INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES
[ISSN: 0975-4725; CODEN(USA): IJPS00]
Journal Homepage: https://www.ijpsjournal.com

OPEN ACCESS

Review Article

Beard Oil: A review

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ARTICLE INFO

Published: 07 Dec. 2024
Keywords:
Beard, facial hair, Minoxidil, Testosterone, Tretinoin, Camouflage, Hair Transplant, Laser.
DOI:
10.5281/zenodo.14293247

ABSTRACT

Facial hair and beards are associated with masculine stereotypes and curiosity. Some men may want to use topical therapy to boost the density and development of their beards. This is a review of all the studies on topical beard enhancement methods. searching through all books with a mustache, beard, or facial hair as of July 22, 2020, in the US National Library of Medicine's PubMed database. The original search produced a total of 445 items. Following the publications' examination, three studies—two of which were double-blind clinical trials and one was a case report—matched the review's objectives. According to research by Ingprasert et al., topical 3% minoxidil significantly increased patient self-assessment, photographic grading, and hair count. When 2.5 percent testosterone gel was used by men with thalassemia major, Saeedi et al. saw an increase in terminal hair. A case report showing an unanticipated increase in beard density for a patient receiving tretinoin 0.05% cream was published by Vestita et al. Insufficient data exists regarding topical therapies to improve facial hair. An off-label medication to improve the beard is topical minoxidil. Additional topical treatments including bimatoprost, tretinoin, and testosterone may be available. To suggest the finest topical solutions for guys who want to improve the look of their beards, more research is required.

INTRODUCTION

For men in various cultures, growing a beard and facial hair has been a means of social expression. There are other variations, such as a goatee, sheave, or full beard. Individuals' social interactions with other sexes might be impacted by facial hair. Numerous research have indicated that beards contribute to a more male, powerful, and elderly-looking character . Certain cultures place religious significance on having a beard. Others, though, are more of a community or racial figure . [1] Some women are drawn to bearded males. Additionally, some women prefer them if they are selected to be long-term spouses or parents. However, cultural disparities can influence both

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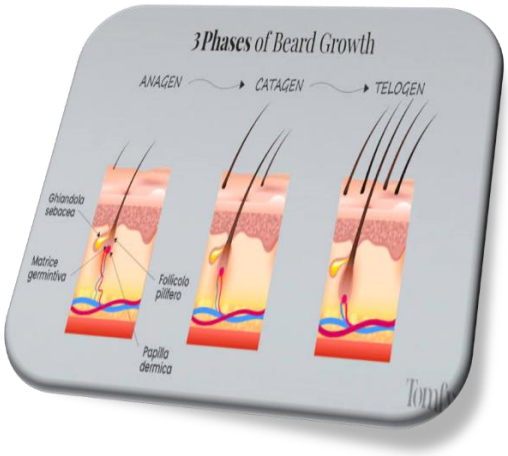
Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

women's and men's preferences for and ways of expressing facial hair. There would likely be a desire for some beard augmentation in men . Reviewing the topical treatments that are available for people looking to improve their facial hair is the goal of this article. Adjuvant and alternative therapies are also included.[2]



To identify any topical medicine to improve the development or density of the beard, use the PubMed search function of the United States National Library of Medicine. Examine all the titles that as of July 22nd have a mustache, beard, or facial hair. Reviewing the topical treatments that are available for people looking to improve their facial hair is the goal of this article. Adjuvant and alternative therapies are also included. To identify any topical medicine to improve the development or density of the beard, use the PubMed search function of the United States National Library of Medicine. Examine all the titles that as of July 22nd have a mustache, beard, or facial hair.[3]

Material :

