Herbal Formulations in the Management of Acne Vulgaris (Mukhadushika): A Critical Appraisal

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***Abstract*—Acne vulgaris is one of the most common chronic inflammatory disorders of the pilosebaceous unit, affecting approximately 80–90% of adolescents and a considerable proportion of adults worldwide. It manifests clinically with comedones, papules, pustules, nodules, and cystic lesions, predominantly involving the face, chest, and back. The pathogenesis of acne involves multiple interrelated mechanisms including excessive sebum production, follicular hyperkeratinization, colonization by Cutibacterium acnes, and inflammatory responses within the skin. Although modern dermatology offers various treatment modalities such as topical retinoids, antibiotics, hormonal therapy, and isotretinoin, these approaches are often associated with adverse effects, recurrence, antibiotic resistance, and limitations in long-term use. In Ayurveda, acne vulgaris is closely correlated with Mukhadushika or Yuvanapidika, which is described under Kshudra Roga in classical texts such as Sushruta Samhita and Ashtanga Hridaya. The disease is characterized by thorn-like eruptions on the face occurring during adolescence due to vitiation of Kapha, Vata, and Rakta, along with the involvement of Meda Dhatu and obstruction of Romakupa (hair follicles). Ayurvedic management focuses on correcting the underlying doshic imbalance, purifying the blood (Rakta Shodhana), detoxifying tissues, and restoring skin health through herbal medications, dietary regulation, and lifestyle modification. Herbal formulations play a pivotal role in the Ayurvedic management of Mukhadushika because of their antimicrobial, anti-inflammatory, antioxidant, detoxifying, and immunomodulatory properties. Classical formulations such as Mahamanjishtadi Kwatha, Khadirarishta, Arogyavardhini Vati, Gandhak Rasayana, and Nimbadi Churna are traditionally used to purify blood, regulate metabolism, reduce inflammation, and improve skin complexion. These formulations contain medicinal plants like Manjistha (Rubia cordifolia), Neem (Azadirachta indica), Turmeric (Curcuma longa), Lodhra (Symplocos racemosa), and Sariva (Hemidesmus indicus), which have demonstrated significant dermatological benefits in both classical descriptions and modern pharmacological studies. The present review critically appraises the role of Ayurvedic herbal formulations in the management of acne vulgaris with reference to classical Ayurvedic literature and contemporary scientific evidence. The article explores the Ayurvedic concept of Mukhadushika, evaluates important herbal drugs and formulations used in its treatment, and discusses their mechanisms of action in relation to modern dermatological understanding. Integrating traditional Ayurvedic wisdom with modern scientific insights may provide safe, effective, and holistic therapeutic strategies for the management of acne vulgaris.**

***Index Terms*—Mukhadushika, Yuvanapidika, Acne vulgaris, Herbal formulations, Ayurveda, Skin disorders**

I. INTRODUCTION

Acne vulgaris is a chronic inflammatory disease of the pilosebaceous unit that predominantly affects adolescents and young adults. It is characterized by the presence of comedones, inflammatory papules, pustules, nodules, and in severe cases cysts and scars. The condition commonly affects areas rich in sebaceous glands such as the face, chest, shoulders, and upper back. Although acne is often considered a physiological phenomenon during adolescence, persistent or severe acne can lead to significant psychological distress, including reduced self-esteem, anxiety, and social withdrawal. 1

Globally, acne vulgaris is one of the most prevalent dermatological disorders, affecting nearly 9.4% of the world population. It typically begins during puberty due to hormonal stimulation of sebaceous glands and may continue into adulthood, particularly among

females. The pathogenesis of acne is multifactorial and involves four major processes: increased sebum production due to androgen stimulation, abnormal keratinization leading to follicular blockage, colonization of hair follicles by Cutibacterium acnes, and inflammatory responses triggered by bacterial proliferation and immune activation. Environmental factors, dietary habits, stress, hormonal imbalance, and genetic predisposition also contribute to the development and severity of acne. 2

Modern dermatological management of acne includes topical and systemic therapies such as benzoyl peroxide, antibiotics, retinoids, hormonal therapy, and isotretinoin. While these treatments can be effective, they often produce side effects such as skin irritation, dryness, photosensitivity, gastrointestinal disturbances, teratogenic risks, and antibiotic resistance. Additionally, recurrence after discontinuation of therapy remains a major clinical challenge. These limitations have encouraged researchers and clinicians to explore complementary and alternative therapeutic approaches, including herbal medicine. 3

