



(REVIEW ARTICLE)



## Indonesian plants potentially to be used as the hair growth promoting agent

Mohammad Kanedi \*

Department of Biology, Faculty of Mathematics and Sciences, University of Lampung, Bandar Lampung, Indonesia.

GSC Advanced Research and Reviews, 2022, 10(03), 171-175

Publication history: Received on 21 February 2022; revised on 26 March 2022; accepted on 28 March 2022

Article DOI: <https://doi.org/10.30574/gscarr.2022.10.3.0088>

### Abstract

Traditional hair care using ingredients from plants has been practiced for a long time by local people in many countries, including Indonesia. However, biological-pharmaceutical scientific research has only flourished in the last two decades. This article presents the results of research conducted by students and researchers in Indonesia. There are dozens of types of plants in Indonesia that are known to have the potential to be developed as hair growth-promoting drugs. Even so, there are still many weaknesses in the research process that must be overcome so that the validity of the information on the efficacy of these plants in overcoming the problem of hair loss can be relied on.

**Keywords:** Alopecia; Hair Growth; Minoxidil; Hair Health; Hair Beauty

### 1. Introduction

Although technology in the field of cosmetics and medicine is now very developed, many people still suffer from distress due to alopecia [1]. That is why many people are willing to spend a lot of money to care for and maintain the beauty of their hair [2]. The high public interest in maintaining the health and beauty of hair is what drives researchers and hair care practitioners around the world to keep looking for anti-hair loss [3]. So far, the standard drugs that have been proven to be most effective in preventing hair loss are minoxidil and finasteride [4]. However, these two types of drugs have side effects that limit their pharmacological benefits, so it is necessary to find natural substitutes for these synthetic drugs. [5].

In the last decade there has been a lot of pharmacological research on the hair-growth promoting activities of plant extracts using test animals and even man. Among the plants that have been tested for their pharmacological effects on hair growth by researchers in various developing countries are *Hibiscus rosa sinensis* and *Calotropis gigantea* [6]. *Naringi crenulata* [7], *Glycyrrhiza gabra* L (Fabaceae) [8], *Cucurbita pepo* L[9], *Centella asiatica*, *Cyperus rotundus* and *Emblica officinalis* [10].

From South Asia alone, Gupta et al. (2010) found dozens of herbs/plants that indicated to have anti-hair loss effects including *Emblica officinalis* (Euphorbiaceae), *Eclipta alba* Linn. (Asteraceae), *Cocos nucifera* Linn (Palmae), *Eucalyptus globules* (Myrtaceae), *Lawsonia inermis* (Lythraceae), *Azadirachta indica* (Meliaceae), *Hibiscus rosasinensis* (Malvaceae), *Nardostachys jatamansi* (Valerianaceae), *Juniperus virginiana*, *Rosmarinus officinale* Linn. (Labiatae), *Acacia concinna* (Mimosaceae), *Prunus dulcis* (Rosaceae), *Ginkgo biloba* (Ginkgoaceae), *Santalum album* (Santalaceae), *Sesamum indicum* (Pedaliaceae), *Cassia angustifolia* (Leguminosae), *Citrus limonum* (Rutaceae), *Rosa damascena* (Rosaceae), *Salvia officinalis* Linn.(Labiatae), *Arnica montana* (Apiaceae), *Simmondsia chinensis* (Simmondiaceae), *Trigonella foenum-graecum* L (Fabaceae), and *Ocimum sanctum* (Labiatae) [11].

\*Corresponding author: Mohammad Kanedi

Department of Biology, Faculty of Mathematics and Sciences, University of Lampung, Bandar Lampung, Indonesia.

What chemicals in plants have biological activity in promoting hair growth? From a variety of literature review, Semwal *et al.* (2011) found there are dozens of phytochemical suspected effects on hair growth, including saponin, alkaloids, ecliphtine, wedelic acid, luteolin, triterpine, glycosides,  $\beta$ - sitosterol, hentriacontanol, vitamin A, vitamin C, iron calcium oxalic, malic acid,  $\alpha$  pinene,  $\beta$  pinene, fatty acid, sterol compounds, polyphenols, steroids, volatile oil and essential oil [12].

