International Journal of Herbal Medicine
Available online at www.florajournal.com

E-ISSN: 2321-2187
P-ISSN: 2394-0514
www.florajournal.com
IJHM 2023; 11(4): 47-50
Received: 05-05-2023
Accepted: 08-06-2023

Jalal Fandi
Faculty of Pharmacy, Damascus University, Damascus, Syria.
Jalal.fandi@damascusuniversity.edu.sy

Ailsi Sami Alhames
(1) Faculty of Pharmacy, International University for Science and Technology (IUST), Daraa, Syria
(2) MSc. Pharmaceutical science, University of East London (UEL), London, United Kingdom
elssi.hames98@gmail.com

Farah Waled Hamed
Faculty of Pharmacy, International University for Science and Technology (IUST), Daraa, Syria
farahhamed606@gmail.com

Dr. Bassel Hussein
Faculty of Pharmacy, Aljazeera Private University (JPU), Daraa, Syria. Scientific Studies and Research Centre, Damascus, Syria
basselhussein10@yahoo.fr.

Corresponding Author:
Dr. Bassel Hussein
Faculty of Pharmacy, Aljazeera Private University (JPU), Daraa, Syria. Scientific Studies and Research Centre, Damascus, Syria

Assessment of a topical cream containing cabbage (*Brassica oleracea*) and lettuce (*Lactuca sativa*) extracts for the treatment of acne vulgaris

Jalal Fandi, Ailsi Sami Alhames, Farah Waled Hamed and Dr. Bassel Hussein

DOI: https://doi.org/10.22271/flora.2023.v11.i4a.879

Abstract
The skin is the largest organ in the human body which is affected by many diseases. Acne vulgaris (AV) is a multifactorial inflammatory disorder affecting skin areas, and the patients constitute a large proportion of dermatology clinics worldwide. The most severe occurrence is during adolescence, a self-extension disease with psychological side and physical effects. This study aimed to prepare a pharmaceutical dosage form (Dermic cream), apply it to AV patients, and evaluate its efficacy and safety. The prepared cream contained an alcoholic extract of two widespread leafy vegetables: Cabbage and Lettuce. After applying the exclusion parameters on 34 volunteers, only 19 patients were chosen, and they applied the cream for 30 days twice a day. The results showed different responses to the treatment. The severe and moderate cases of AV had reduced to mild cases, and the mild cases were utterly healed after applying the cream for nearly 15 days. This study proved the efficacy of both cabbage and lettuce in a dermal cream for the treatment of acne. The best concentration of cabbage was 6%, and it gave an anti-inflammatory effect, while the best concentration of lettuce was 2% which had a peeling effect. This study also found that the prepared cream was well-tolerated and had minimal side effects. These findings suggest that cabbage and lettuce extracts could be together a safe and effective natural alternative for treating acne vulgaris.

Keywords: Acne vulgaris (AV), disorder, cases, treatment, pharmaceutical dosage form, extracts, cabbage, lettuce- responses, efficacy, safety