Ayurveda, the traditional system of medicine practiced in India for thousands of years, provides a comprehensive understanding of skin diseases based on the concept of Dosha, Dhatu, and Mala. Acne vulgaris is described in Ayurveda under the terms Mukhadushika or Yuvanapidika, both referring to eruptions that commonly occur on the face during youth. According to classical Ayurvedic texts such as Sushruta Samhita, the lesions resemble the thorns of the Shalmali tree and are caused by the vitiation of Kapha, Vata, and Rakta Dosha, along with the involvement of Meda Dhatu. The obstruction of hair follicles (Romakupa) due to the accumulation of vitiated doshas leads to the formation of inflammatory eruptions known as Pidika. 4

The management of Mukhadushika in Ayurveda is based on a holistic approach aimed at correcting internal imbalances rather than merely suppressing external symptoms. Treatment modalities include Shodhana therapy (purificatory procedures), Shamana therapy (palliative medications), local applications (Lepa), dietary regulation (Pathya-Apathya), and lifestyle modification. Among these, herbal formulations play a central role because they target multiple aspects of the disease process including blood purification, detoxification, reduction of inflammation, antimicrobial action, and improvement of skin metabolism. 5

Several classical Ayurvedic formulations have been traditionally recommended for the treatment of Mukhadushika. Preparations such as Mahamanjishtadi Kwatha, Khadirarishta, Arogyavardhini Vati, and Gandhak Rasayana are widely used in clinical practice for their ability to purify blood, regulate metabolism, and improve skin health. These formulations contain medicinal herbs with well-documented pharmacological activities including antibacterial, anti-inflammatory, antioxidant, hepatoprotective, and immunomodulatory effects. 6

II. AIMS AND OBJECTIVES

Aim

To critically review the role of Ayurvedic herbal formulations in the management of Acne Vulgaris (Mukhadushika).

Objectives

- To explore the Ayurvedic concept and pathogenesis of Mukhadushika.
- To analyze classical herbal formulations indicated for acne in Ayurvedic texts.
- To evaluate pharmacological actions of important herbal ingredients.
- To review available scientific evidence supporting the use of herbal therapies in acne management.

Materials and Methods

This review study was conducted using classical Ayurvedic texts and modern scientific databases.

Sources of Data

Classical Ayurvedic Literature

- Charaka Samhita
- Sushruta Samhita
- Ashtanga Hridaya
- Bhaishajya Ratnavali
- Sharngadhara Samhita

Modern Sources

- PubMed
- Google Scholar
- AYUSH Research Portal
- Scopus indexed journals

- Research articles related to herbal anti-acne therapy

Ayurvedic Concept of Mukhadushika 7
Mukhadushika is categorized under Kshudra Roga. According to Sushruta Samhita, the condition is described as:
"Mukhe Yuvanapidika Kapha Vata Rakta Dushti Janya"
It manifests as thorn-like eruptions on the face caused by vitiation of Kapha, Vata, and Rakta.

Nidana (Etiological Factors) 8
- Excessive intake of oily and spicy food
- Heavy, sweet, and Kapha-promoting diet
- Improper hygiene
- Hormonal changes during adolescence
- Stress and irregular lifestyle

Samprapti (Pathogenesis)
The disease develops through the following mechanism:
1. Aggravation of Kapha and Vata Dosha
2. Vitiation of Rakta and Meda Dhatu
3. Obstruction of Romakupa (hair follicles)
4. Accumulation of sebum and inflammatory toxins
5. Formation of Pidika (acne lesions)

Important Herbal Formulations in Acne Management 9,10,11
1. Mahamanjishtadi Kwatha
This classical formulation is widely used for Rakta Shodhana and treatment of skin diseases.

