Mini Review

BIOMEDICAL Journal of Scientific & Technical Research

ISSN: 2574 -1241

DOI: 10.26717/BJSTR.2020.32.005253

Serenoa Repens for the Treatment of Capillary Disorders

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ARTICLE INFO

Received: December 01, 2020

Published: December 09, 2020

Citation: Dayanne T C Silva, Gessenildo P Rodrigues. Serenoa Repens for the Treatment of Capillary Disorders. Biomed J Sci & Tech Res 32(3)-2020. BJSTR. MS.ID.005253.

Abstract

Some capillary disorders such as androgenic alopecia have been one of the most common and most frequent problems in dermatology offices, which can affect both sexes, even with advancing age. Thus, the objective of this study was to evaluate, based on a literature review, articles that demonstrate clinical effectiveness in the use of Serenoa repens for the treatment of capillary disorders. In the analysis, it can be observed that the application of extract of Serenoa repens in some male patients, significantly increased the number of total hair, after 24 weeks, as well as for some women after 16 weeks of study, with reversible condition Androgenic Alopecia (AGA). Furthermore, Serenoa repens was efficient when combined in formulations with other phytotherapies, which occurred to increase capillary regeneration, repairing the drop induced by dihydrotestosterone, starting from 5-α reductase II. Accordingly, the use of Serenoa repens as an alternative treatment is promising for this type of capillary disorder, with acceptable tolerability.

Introduction

Due to the density of hair follicles and the high rate of sebum production, the scalp has characteristics that make it susceptible to diseases [1]. These are also sociodemographic circumstances that can influence, such as age, gender, and lifestyle. A study by [2] in a Brazilian public institution, from 2003 to 2014, verified changes in the incidence of dermatological diseases, which confirms the importance of dermatology, whether in the clinical, health, or surgical scope, in these units. It was observed that the age profile increased for skin diseases, wherein the elderly are more common the presence of pathologies such as rashes, superficial mycoses, seborrheic eczema, as well as a greater number of alopecia cases, which according to the research, has an origin on comorbidities, medications, or even changes in skin physiology due to aging [3]. It's important to highlight that throughout life an attachment in the skin of the mammalian body, such as the hair follicle, undergoes cyclical transformations. Initially, with the normal cycle, the phase of active growth (anagen) can last 2 to 6 years. This process continues for a brief period known as the regression phase, with apoptosis (catagen) that can last for 1-2 weeks, and then for a rest phase (telogen) lasting 5-6 weeks. Any alterations in some of these phases can cause inadequate hair growth. Some substances can be responsible for this outcome, such as androgens, which reach or from the systemic circulation, or can be synthesized locally in hair follicles and sebaceous glands, by enzymes such as 5α-reductase that converts testosterone to dihydrotestosterone (DHT) or there may be insufficiency in the microcirculation causing hypoxia to the tissue site [4-6]. These mechanisms cause Androgenic Alopecia (AGA) which can be caused by the follicles' high sensitivity to Dihydrotestosterone (DHT), while Alopecia Areata (AA) can be caused by an autoimmune response to the growth cycle [7]. Several synthetic drugs are available for the treatment of hair loss, but associated side-effects have reduced their applications. As a result, many natural compounds have been studied, taking into account their effectiveness against dermatological processes, both concerning aspects of the antiandrogenic activity, as well as anti-inflammatory and antimicrobial activity [8]. Thus, from the Arecaceae family, Serenoa repens has been used for these disorders, however, it is necessary to understand the mechanisms involved in the utilization process. Therefore, the objective of this study is to evaluate the effectiveness of Serenoa Repens in the treatment of capillary disorders, based on a literature review that demonstrates its effectiveness in the light of clinical studies.

Method

The study was designed based on research databases such as PubMed, Science Direct, and Google scholar. The research has

involved the analysis of studies using the essential oil, extract or formulation containing Serenoa repens, for the treatment of capillary disorders such as hair loss, identifying anti-inflammatory and/or antifungal and/or antioxidant and/or proliferative actions hair follicle. All descriptors were searched in the English language and with variations in the combinations of keywords, which were: "anti-inflammatory", "phytochemical", "animal" "Serenoa repens" "loss of hair" "alopecia", "plant", using the Boolean operatives "AND" or "OR" to combine the search terms, showing articles that contain all the words described or at least one of the words, to expand the results. Articles published in the period from 2010 to 2020 were used, selected initially by title and abstract. This study included articles that proved the effectiveness of Serenoa repens, *in vitro* and/or *in vivo*, as well as by randomized clinical experimental studies. Review articles, articles that address only chemical characterizations, studies without conducting clinical tests, *in vitro*, *in vivo* or randomized studies, duplicate articles, articles that portray social issues of use of plants or demographic aspects, or articles that exclude were the study is from.

