The Efficacy of Hemp Seed Extract Cream in Treating Facial Seborrheic Dermatitis; A Pilot Study

Natcha Intarathachang* and Punyaphat Sirithanabadeekul

Division of Dermatology, Chulabhorn International College of Medicine, Thammasat University, Pathum Thani, Thailand
*Corresponding author, E-mail: pearnatcha.i@gmail.com

Abstract

Seborrheic dermatitis (SD) is one of the most prevalent forms of dermatitis. It is characterized as a form of dermatitis by the presence of red, scaly, and oily patches on the seborrheic area. Currently, there are numerous different medications available for the treatment of seborrheic dermatitis; however, the primary therapy of choice that is widely used among physicians all over the world is groups of topical corticosteroids, which are known to lead to a significant amount of side effects over the long-term usage. Hemp seed extract contains various active ingredients, the most important one is cannabidiol or CBD, that have been studied both in vitro and in vivo to have anti-inflammatory, decreased erythema, and sebum-inhibiting effects. Therefore, hemp seed extract could have potential treatment for facial seborrheic dermatitis (SD). The objective of this study was to determine the effectiveness of a cream containing hemp seed extract is effective in the treatment of SD. A total of ten participants were recruited, and over the course of two weeks, they used the cream on the lesion on face twice daily every day. The severity of SD was evaluated at the beginning of the study, then again after one and two weeks, and side effects were also monitored. The findings of this study demonstrated that applying a cream containing hemp seed extract decreased the clinical severity of SD, as evidenced by a reduction in erythema as well as sebum production. According to the findings of the study, topical hemp seed extract may be an effective alternative therapy option for SD, as it's safe from adverse effects.

Keywords**:** *Seborrheic Dermatitis, Hemp, Hemp Seed Extract, Cannabidiol, SEDASI*

1. Introduction

Seborrheic dermatitis is one of the most prevalent chronic-recurrent inflammatory skin conditions. It is defined by the erythematous and greasy scaling of skin, which is often spread on the seborrheic area, which includes the face, scalp, ears, eyebrows, and upper chest area (Schwartz et al., 2006). Seborrheic dermatitis is most prevalent in adolescents and young adults, with the frequency rising again in people older than 50. SD is estimated to impact between 1 and 5 percent of the global population. (Dessinioti & Katsambas, 2013). The pathophysiology of SD is currently unknown. There are many theories purposed included the overgrowth of Malassezia spp., sebaceous gland activity with high sebum production, Immune responses, and neurogenic disease such as Parkinson's disease variables are also linked to SD etiology (Naldi & Rebora, 2009).

Topical and oral antimycotic agents, such as itraconazole and ketoconazole, as well as topical corticosteroids and immunomodulating agents, such as tacrolimus and pimecrolimus (Cheong et al., 2015), are some of the treatment options available for SD in areas of the body other than the scalp. Other treatment options include laser therapy and phototherapy. Since the use of topical corticosteroids appears to be particularly common among general practitioners, there has been a lot of concern about the potentially harmful side effects of using corticosteroid creams for an extended period of time (Kastarinen et al., 2014).

Cannabis sativa L. is a plant that has been utilized throughout history for a variety of goods produced from its fiber and oilseed. Hemp (non-drug Cannabis sativa L.) is appealing for use in skin care and cosmetics due to its contents, particularly unsaturated fatty acids in the seed, which have therapeutic properties (Leizer et al., 2000).

Phytocannabinoids are the aggregate name for the chemical compounds that are found in Cannabis sativa. THC and CBD, the most prevalent phytocannabinoids in marijuana and hemp, respectively, are the most well-known and understood phytocannabinoid compounds. As an agonist, tetrahydrocannabinol exerts its well-known intoxication effects primarily via the CB1 receptor (VanDolah et al., 2019). Cannabidiol, on

the other hand, has been reported to exert a number of complicated pharmacological effects. To interact with and process action potentials, cannabinoids require particular receptors. CB1 and CB2 are cannabinoid receptors that are found on the plasma membrane of neurons in both the CNS and the PNS (Lu & Mackie, 2016), CB1 is heavily related with psychotropic compounds in cannabis (Burstein, 2015) and is mostly situated on the central nervous system, whereas CB2 is primarily placed on the peripheral nervous system and is associated with cannabinoids' anti-inflammatory and immune modulatory actions.