1. Introduction
Acne vulgaris is a common skin disease affecting approximately 9.4% of the world's population, with the highest prevalence in adolescents [1]. It is a common dermal disorder that primarily acts on adolescents and young adults. This affects about 80% of the population between 12-25 years old. The onset can begin in their twenties or so [1]. The thirties can continue to count in (12% of women and 3% of men) until the age of 44 years, Acne occurs in males and females, and males are more severely affected, and this may be due to the effect of hormones; while females develop earlier and the white race was affected more than the yellow race and Negroes. No relationship was observed between the economic or social level, and the occurrence of AV [2]. However, several factors contribute to the pathogenesis of AV such as: Excess sebum secretion, and follicular hyperkeratosis. In the form of a zoonotic lesion. Several hypotheses are put to explain the cause of the follicular hyperkeratosis, one of the proposed causes is linoleic acid deficiency which may lead to hyperkeratosis. Also, there is an important role of bacteria in the skin. Three main micro-organisms have been isolated from the skin of acne patients, namely *Staphylococcus epidermidis*, *Staphylococcus aureus*, *Propionibacterium acnes Malassezia furfur*. The *Streptococcus pyogenes* play a significant role in acne [3]. Inflammatory processes, according to several mechanisms, which are gram-positive, and non-motile aerobic, coexist with infectious lesions in normal sebaceous follicles [4]. Inflammatory reaction: Microscopic blemishes or whiteheads are the primary lesions in acne, which progresses to infections later. Histologically, lymphocytes and neutrophils are observed around the capillary of infected areas [4].Other factors may cause AV such as heredity, some types of diet, stress, and anxiety [5-8]. It is not easy to develop a specific treatment plan for acne patients, because of the diversity of clinical manifestations and different responses to drugs, however, there are two main types of treatment: Topical and systemic treatments. For the Topical one, isotretinoin is highly effective in treating AV. Benzoyl peroxide is used for the treatment of acne, and some antibiotics are used also as topically and systemic [9, 10].

Natural extract therapy based on the study of botany and the use of plants for medicinal purposes have recently received more attention for treating acne. Plants have been the basis of medicinal treatments during human history, such as *Vitex agnus-castus, Calendula officinalis, Ocimum Basilicum, Triticum aestivum, Brassica oleracea var, and Lactuca. Sativa* [11-13]. Many of the studied plant species presented high therapeutic potential for treating cutaneous lesions without any noticeable side effects [14-16]. The purpose of this study is to prepare a dermal cream containing *Brassica oleracea* var (Cabbage) and *Lactuca. sativa* (Lettuce) extracts for acne treatment and apply the cream product on a sample of volunteers suffering from varying acne severities and determine its efficacy and safety on them.

2. Materials and Methods

2.1 Cabbage or cabbage

The scientific name is *Brassica oleracea* var. *capitata* L. from the cruciferous or cabbage family "little cabbage."

2.1.1 Chemical composition

Cabbage is rich in sulfur compounds, to which the content of glucosinolates is attributed. It is low in fat and high in vitamins, as it is known for its high content of antioxidants such as vitamins E and C, carotenoids, and antioxidant enzymes such as catalase and peroxidase.

These compounds are all present in high percentages in fresh uncooked cabbage, as well as for anthocyanins, flavonoids, terpenes, coumarins, and other compounds essential for plant metabolism [18, 19].

2.2 Lettuce

The scientific name is *Lactuca sativa* of the compound family Asteraceae. Lettuce contains more than 95% of water, in addition to the main chemical components of fat, Minerals, protein, carbohydrates, and fiber. These ingredients exist in relatively small quantities with varying proportions between species and the plant's growth and cultivation conditions. Lettuce contains also margaric, palmitoleic acid, palmitic acid, and myristic acid [the fatty acids from linolenic and arachidic acid, linoleic acid, oleic acid, stearic acid, behenic acid, pentadecylic acid [20]. It contains polyphenols, caffeic acid derivatives (in green species), and anthocyanins, flavones in the red species, as it contains vitamin C [20, 21]. Cabbage and Lettuce were purchased from the local market, at commercial maturity stage, and were chosen to be free of insects and mechanical damage.

2.3 Other materials used for the prepared cream

Vaseline, beeswax, coconut oil, wool fat, cetyl alcohol, glycerin, cetyl stearyl alcohol, preservatives, stearic acid, tri-ethanolamine, paraffin oil (From Merck, and Sigma-Germany). The alcoholic extracts of (green cabbage, purple cabbage, and lettuce) are used as active ingredients. All other chemicals and reagents were of analytical grade and used as received.