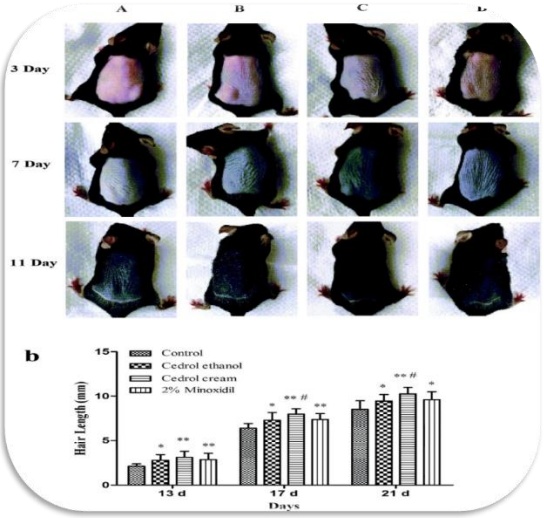
This study employed jojoba oil (Desert Whale, USA) and peppermint oil (Sanoflore, France), which was verified as 100% pure and natural essential oil by an organic product certification authority (ECOCERT-F-32600). Table 1 lists the chemical compositions of the used jojoba and peppermint oils. The source of the 3% minoxidil was Hyundai Pharmacia located in Korea. [4] Jojoba and castor oil are two of the most widely used carrier oils. You'll find these two ingredients in a majority of beard oils. Other commonly used carrier oils include abyssinian oil, babassu oil, coconut oil, argan oil, sweet almond oil, grape seed oil, sunflower seed oil, and apricot kernel oil.

Hair growth analysis :

Photographs of the animals were taken at weeks 1, 2, 3, and 4 following the start of topical administration in order to evaluate the amount of hair development in each group. The impact of hair growth was graded as follows: Numbers range from 0 (no hair growth) to 5 (less than 20% growth), 20% to 40% growth, 40% to 60% growth, 60% to less than 80% growth, and 80% to 100% growth.[5][6]

Histological analysis:

Diethyl ether was used to put the mice to sleep so that skin tissue could be removed. [7] The number of mice that were euthanized at weeks 1, 2, and 4 was 3, 3, and 5, respectively. Their dermal skin samples were then fixed for 24 hours in 10% buffered formalin and then embedded in paraffin wax using conventional methods. Hematoxylin-eosin (H&E) staining allowed us to see general histology, and then we used fluorescence microscopy (Axio imager, Carl Zeiss, Germany) to measure the quantity, length, and depth of hair follicles. The scale bar tool on the fluorescence microscope was also used to measure the skin thickness and follicular depth.



Isolation of total RNA and cDNA synthesis:

Using the High Pure RNA Isolation Kit (Roche Applied Science, Lenzburg, Germany) and the manufacturer's instructions, total RNA was extracted from the removed dorsal skin. The UV/Vis spectrophotometer (Mycosis Co., Korea) was used to measure the amount and quality of the extracted total RNA. We only examined samples that had 2.0 > OD 260/280 > 1.8 in more detail. Using an AccuPower Cycle Script RT Premix Kit (Bioneer, Korea) and 1 pg. of total RNA, 205 µl of cDNA was produced. [8]

Reverse transcription polymerase chain reaction :

Initially, 2 µl of the diluted cDNA was added to AccupowerTM PCR Premix (Bioneer, Korea) together with 10 pmol/L specific primer.[9] Next, cDNA was diluted 1:10 with sterile deionized water. Water was added to this reaction mixture until it reached a final volume of 20 µl. A PCR cycler (MycyclerTM thermal cycler, Bio-Rad, USA) was used to perform the PCR. The insulin-like growth factor-1 (IGF-1) cycling methodology was as follows: 35 cycles of 94°C for 30 s, 60°C for 30 s, 72°C for 30 s, and a final extension at 72°C for 5 min came after the first cycle of 94°C for 5 min. The GAPDH cycling protocol was as follows: First cycle, 94°C for 5 minutes; next, 35 cycles, 94°C for 30 seconds; 58°C for 30 seconds; 72°C for 30 s, 30 s at 72°C, and 5 minutes at 72°C as a final extension. The reaction products were observed using ethidium bromide (EtBr) and

electrophoresed in 1.5% agarose gels. Using an image analyzer (Kodak 1D v3.6 image Analysis system, USA), each band was quantified densitometrically and then normalized using GAPDH intensity. The primer sequences that were employed were: GAPDH forward 5'-AACGGATTTGGTCGTATTGG-3', reverse 5'-AGCCTTCTCCATGGTGGTGAAGAC-3'; IGF-1 forward 5'-AGAGACCCTTTGCGGGGCTGA-3', reverse 5'-CTTCTGAGTCTTGGGCATGT-3