Even though the main receptor of CBD is CB1 and CB2 receptor, there were various studies on TRPV1 agonists that interact with CBD. The neuropeptides produced upon activation of TRPV1 have anti-inflammatory and immunomodulatory effects in some inflammatory illnesses, such as osteoarthritis (Peyravian et al., 2020). This evidence may imply that CBD has anti-inflammatory properties (Peyravian et al., 2020). CBD has also been demonstrated to increase lipid formation in human sebocytes at low concentration, whereas higher concentrations of the cannabinoid induce apoptosis of sebocyte (Oláh et al., 2014).

Thus, the hemp seed extract cream could be a potential treatment option for seborrheic dermatitis due to its anti-inflammatory properties, ability to inhibit sebum production and reduce erythema. Additionally, the high concentration of essential fatty acids in hemp seed extract has been found to have a positive effect on the epidermal barrier function, which is often impaired in patients with seborrheic dermatitis.

2. Objectives

To evaluate the efficacy and safety of hemp seed extracted cream in the treatment of facial seborrheic dermatitis.

3. Materials and Methods

This study was conducted from October 2022 to February 2023 at Dermatology OPD, Benchakitti Park Hospital. Ten participants who were 20 years old or older, had a clinical diagnosis of mild to moderate seborrheic dermatitis localized to the face using the Seborrheic Dermatitis Area and Severity Index (SEDASI) (Micali et al., 2017), and had not received any topical or systemic treatment or probiotics for SD during the month before enrollment were included in this study. The exclusion criteria included pregnant subjects, patients with any severe concomitant dermatitis (e.g. acne, rosacea, contact dermatitis) on the face, patients with history of allergy to the components of hemp seed extract, patients with history of substance abuse, patient who were receiving systemic corticosteroid therapies or immunosuppressants, and patients who were unwilling or unable to follow the study protocol.

All consecutive patients who fulfilled the inclusion and exclusion criteria were invited to participate in the study. All participants were instructed to apply hempseed extract cream 1 finger-tip unit (0.5gm) on thelesion twice daily. The hemp seed cream used in this study was tested for contamination and composed of 1% hemp seed oil, water, disodium EDTA, propylene glycol, carbomer 940, allantoin, IPP, mineral oil, tween 20, cetyl alcohol, lipomulse luxe, triethanolamine (TEA), and phenoxyethanol. The participants were also asked not to use any topical medication and moisturizer during the study. On the first day of visit, every participant was tested of irritation reaction by applying the cream on the antecubital area for 30 mins before prescribed the medication, which none of the participants experienced any irritation. Follow ups were on day 7 and day 14 after using the medication. Participants were evaluated on SEDASI score , erythema index measured by Mexameter®, sebum level using Sebumeter®and transepidermal water loss using TEWA® in every follow up.

The STATA program MP version 14 was used for the statistical analyses. SEDASI score, erythema index and sebum level were presented as mean ± SD and analyzed by Paired-t test to compare with baseline. P-value <0.05 was considered as statistical significance.

4.1 Results

This study was conducted at the out-patient department of Dermatology, Benchakitti park hospital. Total 10 participants, four males and six females, who met the inclusion criteria were enrolled in this study. The average age of participants was 32.1± 13.97 years old. The baseline severity was measured by SEDASI

score, with 50% of mild severity and 50% of moderate severity. No patients withdrew from study. The baseline characteristics are shown in Table 1.