Results and Discussion

Some authors have analyzed the effectiveness of saw palmetto (Serenoa repens L. - Arecaceae) isolated or combined alternatives in the treatment of capillary diseases to verify its benefits in the treatment of androgenetic alopecia (AAG), unlike some synthetic drugs, and their comparisons. For example, [9] have compared the effectiveness of Serenoa repens to treat male AGA in comparing with finasteride for a group of 100 male patients clinically diagnosed with mild to moderate AGA. The comparison of two groups (one taking 320 mg every day for 24 months, and another receiving finasteride 1 mg every day for the same period). The results showed that Serenoa repens could lead to an improvement of androgenetic alopecia, especially in the vertex region. However, only 38% of patients treated with Serenoa repens had an increase in hair growth. On the other hand, finasteride confirmed its efficacy in patients with level II and III alopecia (66%), and significant improvement in both front area and vertex region [9]. Even though Serenoa repens has not shown expressive results at the same level as finasteride, it has great potential for AGA treatments, especially when applied in other pharmaceutical forms and formulations. Even though finasteride represents an improvement in the treatment, its prescription can cause side-effects, such as alterations on sexual functions in a subset of patients, erectile dysfunction and decrease of libido. As said by [10], that carried out a study where a topical product containing Serenoa repens extract were applied in 50 male volunteers, aged between 20–50 years, in a 24 weeks trial to evaluate it as an alternative treatment for male androgenetic alopecia. On the other hand of previously discussed results, authors have shown a significant increase in the numbers of total hair, especially in terminal hair count with a greater increase at weeks 12 and 24, together with limited side-effects [10]. A leveled off a result at week 24 was observed, although it is suggested that prolonged use of the concentrated serum could stabilize or bring better results.

Regarding to plant extract uses, a mixture of other extracts can benefit the treatment, for example in the study carried out by [11] that used Serenoa repens extracts, as well as Pygeum africanum, in the treatment of AGA in women. A randomized, double-blind, placebo-controlled clinical trial were developed in a group of 40 post-menopausal Caucasian women, taking two capsules of a dietary supplement containing lipid co-extract "Complex Alphablok S" as main active ingredient per day during 16-week. Authors have found a statistically significant reverse in the signs of AGA with a decrease in the mean percentage of telogen hair from baseline, as well as an increase in the hair's resistance to traction. As for side-effects, capsules were considered safe and well-tolerated, with mild digestive discomfort in a small number of subjects [11]. Likewise, [12] conducted a comparative study with placebo in a group of 20 postmenopausal women aged 50 to 75 years. The group was treated with a 5α-reductase inhibitor food supplement combined with Pygeum africanum/ Serenoa repens extracts, in doses of 100 mg and 50 mg / 2 capsule per day. After 16 weeks a significant increase in the number of total hairs was observed, a greater increase in the proportion of hair in the anagen phase, and three times better improvement in hair resistance to traction [12]. [13] to evaluate the efficacy of nutritional complexes for the improvement of hair loss and health, carried out experiments *in vitro* and *in vivo*. At start cell cultures treated with the soluble extract of 30, 60, and 100 µg / ml of Serenoa repens were used. The control culture medias and the cells treated with the tested product were used to measure DHT according to the ELISA method. For *in vivo* tests, patients were selected to ingest a gelatin gel containing 300 mg of several nutritional ingredients, such as Serenoa repens, Borrago officinalis, Linum usitatissimum, Tritticum vulagare, Pynus sylvestris e Secale cereale. *In vitro* tests after 24 hours of treatment, the amount of DHT were reduced by 9.6% and after 48 hours 29.2% by Serenoa repens in comparison to the negative control. It helped to verify that the 5α reductase inhibition, which converts testosterone to dihydrotestosterone, is time-dependent. Complementary, for *in vivo* tests, the formulation containing phytosterols, which include Serenoa repens as a supplement, improved the overall coverage of the scalp.

The benefits were vascularity improvement, hair diameter, strength, volume, and reduction in the perception of hair loss, observed in analysis using trichoscopy. These characteristics demonstrated the effectiveness of the formulation, that not only inhibits 5α reductase but exerts an influence on physiological properties of the scalp [13]. Taking into account studies in animal models, [14] investigated the effects of Serenoa repens lipostatic extracts (LSESr) in mice. Experimentally the authors' cultured human keratinocyte cells (HACAT), incubated with

dihydrotestosterone (DHT) and treated with LSESr, where hair cell growth and hair regeneration were evaluated, as well as the associated mechanisms in different combinations. According to the authors, LSESr treatment could increase the proliferation of HACAT cells, promote hair regeneration, and repair in the DHT-induced hair loss in the mouse models. Experiments showed that the LSESr significantly changes the skin in the capillary region (characteristics such as color, density, weight, and thickness of the strands). It triggers the growth of the follicle, favorable inflammatory response, and hair regeneration by activating the TGF-β signaling and mitochondrial signaling pathway [14]. Concerning other mechanisms, [15] used cocultures to investigate the activity of Serenoa repens in paracrine interactions between microvascular endothelial cells in humans and dermal papilla cells of the human hair follicle (FDPC). Authors have found that Serenoa promotes endothelial production in the tubulogenesis cycle, as it increases the expression of β-catenin in FDPC cells, protecting the vascular endothelium from oxidative stress and preventing the expression of testosterone-induced 5α reductase II [15]. Different scientific perspectives can improve the search for alternative treatments for male patients who cannot tolerate the adverse effects of certain synthetic drugs, such as finasteride. At all mentioned studies, the use of Serenoa repens has generated significant results and great tolerability in keeping the conditions of hair growth. It has shown a reduction of the enzymatic expression of 5α reductase, induced by testosterone, increasing hair growth and improving visual appearance. Despise the pharmaceutical form, Serenoa repens can be considered as an approachable treatment for AGA, and an effective alternative for patients using synthetic drugs, without side-effects, regardless of gender.

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ISSN: 2574-1241

DOI: 10.26717/BJSTR.2020.32.005253

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