 60% of the people receiving saw palmetto extract in the study responded positively to the treatment. ⁽⁶⁾

(1) NIH National Library of Medicine - *Serenoa Repens*: Does It have Any Role in the Management of Androgenetic Alopecia?

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2840915/>

J Cutan Aesthet Surg. 2009 Jan-Jun; 2(1): 31–32.

doi: 10.4103/0974-2077.53097

(2) Urysiak-Czubatka I, Kmieć ML, Broniarczyk-Dyła G. Assessment of the usefulness of dihydrotestosterone in the diagnostics of patients with androgenetic alopecia. *Postepy Dermatol Alergol*. 2014;31(4):207-215.

doi:10.5114/pdia.2014.40925

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(4) Chatterjee S, Agrawala S: Saw palmetto in androgenic alopecia – an effective phytotherapy. *Nat Prod Radiance* 2003; 2: 302–305.

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Shikakai (*Acacia Concinna*) (INCI: Acacia Concinna Fruit Powder)

Shikakai is a natural cleanser and scalp soothing Ayurvedic herb. It is rich in antioxidants, vitamins C, A, E and K, phytochemicals, anti-fungal and anti-inflammatory properties that help reduce dandruff, itching, and scalp dryness which helps improve scalp health and helps boost hair growth, reduce hair fall while improving the texture of the hair. ⁽¹⁾⁽²⁾

By promoting sebum secretion to the scalp, Shikakai helps to moisturize the hair which in turn prevents split ends.

Free radicals tend to damage hair cells resulting in premature greying of the hair. Shikakai contains an abundance of antioxidants that can prevent oxidation of free radicals, thereby protecting hair from greying prematurely.

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Yucca Root Powder (*Yucca schidigera*) (INCI: Yucca Schidigera Root Extract)

Yucca root benefits hair growth by activating blood flow via blood vessels which supplies nutrients and oxygen to hair follicles and hair strands that can lead to an increase of the growth phase of the hair lifecycle.

Packed with a high concentration of polyphenols, Yucca root has shown to neutralize free radicals, fight oxidative stress, and reinforce hair's strength. It also has natural properties which protect hair from UV damage and is a natural solution that works best as a hair growth promoter. ⁽¹⁾

Yucca root contains antioxidants and is antiseptic, anti-fungal, anti-microbial which keep hair strands unclogged and scalp healthy, allowing hair to grow. Yucca roots eliminate dirt and buildup of the scalp. ⁽¹⁾

Saponins present in a high amount in yucca offer a healthy alkaline environment which

provides optimal conditions to hair strands for better nourishment and hair growth. Acidic elements used in typical daily hair care and hair styling products disturb the hairs healthy pH level. ⁽¹⁾

(1) ScienceDirect

Rapid, cost-effective and accurate quantification of *Yucca schidigera* Roezl. steroidal saponins using HPLC-ELSD method

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