2.4 The botanical extracts and the extraction method

The following extraction modified method was adopted: [16]. Fresh and clean leaves were obtained for each of the studied plant species (lettuce and cabbage) are dried industrially by an oven to remove as much water as possible inside the composition of each of them, where about (50- 60%) of its initial weight) was lost. After that, to increase the efficiency of the extraction process, we weighed 200 grams of dried leaves with low moisture in the form of small and soft parts. The plant samples (200 g) were immersed in 1000 ml of (ethyl alcohol/ water) (30/ 70) (volume/ volume), and they left for 24 hours on an electric shaker at a rate of 100 rpm. Then the extracts were filtered in the rotary evaporator (Rotavapor® R-300- Buchi Labortechnik AG- Switzerland) to get rid of residual alcohol. All the extracts were collected in a sterile vial and stored at a temperature of -18 °C until use.

2.5 Cream preparation

The cream was prepared as the following: Mixing and heating the components of the oily and the aqueous phases separately in a water bath at 65 °C, then adding the oily phase to the aqueous phase gradually with continuous stirring while temperature was reduced. At a temperature of 45 °C, the plant extracts (with different concentrations), and the preservatives were added. The chosen cream was determined due to some factors as, the homogeneity of appearance, ease of spreading on skin, and the cream stability during storage of different temperature degrees.

2.6 Participants, sampling, and interventions

The inclusion and exclusion criteria were included in this study for the participants at the beginning of the experiment. The chosen cream was applied to nineteen volunteers. All volunteers were of medium or severe cases. They were informed to use a thin layer of cream topically on the affected acne areas two times daily, and in the case of exposure to the sun, sunscreen is needed. Volunteers filled out a questionnaire by age, sex, skin type, where acne mainly spread, and their previous treatment history. A total of 34 volunteers were assessed for eligibility, from which 19 were eligible for participation.

2.7 Inclusion criteria

- Adult participants (≥ 17 years old).
- Participants were diagnosed with acne vulgaris by dermatologists.
- Participants were willing to follow the instructions.
- Participants have not taken any kind of topical or systematic medications for the past month.

2.8 Exclusion criteria

- Pregnancy or planning to get pregnant.
- Lactation.
- Any other dermatological disorders.
- Allergy towards any of the cream components.

3. Results and Discussion

The prepared cream was applied to nineteen volunteers with different acne cases. All the nineteen participants who completed the study, showed improvement in their acne condition within 30 days of treatment. The optimal concentration of cabbage in cream was 6%, and it gave an anti-inflammatory effect, while the best concentration of lettuce was 2% which had a peeling effect. Table 1 shows information about volunteers and the improvement advancement during the treatment (Baseline, after 15, and 30 days of treatment).

Also, two significant cases are presented in Detail. (Figures 1-2). The obtained results showed the effectiveness of the applied product in treating most cases. The efficacy of the product included the improvement of volunteer's situation, which was assessed by decreasing the spread area of acne pimples (such as on the face, back, chest), and in decreasing the acne pimples size, or even disappearing all or parts of them. The most

common side effects reported by the participants were light to mild skin irritation and dryness. No serious adverse reactions were reported during the study period. None of the 19 cases stopped the treatment before 30 days of starting the trial.

Case Number- 1

A 23-years-old teenage girl with oily skin type had moderate papulopustular acne concentrated on the right cheek. She had not sufficiently improved by treating with systemic Azithromycin for one month, or with Benzyl peroxide 5% gel and Sulfur soap at 19 years old. At age 21, she used Clindamycin 1% solution and Tretinoin 0.01% gel. The improvement with these products was little and not satisfactory. This patient was convinced to stop this prescription and use only our prepared cream. During the treatment of the cream which lasted for 30 days, there was an excellent improvement without any mentioned side effects (Figuer.1.).

Fig 1: Case Number 1.