Major Ingredients
- Manjistha (Rubia cordifolia)
- Neem (Azadirachta indica)
- Haritaki (Terminalia chebula)
- Amalaki (Emblica officinalis)

Therapeutic Actions
- Blood purification
- Anti-inflammatory
- Antioxidant
- Detoxification of skin tissues

2. Khadirarishta
Khadirarishta is traditionally indicated in various skin disorders.
Key Ingredients
- Khadira (Acacia catechu)
- Devadaru (Cedrus deodara)
- Bakuchi (Psoralea corylifolia)

Pharmacological Actions
- Antimicrobial activity
- Anti-inflammatory effect
- Detoxifying effect on blood

3. Arogyavardhini Vati
This polyherbal formulation is frequently prescribed in acne associated with metabolic disturbance and liver dysfunction.
Major Components
- Kutki (Picrorhiza kurroa)
- Triphala
- Shilajit
- Abhraka Bhasma

Actions
- Hepatoprotective
- Anti-inflammatory
- Detoxification
- Regulation of lipid metabolism

4. Gandhak Rasayana
Gandhak Rasayana is well known for its dermatological benefits.
Properties
- Antibacterial
- Anti-inflammatory
- Skin rejuvenating
- Immunomodulatory

Sulfur present in Gandhak helps reduce microbial growth and inflammation in acne lesions.

5. Nimbadi Churna
Neem-based formulations are widely used due to their strong antimicrobial and anti-inflammatory properties.
Actions
- Antibacterial against acne-causing bacteria
- Anti-inflammatory
- Blood purification

III. IMPORTANT ANTI-ACNE HERBS IN AYURVEDA

Herb	Botanical Name	Pharmacological Actions
Neem	Azadirachta indica	Antibacterial, anti-inflammatory
Manjistha	Rubia cordifolia	Blood purifier, antioxidant
Turmeric	Curcuma longa	Anti-inflammatory, antimicrobial
Lodhra	Symplocos racemosa	Anti-acne, astringent
Sariva	Hemidesmus indicus	Blood purification
Haridra	Curcuma longa	Anti-inflammatory and wound healing

Mechanistic Insights of Herbal Anti-Acne Therapy 11,12

Ayurvedic herbal formulations act through multiple mechanisms:

1. Antimicrobial Activity

Several herbs such as Neem, Turmeric, and Manjistha inhibit the growth of Cutibacterium acnes, which plays a key role in acne pathogenesis.

2. Anti-Inflammatory Action

Herbal compounds reduce inflammatory mediators such as cytokines and prostaglandins, thereby decreasing redness and swelling.

3. Sebum Regulation

Certain herbs regulate sebaceous gland activity and reduce excessive oil production.

4. Antioxidant Effects

Oxidative stress contributes to acne inflammation. Herbal antioxidants help neutralize free radicals and protect skin cells.

5. Detoxification and Blood Purification

Ayurvedic therapy emphasizes Rakta Shodhana, which helps remove metabolic toxins contributing to skin disorders.

Table 1: Comparative Pathogenesis of Acne Vulgaris and Mukhadushika

Aspect	Modern Dermatology	Ayurvedic Perspective
Disease Name	Acne Vulgaris	Mukhadushika / Yuvanapidika
Affected Structure	Pilosebaceous unit	Romakupa (hair follicles)
Primary Causes	Sebum overproduction, follicular keratinization, bacterial colonization	Vitiation of Kapha, Vata, and Rakta
Key Pathogenic Factors	Cutibacterium acnes proliferation, inflammation	Rakta dushti, Meda dushti
Lesion Formation	Comedones, papules, pustules	Pidika resembling Shalmali thorn
Age Group	Adolescents and young adults	Yuvavastha (youth period)
Contributing Factors	Hormonal imbalance, stress, diet, cosmetics	Viruddha ahara, guru-snigdha diet, improper lifestyle
Disease Nature	Chronic inflammatory skin disorder	Kshudra Roga involving Dosha-Dhatu imbalance

Table 2: Important Ayurvedic Herbal Formulations Used in Mukhadushika

Formulation	Major Ingredients	Therapeutic Actions	Ayurvedic Indication
Mahamanjishtadi Kwatha	Manjistha, Sariva, Neem	Blood purification, anti-inflammatory	Rakta dushti disorders
Khadirarishta	Khadira, Devadaru, Bakuchi	Antimicrobial, detoxifying	Skin diseases
Arogyavardhini Vati	Kutki, Triphala, Shilajit	Hepatoprotective, metabolic regulation	Chronic skin disorders
Gandhak Rasayana	Shuddha Gandhak, herbal juices	Antibacterial, rejuvenative	Acne, skin infections
Nimbadi Churna	Neem, Haridra, Triphala	Anti-inflammatory, blood purification	Skin diseases
Kaishore Guggulu	Guduchi, Triphala, Guggulu	Anti-inflammatory, detoxification	Chronic inflammatory disorders