In Indonesia, the use of natural ingredients for hair growth has been traditionally practiced by local people for a long time. However, scientific pharmacological researches on the efficacy of natural ingredients in overcoming hair loss and baldness have only been carried out massively recently. The results of research by students and researchers in the biology-pharmaceutical field on the efficacy of various types of plants to promote hair growth and fertility in Indonesia in the last two decades are presented in this article.

## 2. Indonesian herbs expected to be hair growth promoting agent

As in other countries in the South-Southeast Asia region, in Indonesia there are also dozens of plant species that deserve to be proposed as natural ingredients for hair health care. The list of plant species that have been studied for their properties in promoting hair growth is presented in Table 1.

**Table 1** List of plants expected to be efficacious in promoting hair growth

No	Plant species	Subject tested	Results	Reference
1	<i>Morinda citrifolia</i> L.	Flemish giant rabbits	At the concentration of 25% fruit extract of <i>Morinda citrifolia</i> promote hair growth beyond standard hair tonic	[13]
2	<i>Hibiscus sabdariffa</i> , rosella plant	Women (human)	Rosella flower hair tonic provides a better hair loss reduction effect than Ginseng hair tonic (positive control) in wome	[14]
3	<i>Northopanax scutellarius</i>	White rabbits	The extract of <i>N. scutellarius</i> give effect up to 85% of hair growth in rabbits compared to the positive control.	[15], [16]
4	<i>Camellia sinensis</i> L.	Rabbits, <i>Lepus</i> sp.	Plant leaf extract of <i>Camellia sinensis</i> significantly promote hair growth in rabbit	[17]
5	<i>Anredera cordifolia</i> (Ten.) Steenis	Female rabbits, <i>Oryctolagus cuniculus</i>	Gel containing 25% <i>Anredera cordifol</i> leaves extract most effective in promoting hair growth	[18]
6	<i>Peperomia pellucida</i> L.	Male rabbits, <i>Oryctolagus cuniculus</i>	Topical gel containing plant extracts of <i>P. pellucida</i> significantly hair growth in a concentration-related manner	[19]
7	<i>Aloe vera</i> and <i>Apium graveolens</i> L.	Wistar rats, <i>Rattusnorvigicus</i>	The combined extractof two plants causes growth rate of 0.32 mm/day	[20]
8	<i>Capsicum frutescent</i> , chili pepper	Rabbits, <i>Oryctolagus cuniculus</i>	Plant leaf extract of chili pepper promote hair growth better than that of <i>Aloe vera</i> hair tonic.	[21]
9	<i>Kalanchoe pinnata</i>	Male rabbits, <i>Oryctolagus cuniculus</i>	At the highest concentration, promoting activity of leaf gel extract of <i>Kalanchoe pinnata</i> surpassed minoxidil.	[22]
10	<i>Hibiscus tiliacius</i> L and <i>Tamarindus indica</i> L.	Male rabbits	The effect of the combined extracts of the two plants is close to the effect of minoxidil	[23]