Water and food intake, food efficiency ratio and body weight change :

The water and food intakes of experimental animals were measured once a week, and the weight was measured immediately before the experiment started and at 09:00~10:00 a.m. once a week during the experimental period.[10]

Statistical analysis :

Using SPSS WIN (v21.0), the data were statistically analyzed using the Student's t-test for group comparison. If the p-values were less than 0.05, the results were deemed statistically significant.[10][11]

Results :

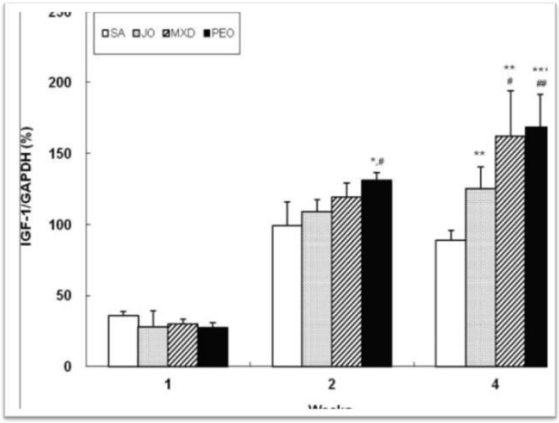
Hair growth promotion :

From week 2, PEO grew hair more rapidly than SA and JO. At week 3, PEO remarkably promoted hair growth than SA and JO, even greater than MXD. At week 4, PEO showed hair growth about 92%, whereas MXD about 55%The darkening of the skin tone, which signifies the transition from telogen to anagen (bright pink in telogen and grey/black in anagen), was used to assess the encouragement of hair development. PEO caused the dorsal skin tone to change from pink to grey/black at week 1, and starting at week 2, it demonstrated a noticeably quick rise in hair development. These findings unequivocally show that topical PEO treatment causes telogen mouse skin to rapidly develop anagen hair.[12]

Change of ALP enzyme activity with hair cycle : In comparison to SA, JO, and MXD, PEO had 253% ($p < 0.05$), 35%, and 13% higher ALP activity at week 2. In comparison to SA, JO, and MXD, PEO demonstrated 192% ($p < 0.05$), 90%, and 13% higher ALP activity at week four[13]. PEO caused the earliest telogen-to-anagen conversion in C57BL/6 mice after topical administration on their backs for four weeks; MXD, JO, and SA followed in that order. When compared to the MXD group, the PEO group's increase in ALP activity was swift, and it was noticeably larger than that of the SA and JO groups.[14]

Comparison of IGF-1 mRNA expression :

In comparison to SA and JO, PEO displayed 21% and 33% higher IGF-1 mRNA expression at week 2 ($p < 0.05$), respectively . In comparison to SA and JO, PEO demonstrated 89% ($p < 0.001$) and 34% ($p < 0.01$) higher IGF-1 mRNA expression at week 4, which was comparable to MXD. PEO significantly outperformed MXD in terms of enhanced IGF-1 mRNA expression.[15].



Change of water and food intakes, food efficiency ratio and body weight :

Body weight gain, food efficiency, and weight of MXD group were higher than the other groups but did not show significant difference . [16]Daily water intake, food intake, body weight gain, and food efficiency ratio in C57BL/6 mice applied with test compounds for 4 wks.

Items / Groups	SA	JO	MXD	PEO
Water intake (ml/day)	6.96 ± 0.12	7.12 ± 0.19	7.16 ± 0.12	7.14 ± 0.15
Food intake (g/day)	4.61 ± 0.28	4.51 ± 0.27	4.78 ± 0.28	4.64 ± 0.20
Body weight gain (g/day)	0.20 ± 0.02	0.18 ± 0.04	0.25 ± 0.03	0.20 ± 0.04
Food efficiency ratio (%)[1)]	4.38 ± 0.47	3.93 ± 0.75	5.22 ± 0.69	4.36 ± 0.67

DISCUSSION:

Although MXD has been used extensively to treat androgenetic alopecia, little is known about the pharmacological activity of the drug or the specific cells in hair follicles that it targets . When MXD was applied topically, [17]it was thought to promote hair development through an indirect pharmacological effect, such as by causing a localized irritation or vasodilatation, which increases blood flow to the follicular dermal papilla cells . The most likely target region for MXD's activity is the follicular dermal papilla cells . According to Mori and Uno, topical MXD administration selectively increases telogen follicles' secondary germ, causing them to develop into anagen follicles more quickly. As a result, hair follicles are helpful indicators linked to the hair cycle . The evolution of anagen I–VI is described Dermal thickness alterations that are stage-dependent in mice with synchronized hair follicle cycling are similarly linked to this phenomenon. A telogen, anagen I, or anagen II hair follicle has not yet developed into the subcutis. The follicles descend to the subcutis from the dermis during the anagen III stage.[18] Without significantly altering body weight gain or dietary efficiency, we discovered that PEO significantly accelerated hair growth in comparison to SA and JO and even quicker than MXD. According to Chen et al. [19], mice's hair totally regrows in just 10 days following topical administration of MXD, suggesting that MXD has an augmenting influence on the proliferative rate of hair development. Histological examination of our study's samples at week two revealed that MXD increased hair development in terms of the quantity, depth, and dermal thickness of hair follicles. One of the main ingredients of peppermint oil, a cyclic alcohol, is menthol. Menthol is a common ingredient in food and cosmetic products. It has been observed that menthol alters the Ca2+ currents in neuronal membranes, hence increasing the sensitivity of cutaneous cold receptors .The most successful penetration enhancer that might be regarded as the model for the use of terpenes as penetration enhancers is menthol, along with limonene .[20] Terpenes, such as menthol, β-pinene, terpinene-4-ol, α-pinene, and 1,8-cineole, have been utilized

for many years either on their own or as components of essential oils in pharmaceuticals, cosmetics, and home goods. Terpenes have also been thoroughly investigated in the field of transdermal medication forms and experimental dermopharmacy as penetration enhancers Because of competitive hydrogen bonding, the network of hydrogen connections between ceramides may become less rigid when skin is treated with terpenes [21]. The majority of terpenes have a high concentration in the skin layers, which indicates that they can readily enter blood circulation in vivo and infiltrate the stratum corneum. According to our research, PEO stimulated the growth of exceptionally long and thick hair after topical administration for four weeks. [22]It also encouraged the elongation of hair follicles in a vertical portion from the epidermis to the subcutis, indicating that they were in the anagen III stage. MXD application produced comparable outcomes. We found that the lengthening of the keratinized hair shaft was correlated with the increase in hair follicle length and that it was not connected with any loss of hair follicle architecture. The purpose of alopecia treatment medications is to either initiate or sustain the anagen stage of the hair cycle. In particular, cutaneous papillae showed evidence of ALP activity. ALP activity in the dermal papilla peaked in early anagen, remained low during catagen, and was moderate in very early anagen . Only in early anagen did the bulbar dermal sheath exhibit strong ALP activity . The bulk of the evidence suggests that there is a direct relationship between the depth of the hair follicle and the amount of ALP activity, [21][22]despite the fact that clinical trial results differ. In comparison to MXD, PEO in our study caused noticeably higher ALP activity at week two. This study shows that PEO promotes ALP and dermal papilla. We examined the IGF-1 gene's mRNA expression in order to gain a better understanding of the endocrine system's role in hair development. It is a strong mitogen that promotes cell survival and proliferation and contributes to the thinning of hair . In our investigation, PEO demonstrated noticeably higher IGF-1 mRNA expression at week two, while MXD did so at week four. In summary, our experimental results indicate that 3% PEO promotes the preservation of hair dermal papilla vascularization, which may aid in the induction of the early anagen stage and hence aid in hair development. Furthermore, PEO successfully promoted hair development in an animal model through a number of methods, suggesting that it can be utilized as a therapeutic or preventive alternative medication for human hair loss.[22][23].

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HOW TO CITE: Rushikesh Tangade*, Ashok Jagdale, Kawade R. M., Beard Oil: A review, Int. J. of Pharm. Sci., 2024, Vol 2, Issue 12, 608-615. https://doi.org/10.5281/zenodo.14293247