(Before treatment and after 30 days of treatment)

Case Number-2

A 19-year-old female patient with oily skin type suffered from severe acne, concentrated especially on the cheeks. At the age of 14, she had taken doxycycline tablets 100 mg once daily for 3 months with a combination of topical treatment: Benzyl peroxide 5% gel and Sulfur soap. At age 16, she had used a drug prescribed by a dermatologist containing: Glycolic acid 6% cream, Clindamycin 1% solution, and Tretinoin 0.01% gel. The improvement was slight and only during the use of drugs. This patient was convinced to stop this prescription and use only our prepared cream and follow the instruction of the experiment.

Figure.2. showed the improvement of the volunteer with no side effects during the treatment.

Fig 2: Case Number 2.

(Before treatment and after 30 days of treatment).

4. Conclusions

The efficacy and safety of the prepared cream containing *Brassica oleracea* and *Lactuca sativa* extracts were studied in treating acne vulgaris cases of nineteen subjects. The optimal formula of the cream containing the plant extracts was chosen carefully depending on many factors such as appearance, cream homogeneity, ease of spread on skin, and stability. The progress of treatment was observed in different periods of time (Baseline, after 15 days, and 30 days of treatment). According to the previous results, the prepared cream showed excellent efficacy in treating acne patients with no noticeable side effects. This efficacy may be due to the presence of several chemical groups in the botanical extracts, such as Phenols, flavonoids, and other compounds which have anti-inflammatory effects, and antioxidant activity. This research proved the benefits of using *Brassica oleracea* and *Lactuca sativa* extracts in a pharmaceutical cream form of acne treatment. Our results showed that the prepared cream significantly reduced inflammatory and non- inflammatory acne lesions and had a relevant effect on reducing acne severity. The best results were of cabbage concentration 6% and lettuce concentration 2%. More investigations and studies are needed in the future to ascertain these results.

Table 1: Volunteers Information, and the estimation of the cream efficacy and safety

Volunteers Information					Estimation after 15 days of treatment	Estimation after 30 days of treatment
Case	Sex	Age	Acne Area	Acne Degree		
1	F	23	Forehead and shoulders	Medium	Noticeable improvement after 5 days	Complete disappearance of acne
2	F	22	All the face	Medium	Immediate improvement	Complete disappearance of acne
3	F	17	Forehead and right cheek	Medium	improvement	Complete disappearance of acne
4	M	19	Forehead and shoulders	sever	Excellent improvement	Complete disappearance of acne
5	F	19	Both cheek	sever	Good improvement	Decrease in acne size and count
6	F	22	All the face	mild	Rapid improvement	Excellent improvement
7	F	19	forehead	sever	Excellent improvement	Most acne disappeared in 20 days
8	M	22	Right cheek	Medium	Little improvement	Pimples traces remained
9	M	27	Forehead	medium	Improvement in 9 days	Excellent improvement
10	M	25	Back and shoulders	Medium	Little improvement	All acne disappear

11	F	17	Face and Shoulders	sever	Excellent improvement	Complete recovery
12	F	23	Right and Left cheek	Medium	Excellent improvement	Complete recovery
13	M	18	All face	Medium	Little improvement	improvement
14	M	19	Shoulders and Face	Medium	Good improvement	Excellent improvement
15	F	22	Forehead and nose	sever	improvement	Decrease in acne size and count
16	F	35	Forehead	Medium	Good improvement	Complete disappearance of acne
17	M	20	All the Face	Medium	Good improvement	Good improvement
18	F	26	Back and shoulders	sever	improvement	Complete disappearance of acne
19	M	25	Left cheek	Medium	Little improvement	Little improvement