11	<i>Carica papaya</i> L.	Male rabbits, <i>Oryctolagus cuniculus</i>	Gel extract of <i>Carica papaya</i> seeds at a concentration 15% significantly promote hair growth but not the hair mass.	[24]
12	<i>Aloe vera</i>	<i>Rattus norvegicus</i>	No significant effect of <i>Aloe vera</i> extract on hair growth	[25]
13	<i>Ipomoea aquatic</i> Forsk	Male rabbits (New Zealand White strain)	Hair tonic contained 5% leaf extract of <i>Ipomoea aquatica</i> effectively promote hair growth in rabbits.	[26]
14	<i>Persea americana</i> Mill, <i>Cari capapaya</i> L. and <i>Apium graveolens</i> L	Male rats, <i>Rattus novergicus</i>	Combined extract 3 plants: (1) change the color of hair (2) increase growth of hair follicles (3) cause hyperkeratosis and hypergranulosis in epidermal tissues	[27]
15	<i>Vigna sinensis</i> L and <i>Apium graviolens</i> L.	Male rabbits	Combined extract of two plants increases hair length up to 23 mm in 35 days.	[28]
16	<i>Capsicum annum</i> Var. Abbreviata	Albino mice	Gel fruit extract of gendong chili in concentration of 5% increase hair growth in mice	[29]
17	<i>Amaranthus tricolor</i>	Rabbits, <i>Oryctolagus cuniculus</i>	The plant extract of <i>Amaranthus tricolor</i> promote hair growth of rabbits in a concentration-related manner	[30]
18	<i>Momordica charantia</i>	Male rats	Plant extract of <i>Momordica charantia</i> exceeds the effect of standard drug minoxidil.	[31]
19	<i>Etlingera elatior</i> (Jack) R.M.Sm	Male rabbits	Leaf extract of <i>Etlingera elatior</i> at a concentration of 10% effectively promote hair growth in 28 days	[32]
20	<i>Averrhoa bilimbi</i>	Male rabbits, <i>Lepus nigricollis</i>	Administration of the <i>A. bilimbi</i> extract doubling hair growth compared to the control	[33]

### 3. Critical issues of the research findings

Although there have been dozens of studies in Indonesia that report the types of plants that are worthy of being recommended as drugs to promote hair growth, the results of these studies still require further study. First of all, the preparations used are generally still in the form of crude extracts. This condition certainly cannot be used as a basis for ascertaining the type of compound that actually has activity on the physiological process of hair growth. Next, the study only focused on growth parameters in the form of hair length and/or mass. Meanwhile, the cellular aspects of the epidermis and hair follicles have not been studied in detail.

Furthermore, there are still results that contradict the claims of previous researchers that the plant is very good for use as a hair growth-promoting herb. This, for example, can be seen from the research results of Masyithoh *et al.* (2019) which got results that *Aloe vera* did not show any significant difference in promoting hair growth. While the claims of traditional communities and the findings of previous researchers, actually recommend *Aloe vera* as the best hair growth promoting agent. Differences in research results with standard claims indicate something is wrong in the research process. It may be related to the formulation of the research problem or the materials and tools used are not appropriate.

### 4. Conclusion

Despite the many weaknesses in the applied testing techniques, pharmacological research conducted in Indonesia in the last two decades still has benefits in the search for plants for anti-alopecia drugs. At least, there are dozens of types

of plants that grow in Indonesia, both native and exotic, which are known to have the potential to be developed as drugs to promote hair growth.

---

## Compliance with ethical standards

### *Acknowledgments*

I would like to acknowledge my colleague at Department of Biology, faculty of mathematics and sciences, for their inspirational supports.

### *Disclosure of conflict of interest*

Author declared there is no competing interest.