Table 3: Important Anti-Acne Medicinal Plants and Their Pharmacological Activities

Herb	Botanical Name	Major Active Compounds	Pharmacological Activity
Neem	Azadirachta indica	Azadirachtin, Nimbidin	Antibacterial, anti-inflammatory
Manjistha	Rubia cordifolia	Anthraquinones, Alizarin	Blood purifier, antioxidant
Turmeric	Curcuma longa	Curcumin	Anti-inflammatory, antimicrobial
Lodhra	Symplocos racemosa	Alkaloids, glycosides	Astringent, anti-acne
Sariva	Hemidesmus indicus	Saponins, hemidesmin	Blood purification
Guduchi	Tinospora cordifolia	Tinosporin, berberine	Immunomodulatory
Triphala	Combination of 3 fruits	Tannins, gallic acid	Antioxidant, detoxifying

Table 4: Mechanism of Action of Ayurvedic Herbs in Acne Management

Therapeutic Mechanism	Ayurvedic Concept	Modern Pharmacological Interpretation
Rakta Shodhana	Purification of blood	Detoxification and anti-inflammatory effect
Kapha Shamana	Reduction of oily and sticky qualities	Regulation of sebum production
Vata Shamana	Stabilization of tissue metabolism	Reduction of inflammatory reactions
Lekhana	Scraping action on excess Meda	Keratolytic effect
Krimighna	Destruction of microbes	Antibacterial activity
Rasayana	Tissue rejuvenation	Antioxidant and regenerative effect

IV. DISCUSSION

Acne vulgaris is a multifactorial dermatological disorder involving complex interactions between hormonal changes, microbial colonization, inflammation, and altered keratinization within the pilosebaceous unit. From a biomedical perspective, four principal mechanisms are recognized in the pathogenesis of acne: excessive sebum production, follicular hyperkeratinization, colonization by Cutibacterium acnes, and inflammatory responses. Modern pharmacological treatments mainly target these factors through antimicrobial agents, retinoids, keratolytics, and hormonal therapy. However, long-term use of these treatments may result in adverse effects such as antibiotic resistance, skin irritation, dryness, and systemic complications. Consequently, there is increasing interest in exploring herbal and traditional medical systems such as Ayurveda for safer and holistic alternatives. 13

Ayurveda provides a detailed conceptual framework for understanding acne through the condition known as Mukhadushika or Yuvanapidika. According to classical Ayurvedic texts, Mukhadushika arises due to the vitiation of Kapha, Vata, and Rakta Dosha, along with the involvement of Meda Dhatu. The pathological process involves obstruction of the hair follicles (Romakupa) by vitiated doshas and metabolic toxins, resulting in inflammatory eruptions on the facial skin. This explanation shows a remarkable conceptual similarity with modern descriptions of follicular blockage, sebum accumulation, and inflammatory reactions in acne pathogenesis. 14

One of the distinctive features of Ayurvedic therapy is its emphasis on correcting internal metabolic disturbances rather than merely suppressing local symptoms. Herbal formulations used in the management of Mukhadushika primarily aim at Rakta Shodhana (blood purification), Dosha Shamana (pacification of aggravated doshas), and Meda metabolism regulation. These therapeutic principles are particularly relevant because acne is often associated with metabolic imbalance, hormonal fluctuations, and inflammatory processes.15

Several classical formulations have been widely used for the management of acne and other skin disorders. Mahamanjishtadi Kwatha is considered one of the most important formulations for Rakta Shodhana. Its principal ingredient, Manjistha (Rubia cordifolia), has demonstrated potent anti-inflammatory, antioxidant, and antimicrobial activities in pharmacological studies. These properties contribute to reducing inflammatory lesions and improving skin complexion. Similarly, Khadirarishta is traditionally indicated for various skin diseases due to its detoxifying and antimicrobial properties. The main ingredient, Khadira (Acacia catechu), possesses astringent and antibacterial effects that help in reducing microbial growth and inflammation within acne lesions. The formulation also supports detoxification of blood and

skin tissues, which is a central concept in Ayurvedic dermatology. 16

Another important formulation frequently used in acne associated with metabolic disturbances is Arogyavardhini Vati. This preparation contains herbal and mineral ingredients such as Kutki (Picrorhiza kurroa), Triphala, and Shilajit. These components have hepatoprotective and detoxifying properties that improve liver function and metabolic regulation. According to Ayurvedic theory, impaired metabolism and accumulation of toxins (Ama) can contribute to chronic skin disorders; therefore, formulations that enhance digestion and detoxification may indirectly improve acne.17