Table 1 Dermographic characteristics of participants

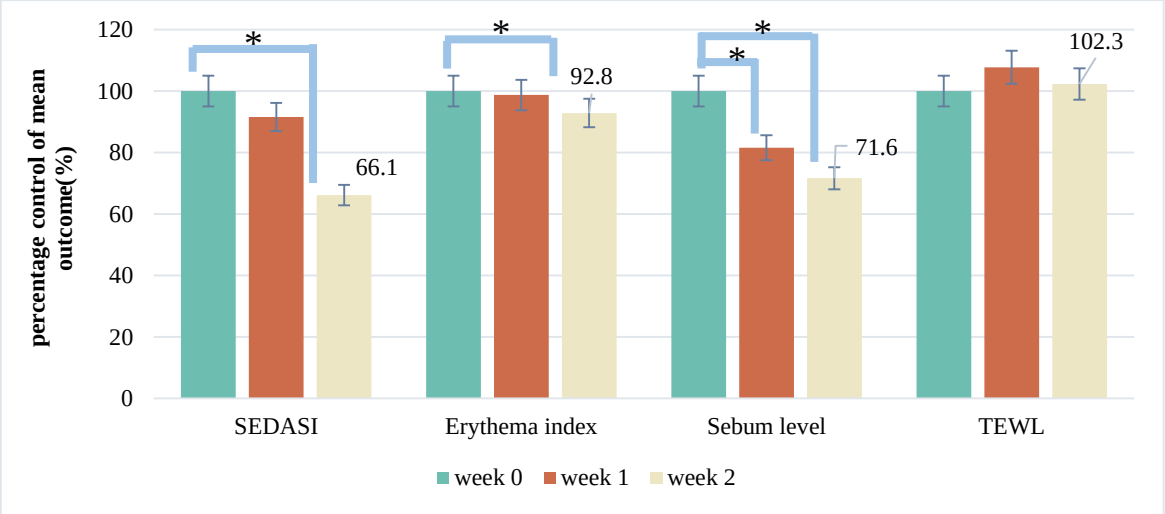
Dermographic characteristics	Value (%) n=10
Sex	
Male	4 (40%)
Female	6 (60%)
Age(years), mean±SD	32.1± 13.97
Severity by SEDASI	
Mild	5 (50%)
Moderate	5 (50%)

Table 2 Mean SEDASI, sebum level, erythema index and transepidermal water loss

Week	SEDASI		Sebum		Erythema		TEWL	
	Mean± SD	P-value	Mean± SD	P-value	Mean± SD	P-value	Mean± SD	P-value
0	18.90± 3.63	1	53.87±11.35	1	454.103± 22.93	1	27.32± 5.96	1
1	17.31±2.54	0.268	43.94± 9.36	0.0469*	448.585±23.61	0.3973	29.43±3.85	0.363
2	12.52±3.17	0.005*	38.61±8.88	0.0015*	421.695±16.73	0.0075*	27.92±0.67	0.78

*P-value <0.05 was considered as statistical significance.

The results of the study indicated that the application of hempseed extract cream led to a reduction in the Seborrheic Dermatitis Area and Severity Index (SEDASI) score starting from the first week of treatment, which accounted for 8.5%. This reduction was statistically significant compared to the baseline measurements, as reduced 33.9% and by a P-value of 0.01, as illustrated in Table 2 and Figure 1. The reduction of the erythema index, as assessed by the Mexameter®, in the first week of treatment with hempseed extract cream. This decrease was significant compared to baseline, as reduced 7.2%, in the second week, indicated by a P-value of 0.02. The findings are presented in Table 2 and Fig 1. The sebum level was measured utilizing a Sebumeter®, and the results depicted in Table indicated that the use of hemp seed extract cream resulted in a significant reduction in sebum levels from the first week of treatment. It decreased 18.5% from the first week of use. This reduction persisted throughout the second week, approximately 28.4% with a P-value of 0.02 and 0.001, respectively. The last measurement is TEWL (Trans-Epidermal Water Loss), which is a measure of the amount of water that is lost from the skin surface to the environment using TEWA®. The data in table 2 and Figure 1 suggest that there is no significant difference in TEWL between the baseline and post treatment. According to the results, the percent of mean TEWL increased 7.7% and 2.3 % after the treatment.



* P-value <0.05 was considered as statistically significant.

Figure 1 Percentage control mean of outcomes.