---

## References

- [1] Awe EO. and Makinde JM. The hair growth promoting effect of *Russelia equisetiformis* (Schlect& Chan). Journal of Natural Products (India) 2009 Vol.2 pp.70-73 ref.6.
- [2] Alessandrini A, Piraccini BM. Essential of HairCare Cosmetics. Cosmetics. 2016 Sep 27;3(4):34.
- [3] Koparal AT. and Bostancioglu RB. Promotion of hair growth by traditionally Used *Delphinium staphisagria* seeds through induction of angiogenesis. iranian journal of pharmaceutical research. 2016; 15(2): 551-560.
- [4] Patel S, Sharma V, S Chauhan N, Thakur M, DixitVK. Hair growth: focus on herbal therapeutic agent. Current drug discovery technologies. 2015 Mar 1; 12(1):21-42.
- [5] Rathi V, Rathi JC, Patel A, Tamizharasi S. Hair growth activity of *Cicer arietinum* Linn. *Ocimum sanctum* Linn and *Cyperus rotundus* Linn in Albino Rats. Journal of Pharmacognosy and Phytochemistry. 2017;6(1):157-9.
- [6] Pathan A., Pathan M., Garud N. and Garud A. Effect of some novel medicinal plants and polyherbal formulation on stress induced alopecia. Pharmacology On Line. 2012 Dec.30; 3:150 -157.
- [7] Allayie SA, Hemalatha S, Elanchezhiyan C, Manoharan V, Balasubramanian K, et al. (2012) In vivo evaluation of hair growth potential of fresh leaf extracts of *Naringi crenulata*. J Clin Exp Dermatol Res 3:148. doi:10.4172/2155-9554.1000148.
- [8] Upadhyay S., Ghosh A.K. and Singh V. Hair growth promotant activity of petroleum ether root extract of *Glycyrrhiza glabra* L (Fabaceae) in female rats. Tropical Journal of Pharmaceutical Research 2012; 11(5): 753-758.
- [9] Cho YH., Lee SY., Jeong DW., Choi EJ., Kim YJ., Lee JG., Yi YH. and Cha HS. Effect of pumpkin seed oil on hair growth in men with androgenetic alopecia: a randomized, double-blind, placebo-controlled trial. Evid Based Complement Alternat Med. 2014; 2014:549721. doi: 10.1155/2014/549721. Epub 2014 Apr 23. PMID: 24864154; PMCID: PMC4017725.
- [10] Jain PK. and Dass DJ. Evaluating Hair growth potential of some traditional herbs. Asian J Pharm Clin Res, 2015; 8 (6): 150-152.
- [11] Gupta A, Malviya R, Singh TP, Sharma PK. Indian medicinal plants used in hair care cosmetics: a short review. Pharmacognosy Journal. Jun1, 2010;2(10):361-4.
- [12] Semwal BC., Agrawal KK., Singh K., Tandon S. and Sharma S. Alopecia: Switch to herbal medicine. Journal of Pharmaceutical Research and Opinion. 2011; 1(4):101 – 104.
- [13] Rahmawati A, Sudarso, Hartanti D. 2009. Hair tonic effects fruit extract of mengkudu (*Morinda citrifolia* L) and its phytochemical test. Pharmacy, August 2009; 06(02): 26-34.
- [14] Fatmawati A. Hair tonic effect of rosella flower (*Hibiscus sabdariffa*) in decreasing scalp hair loss. Mini thesis (Skripsi) Program Studi Pendidikan Tata Rias Jurusan Ilmu Kesejahteraan Keluarga Fakultas Teknik, Universitas Negeri Jakarta tahun 2014. pp 57.
- [15] Sa'diah S, Herlina N, Indriati D. Effectiveness of emulsion preparation of 70% ethanol leaves extract of mangkokan (*Northopanax scutellarius* (Burm.f) Merr) in promoting hair growth. Fitofarmaka, June 2015; 4(1): 10-17.

