

The use of botanically derived agents for hyperpigmentation: A systematic review

Whitney A. Fisk, MS,^a Oma Agbai, MD,^b Hadar A. Lev-Tov, MD,^{b,c} and Raja K. Sivamani, MD, MS, AHE^b
Sacramento and Mather, California

See related articles on pages 281 and 369

Background: Hyperpigmentation disorders are common among those seeking care from dermatologists and primary care physicians. The cosmeceutical and natural product industries are rapidly growing and many botanical agents are purported to improve hyperpigmentation disorders.

Objective: We sought to review clinical evidence for the use of botanical agents in the treatment of hyperpigmentation.

Methods: We searched MEDLINE and Embase databases and a total of 26 articles met inclusion criteria. Study methodology was analyzed and the reproducibility of the studies was graded.

Results: Several botanical agents appear promising as treatment options but few studies were methodologically rigorous. Several plant extract and phytochemicals effectively lighten signs of epidermal melasma and hyperpigmentation induced by ultraviolet radiation exposure. Results were mixed for treatment of solar lentigines or dermal hyperpigmentation.

Limitations: There were few rigorously designed studies; future research will be critical to further ascertain the discussed results.

Conclusions: The subtype of hyperpigmentation is important for treatment prognosis, with dermal hyperpigmentation less responsive to treatment. Botanical extracts may play an integrative role in the treatment of hyperpigmentation and further studies that integrate them with standard therapies are needed. Side effects, including worsened hyperpigmentation, need to be discussed when considering these therapies. (J Am Acad Dermatol 2014;70:352-65.)

Key words: botanical; hyperpigmentation; lentigo; melasma; natural; phytochemical; plant.

Hyperpigmentation is a common symptom encountered by dermatologists and primary care physicians. Pigmentation disorders were the third most common diagnosis in a cohort of 2000 dark-complexioned dermatology patients,¹ secondary only to acne and eczema. Common hyperpigmentation disorders include melasma, solar lentigines, postinflammatory hyperpigmentation (PIH), and chloasma, which refers to melasma precipitated in the setting of hormonal stimulation such as pregnancy or oral contraceptive use. Ultraviolet (UV) exposure can exacerbate all of these conditions.²

Darker-complexioned individuals are more likely to develop disorders of hyperpigmentation.³

Clinically, hyperpigmentation manifests as brown or blue skin discoloration depending on whether melanin deposition occurs in the epidermis or the dermis, respectively.⁴ The location of pigment deposition can be evaluated with Wood's lamp and may impact treatment decisions.⁴ For example, epidermal melasma responds better to topical therapies,² than does dermal or mixed-type melasma, both of which include a component of dermal pigment deposition. Dermal hypermelanosis is less

From the School of Medicine^a and Department of Dermatology,^b University of California—Davis, Sacramento; and Veterans Affairs Northern California Health Care System, Mather.^c

Funding sources: None.

Conflicts of interest: None declared.

Accepted for publication September 20, 2013.

Reprint requests: Raja K. Sivamani, MD, MS, AHE, Department of Dermatology, University of California—Davis, 3301 C St, Suite 1400, Sacramento, CA 95816. E-mail: rksivamani@ucdavis.edu.

Published online November 25, 2013.

0190-9622/\$36.00

© 2013 by the American Academy of Dermatology, Inc.

<http://dx.doi.org/10.1016/j.jaad.2013.09.048>

responsive to treatment partially because resident dermal macrophages phagocytose pigment and many therapies do not target these cells⁵ (Fig 1).

“Cosmeceuticals,” products containing biologically active ingredients that purportedly improve the appearance of skin, are increasingly popular alternatives to standard depigmenting agents (Table I).⁶ Such products are attractive to consumers because they are presumed safe, often inexpensive, and available over the counter. Evidence-based knowledge of the beneficial effects, the side effects, and the indications of these cosmeceuticals will be increasingly helpful for dermatologists, who will undoubtedly encounter many patients using these products. This review systematically reviews clinical studies examining the effects of plant extracts, herbal preparations, and isolated plant-derived compounds in the treatment of hyperpigmentation disorders.