4.1.1 Safety and side effects

Within the study, one participant (10%) reported skin dryness and scaling after applying hemp seed extract cream, while one (10%) participant reported irritation surrounding the lesion during the first week. In week 2, one subject (10%) experienced scaling of the lesion. The skin's dryness and scaling improved after using a cream-based moisturizer, and there was no recurrence of scaling after that. During the trial duration, no subjects reported any systemic side effects.

4.2 Discussion

Seborrheic Dermatitis (SD) is a common skin condition that affects up to 5% of the general population (Naldi & Rebora, 2009). It is characterized by erythematous, scaly, and greasy plaques on seborrheic areas such as the face, scalp, and chest. (Naldi & Rebora, 2009). The exact cause of SD is unknown, but it is believed to be related to the interaction of factors such as Malassezia yeast (A. K. Gupta et al., 2004), genetics, and an individual's immune response (Aditya K Gupta et al., 2004).

Hemp seed extract is derived from the seeds of the hemp plant (Cannabis sativa). It contains a variety of compounds, including cannabidiol (CBD), which is a non-psychoactive compound with potential therapeutic benefits (Farinon et al., 2020). Hemp seed extract and CBD have been shown to have anti-inflammatory effects through many pathways as evidenced by both in vitro and in vivo studies, it also inhibit sebum production (Oláh et al., 2014) by suppressing the p65 NF-κB pathway. Moreover, hemp seed extract can reduce erythema (Ali & Akhtar, 2015). In a study on human skin cells, CBD was found to suppress the production of pro-inflammatory cytokines (Tüting & Gaffal, 2017), which are molecules that can contribute to skin redness and inflammation. These properties make hemp seed extract and CBD potential treatments for seborrheic dermatitis (Ali & Akhtar, 2015).

Patients with seborrheic dermatitis reported elevated TEWL similar to individuals with AD, indicating decreased permeability function. Most likely explanation for aberrant TEWL in SD is the impaired epidermal barrier function (Maghfour et al., 2021) resulting from the inflammatory process of the skin. In this research, there was no difference between the baseline and treatment results of TEWL. The absence of a difference in TEWL values may be attributable to skin dryness, after using hemp seed extract cream, resulting from decreased sebum production and sebocyte apoptosis. According to a 2015 study by Ali et al., 3% topical cannabis seed extract reduced sebum production and erythema (Ali & Akhtar, 2015).

The results of this study reveal that hemp seed extract cream is effective in lowering the severity of seborrheic dermatitis and the erythema index during the second week of use. In addition, the sebum level

decreased dramatically throughout the first week of use. All of these qualities suggest that hemp seed extract cream may be beneficial for treating seborrheic dermatitis.

Regarding the investigation of safety and adverse effects, a limited number of patients have reported moderate adverse reactions, such as mild scaling and itching. This study has a few limitations, including a small sample size, a restriction to a single site, the absence of an evaluation of long-term use, and the inclusion of only Thai participants.

5. Conclusion

As it reduces clinical severity, erythema, and sebum production, hemp seed extract cream is useful and safe for the treatment of seborrheic dermatitis. Since seborrheic dermatitis is a chronic and recurrent illness, individuals who do not want to take long-term topical corticosteroids may use hemp seed extract cream as an alternative. Further studies are needed to compare the effectiveness and long-term side effects of hempseed extract cream and conventional treatment.

6. Acknowledgement

The author would like to thank all staffs at department of dermatology, CICM for their guidance and consultation all the way through this research.

7. References

Ali, A., & Akhtar, N. (2015). The safety and efficacy of 3% Cannabis seeds extract cream for reduction of human cheek skin sebum and erythema content. *Pakistan journal of pharmaceutical sciences*, *28*(4).

Burstein, S. (2015). Cannabidiol (CBD) and its analogs: a review of their effects on inflammation. *Bioorganic & medicinal chemistry*, *23*(7), 1377-1385.

Cheong, W. K., Yeung, C. K., Torsekar, R. G., Suh, D. H., Ungpakorn, R., Widaty, S., Azizan, N. Z., Gabriel, M. T., Tran, H. K., & Chong, W. S. (2015). Treatment of seborrhoeic dermatitis in Asia: a consensus guide. *Skin appendage disorders*, *1*(4), 187-196.