5. References

1. Alanazi MS, Hammad SM, Mohamed AE. Prevalence and psychological impact of Acne vulgaris among female secondary school students in Arar city, Saudi Arabia, in 2018. Electron Physician. 2018;10(8):7224-7229.
2. Ghosh, VK, Nagore DH, Kadbhane KP, *et al.* Different approaches of alternative medicines in acne vulgaris treatment. Orient Pharmacy and Experimental Medicine. 2011;11:1-9.
3. Xu H, Li H. Acne, the skin microbiome, and antibiotic treatment. American Journal of Clinical Dermatology. 2019;20(3):335-344.
4. Pornpattananangkul D, Fu V, Thamphiwatana S, Zhang L, Chen M, Vecchio J, *et al. In vivo* treatment of propionibacterium acnes infection with liposomal lauric acids. Advance Healthcare Materials. 2013;2(10):1322-8.
5. Harper JC, Thiboutot DM. Pathogenesis of acne: Recent research advances. Advance Dermatology. 2003;19:1-10.
6. Oberemok SS, Shalita AR. Acne vulgaris, I: Pathogenesis and diagnosis. Cutis. 2002;70(2):101-105.
7. Prasad Shyam Baboo. Acne vulgaris: A review on pathophysiology and treatment. Asian Journal of Pharmaceutical and Clinical Research. 2016;9:54-59.
8. Aydemir EH. Acne vulgaris. Turkish Archives of Pediatrics. 2014;49(1):13-16.
9. Sutaria AH, Masood S, Schlessinger J. Acne Vulgaris. Stat Pearls Publishing (Internet); c2023.
10. Kraft J, Freiman A. Management of acne. Canadian Medical Association Journal. 2011;19183(7):E430-5.
11. Helal A, Hamed, *et al.* Study the effect of natural products in acne patients. Journal of Home Economics. 2017, 27(1).
12. Proença AC, Luís Â, Duarte AP. The role of herbal medicine in the treatment of acne vulgaris: A Systematic Review of clinical trials. Evidence-based Complementary and Alternative Medicine; c2022.
13. Raj Kumar Saroj, Sanjay Kumar, Shatrunjay Yadav. Effect of bio-fertilizers with chemical fertilizers on growth, yield, and quality of cauliflower (*Brassica oleracea* var. *botrytis*). Int. J Hortic Food Sci. 2022;4(1):26-31.
14. Rama Al Mouslli, Ghina Obaid, Nour Al Assal1, Kinda Al Yaseen, Rama Aziz, Bassel Hussein. Preparation and evaluation of dermal gel containing *Ocimum basilicum* for acne vulgaris treatment. IJSAR. 2022;03(10):4446-4449.
15. Lordani TVA, Lara CE, Ferreira FBP, Monich MST, Silva CM, Lordani CRF, *et al.* Therapeutic effects of medicinal plants on cutaneous wound healing in humans: A Systematic Review. 2018, 12.
16. Sanlier N, Guler Saban M. The Benefits of *Brassica* Vegetables on Human Health. Journal of Human Health Research. 2018;1:104.
17. Lee Y, Kim S, Yang B, Lim C, Kim JH, Kim H, *et al*. Anti-inflammatory effects of *Brassica oleracea* var. *capitata* L. (Cabbage) Methanol extract in mice with contact dermatitis. pharmacognosy Magazine. 2018;14(54):174-179.
18. Bhandari SR, Kwak JH. Chemical composition and antioxidant activity in different tissues of *Brassica* vegetables. Molecules. 2015;1320(1):1228-43.
19. Prohens J, Nuez F. (Eds.). Handbook of plant breeding. Vegetables I: Asteraceae, Brassicaceae, Chenopodicaceae, and Cucurbitaceae. Springer, New York, NY, USA. 2008;1:75-116.
20. Sularz Olga, Sylwester Smolen, Aneta Koronowicz, Iwona Kowalska, Teresa Leszczy- nska. Chemical Composition of Lettuce (*Lactuca sativa* L.) Biofortified with Iodine by KIO_3, 5-Iodo-, and 3.5-diiodosalicylic acid in a hydroponic cultivation. Agronomy. 2020;10:1022.
21. Llorach R, Martínez-Sánchez A, Tomás-Barberán FA, Gil MI, Ferreres F. Characterizations of polyphenols and antioxidant properties of five lettuce varieties and escarole. Food Chemistry Journal. 2008;108(3):1028-1038.