- [16] Yasir AS. Hair tonic activity of ethanol extract of plant leaf of mangkoka on hair growth of male rabbits. *Jurnal Farmasi Malahayati*. January 2019; 2(1): 76-85.
- [17] Anisah S, Prabandari S, Ikhsanudin M. Effect of extract concentration macerated from *Camellia sinensis* L tea plant on rabbit's hair growth (*Lepus sp.*) *Jurnal Para Pemikir*. June 2017; 6(2): 161-164.
- [18] Aprilia T. Hair growth promoting effects of ethanol leaf extract of binahong (*Anredera cordifolia* (Ten.) in rabbits. Available at; <https://docplayer.info/69002893-Uji-picu-pertumbuhan-rambut-kelinci-dengan-ekstrak-etanol-daun-binahong-anredera-cordifolia-ten-steenis-skripsi-oleh-titin-aprilia.html> 2017.
- [19] Kanedi M, Lande ML, Nurcahyani N, Anggraeni IR, Yulianty. 2017. Hair-growth promoting activity of plant extracts of suruhan (*Peperomia pellucida*) in rabbits. *IOSR Journal of Pharmacy and Biological Sciences (IOSR-JPBS)* e-ISSN:2278-3008, p-ISSN:2319-7676. Ver. VI. Sep. – Oct. 2017; 12(5):18-23.
- [20] Wicaksono E and Hariyatmi. Benefit test of leaf extracts of Aloe vera and seledri (*Apium graveolens* L.) against hair growth of Wistar rats (*Rattus norvegicus*). *Prosiding Seminar Nasional Pendidikan Biologi dan Saintek III2018*: 131-135.
- [21] Musdalipah and Karmilah. Effect of leaf extract of cabe rawit (*Capsicum frutescens* L.) on the hair growth of rabbits (*Oryctolagus cuniculus*) *Riset Informasi Kesehatan*, tahun 2018; 7(1): 83-88.
- [22] Kanedi M, Lande ML, Nurcahyani N, Yulianty, Yusni I. 2018. Potency of Leaf Extracts of CocorBebek (*Kalanchoepinnata*) as Hair-Growth Promoting Agent. *Sch. Acad. J. Biosci.*, Apr 2018; 6(4): 330-33.
- [23] Sayuti, NA. Hair growth activity of micro-emulsion leaf extract of *Hibiscus tiliaceus* and *Tamarindus indica* *Prosiding Nasional APIKES-AKBID Citra Medika Surakarta (National Proceeding of APIKES-AKBID Citra Medika Surakarta)* March 10, 2016: 29-39.
- [24] Meilani A, Kanedi M, Yulianty, Nurcahyani N. Effect of seed extract of papaya (*Carica papaya* L.) on hair growth of rabbits (*Oryctolagus cuniculus* (Linnaeus, 1758) *Inovasi Pembangunan – Jurnal Kelitbangan* | 2019; 7(3): 221-228.
- [25] Masyithoh PL, Utomo AW, Mahati E, Muniroh M. 2019. Effect of Aloe vera gel on the hair cells growth. *Jurnal Kedokteran Diponegoro*. October 2019; 8(4): 1263-1269.
- [26] Mu'Ani H dan Purwati. Stability and hair tonic activity test of leaf extract of *Ipomoea aquatica* on hair growth in male rabbits. *Indonesia Natural Research Pharmaceutical Journal* 2019; 4(2): 23-31.
- [27] Amri K, Islam IC, Permatasari AR, Hatta TH, Masadah R. Effects of combined extract of avocado fruit (*Persea americana* Mill), papaya seeds (*Carica papaya* L.) and leaf of seledri (*Apium graveolens* L) on hair growth in rats (*Rattus norvegicus*). *Hasanuddin Student Journal* 2018; 2(1): 180-188.
- [28] Widodo S dan Purba AV. Development of ethanol gel extract of *Vigna sinensis* and *Apium graveolens* as hair growth promoting agent. *Syntax Literate: Jurnal Ilmiah Indonesia*. Desember 2020; 5(12): 1736-1753.
- [29] Sulastri L, Asih S, Amelia R. Hair growth activity test of emulsion gel of ethanol extract of *Capsicum annum* fruits in male albino mice (*Mus musculus*) .*Medical Sains*. March 2020; 4(2): 101-110.
- [30] Krisnawati M. Effect of cream preparation containing ethanol leaf extract of *Amaranthus tricolor* on hair growth of rabbits (*Oryctolagus cuniculus*). *Jurnal Kesehatan Madani Medika*, Desember 2020; 11(2); 247-256.
- [31] Rasyadi Y, Fendri STJ, Wahyudi FT. Effect of pomade preparation of ethanol leaf extract of pare (*Momordica charantia* L.) on hair growth in male Wistar rats. *Jurnal Insan Farmasi Indonesia*, Desember 2021: 4(2): 266-274.
- [32] Nurlatifah AS, Alifiar I, Setiawan F. Activity test of ethanol leaf extract of kecombrang, *Eclipta alata* (Jack) R.M.Sm, on hair growth of rabbits. *JIF Farmasyifa*, January 2021; 4(1): 76-86.
- [33] Priatna AA, Erlin E, and Romansyah R. Effect of leaf extract of *Averrhoa bilimbi* L. on the hair growth of rabbits (*Lepus nigricollis*). *J-KIP (Jurnal Keguruan dan Ilmu Pendidikan)* February 2022; 3(1): 169-176.