Dessinioti, C., & Katsambas, A. (2013). Seborrheic dermatitis: etiology, risk factors, and treatments:: facts and controversies. *Clinics in dermatology*, *31*(4), 343-351. https://www.sciencedirect.com/science/article/abs/pii/S0738081X13000023?via%3Dihub

Farinon, B., Molinari, R., Costantini, L., & Merendino, N. (2020). The seed of industrial hemp (Cannabis sativa L.): Nutritional quality and potential functionality for human health and nutrition. *Nutrients*, *12*(7), 1935.

Gupta, A. K., Batra, R., Bluhm, R., Boekhout, T., & Dawson, T. L., Jr. (2004). Skin diseases associated with Malassezia species. *J Am Acad Dermatol*, *51*(5), 785-798. https://doi.org/10.1016/j.jaad.2003.12.034

Gupta, A. K., Madzia, S., & Batra, R. (2004). Etiology and management of seborrheic dermatitis. *Dermatology*, *208*(2), 89-93.

Kastarinen, H., Oksanen, T., Okokon, E. O., Kiviniemi, V. V., Airola, K., Jyrkka, J., Oravilahti, T., Rannanheimo, P. K., & Verbeek, J. H. (2014). Topical anti-inflammatory agents for seborrhoeic dermatitis of the face or scalp. *Cochrane Database Syst Rev*(5), CD009446. https://doi.org/10.1002/14651858.CD009446.pub2

Leizer, C., Ribnicky, D., Poulev, A., Dushenkov, S., & Raskin, I. (2000). The composition of hemp seed oil and its potential as an important source of nutrition. *Journal of Nutraceuticals, functional & medical foods*, *2*(4), 35-53.

Lu, H.-C., & Mackie, K. (2016). An introduction to the endogenous cannabinoid system. *Biological psychiatry*, *79*(7), 516-525. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4789136/pdf/nihms734601.pdf

Maghfour, J., Rundle, C. W., Rietcheck, H. R., Dercon, S., Lio, P., Mamo, A., Runion, T. M., Fernandez, J., Kahn, J., & Dellavalle, R. P. (2021). Assessing the effects of topical cannabidiol in patients with atopic dermatitis. *Dermatology Online Journal*, *27*(2).

Micali, G., Lacarrubba, F., Dall'Oglio, F., Tedeschi, A., & Dirschka, T. (2017). A new proposed severity score for seborrheic dermatitis of the face: SEborrheic Dermatitis Area and Severity Index (SEDASI). Journal of the American Academy of Dermatology,

Naldi, L., & Rebora, A. (2009). Seborrheic Dermatitis. *New England Journal of Medicine*, *360*(4), 387-396. https://doi.org/10.1056/NEJMcp0806464

Oláh, A., Tóth, B. I., Borbíró, I., Sugawara, K., Szöllõsi, A. G., Czifra, G., Pál, B., Ambrus, L., Kloepper, J., & Camera, E. (2014). Cannabidiol exerts sebostatic and antiinflammatory effects on human sebocytes. *The Journal of clinical investigation*, *124*(9), 3713-3724. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4151231/pdf/JCI64628.pdf

Peyravian, N., Deo, S., Daunert, S., & Jimenez, J. J. (2020). Cannabidiol as a novel therapeutic for immune modulation. *ImmunoTargets and therapy*, *9*, 131.

Schwartz, R. A., Janusz, C. A., & Janniger, C. K. (2006). Seborrheic dermatitis: an overview. *American family physician*, *74*(1), 125-130.

Tüting, T., & Gaffal, E. (2017). Regulatory Role of Cannabinoids for Skin Barrier Functions and Cutaneous Inflammation. In *Handbook of Cannabis and Related Pathologies* (pp. 543-549). Elsevier.

VanDolah, H. J., Bauer, B. A., & Mauck, K. F. (2019). Clinicians' guide to cannabidiol and hemp oils. Mayo Clinic Proceedings,