METHODS

Between April and August 2013 we searched Embase and MEDLINE databases for published clinical studies examining the use of plant-derived products for the treatment of hyperpigmentation. Embase database was searched using Emtree search terms “phytotherapy,” “plant medicinal product,” “herbal medicine,” and “hyperpigmentation,” which included subcategories “flavonoid,” “herbaceous agent,” “melanosis,” “post-inflammatory hyperpigmentation,” “chloasma,” “lentigo,” and “melanocytosis.” MEDLINE database was searched using the MeSH terms “phytotherapy,” “plants, medicinal,” “plant extracts,” “complementary therapies,” and “hyperpigmentation,” which included the subcategories “flavonoids,” “melanosis,” “post-inflammatory hyperpigmentation,” and “lentigo.” The term “melasma” is not specifically included in either PubMed MeSH or Embase Emtree databases; it is included under the umbrella terms “melanosis” and “chloasma,” respectively. Given this, we included the key word “melasma” in searching both databases, in addition to the MeSH and Emtree terms listed above. Studies involving plant-derived compounds and pigmentation as an outcome measure were included. The searches were filtered to only include clinical studies and those written in English.

Bibliographies were searched for additional studies that met inclusion and exclusion criteria. Of 149 articles found, 26 met inclusion criteria (Table II).

RESULTS/DISCUSSION

The studies are summarized in Table II. Botanical therapies were studied as topical, adjunctive, and preventative treatments. Oral therapies included procyanidin,⁷ Pycnogenol (standardized extract of French maritime pine bark),⁸ Polypodium leucotomos extract,⁹ and Chinese herbs,¹⁰⁻¹² all of which have strong antioxidant activities. Several studies examined botanicals in combination with standard treatments,^{7,13,14} but only 1 isolated the complimentary effect of the botanical compound¹⁴ by studying a cosmetic formulation with and without the extract.

CAPSULE SUMMARY

- Topical botanical therapies are increasingly popular alternative therapies.
- Clinical studies suggest botanicals most effectively treat superficial forms of hyperpigmentation, including epidermal melasma.
- Botanicals should be considered for integration with standard therapies for hyperpigmentation and further integrated clinical studies are needed.

Therapeutic mechanisms of action

Hyperpigmentation results from excessive melanin deposition, which leads to areas of increased pigment density or areas of unusual pigment dispersion.⁴ Inhibition at any stage of melanin production or dispersion may affect clinical pigmentation and botanicals inhibit pigmentation through a variety of mechanisms.

As shown in Tables III and IV, several botanicals inhibit tyrosinase, the enzyme that catalyzes several oxidative reactions required for melanin synthesis from its precursor amino acid, tyrosine.¹⁵ Tyrosinase is a glycoprotein located within the membrane of vesicles that transport melanin polymers, termed “melanosomes.”¹⁵

Once formed in epidermal melanocytes, melanosomes are transferred to surrounding keratinocytes (Fig 1). Soy extract contains serine protease inhibitors, heat labile enzymes that suppress melanosome transfer through inhibition of the keratinocyte protease-activated-receptor 2.^{16,17}

Several botanicals inhibit hyperpigmentation through anti-inflammatory and antioxidant effects. In vitro studies have shown that inflammatory mediators enhance melanogenesis; leukotrienes C4 and D4 and prostaglandin E2 stimulate melanocyte cell growth and dendrite proliferation and several inflammatory mediators stimulate melanocyte pigment production, including interleukin-1, interleukin-6, and reactive oxygen species.¹⁸⁻²⁰ Also, inflammation-induced

Download English Version:

<https://daneshyari.com/en/article/6073349>

Download Persian Version:

<https://daneshyari.com/article/6073349>

[Daneshyari.com](https://daneshyari.com)