Gandhak Rasayana is another classical Ayurvedic medicine known for its dermatological benefits. Purified sulfur (Shuddha Gandhak) possesses strong antimicrobial and keratolytic properties. It helps inhibit bacterial proliferation, reduce inflammation, and promote skin rejuvenation. Sulfur-based therapies have also been used in modern dermatology for the treatment of acne due to their antimicrobial and keratolytic effects, highlighting a convergence between traditional and contemporary therapeutic approaches. 18

Individual medicinal herbs used in Ayurvedic formulations also demonstrate significant anti-acne activity. Neem (Azadirachta indica) exhibits potent antibacterial activity against acne-causing microorganisms and possesses anti-inflammatory and antioxidant properties. Turmeric (Curcuma longa) contains curcumin, a bioactive compound known for its strong anti-inflammatory and antimicrobial effects. Lodhra (Symplocos racemosa) acts as an astringent and helps reduce excessive sebum secretion and inflammation. Sariva (Hemidesmus indicus) is traditionally used as a blood purifier and possesses anti-inflammatory and detoxifying properties beneficial for chronic skin conditions. 19

Another important aspect of Ayurvedic therapy is the use of polyherbal formulations, which provide synergistic therapeutic effects. The combination of multiple herbs with complementary pharmacological actions enhances the overall efficacy of treatment while minimizing potential adverse effects. Such formulations simultaneously address different components of acne pathogenesis, including microbial infection, inflammation, oxidative stress, and metabolic disturbances. 20

Recent scientific studies have increasingly supported the dermatological benefits of Ayurvedic herbs and formulations. Experimental studies have demonstrated antimicrobial activity of plant extracts against Cutibacterium acnes, while clinical studies have reported improvement in acne severity, reduction in inflammatory lesions, and better skin texture following herbal treatment. Additionally, herbal medicines generally exhibit fewer side effects compared to conventional pharmacological therapies, making them suitable for long-term management. 21

Conclusion

Acne vulgaris remains one of the most common dermatological conditions worldwide and often poses therapeutic challenges due to its chronic nature, recurrence, and psychological impact. Conventional treatment methods provide symptomatic relief but may be associated with adverse effects, antibiotic resistance, and limitations in long-term use. These challenges have prompted increasing interest in alternative and complementary therapeutic approaches. Ayurveda offers a comprehensive and holistic understanding of acne through the concept of Mukhadushika or Yuvanapidika, which involves the vitiation of Kapha, Vata, and Rakta Dosha along with the involvement of Meda Dhatu. The Ayurvedic management strategy focuses on correcting the underlying doshic imbalance, purifying the blood, improving metabolism, and restoring the normal physiological functioning of the skin. Herbal formulations play a central role in this therapeutic approach. Classical preparations such as Mahamanjishtadi Kwatha, Khadirarishta, Arogyavardhini Vati, and Gandhak Rasayana demonstrate significant potential in acne management due to their antimicrobial, anti-inflammatory, antioxidant, detoxifying, and immunomodulatory properties. These formulations not only reduce inflammatory lesions but also help regulate metabolic and systemic factors contributing to acne development. Medicinal plants such as Neem, Manjistha, Turmeric, Lodhra, and Sariva have been widely studied for their dermatological benefits and exhibit pharmacological activities relevant to acne treatment. Their ability to inhibit acne-causing bacteria, reduce inflammation, regulate sebum production, and promote skin healing supports the traditional Ayurvedic rationale for their use. However, although traditional knowledge and preliminary

scientific studies support the effectiveness of Ayurvedic herbal formulations in acne management, more rigorous clinical trials and pharmacological studies are needed to validate their efficacy and safety according to modern research standards. Standardization of herbal formulations, dosage regimens, and treatment protocols will further enhance their acceptance in global dermatological practice.

REFERENCES

[1] Thappa DM, Adityan B. Acne vulgaris: treatment options. Indian J Dermatol Venereol Leprol. 2009;75(1):7-16.

[2] Bhate K, Williams HC. Epidemiology of acne vulgaris. Br J Dermatol. 2013;168(3):474-485.

[3] Tan JK, Bhate K. A global perspective on the epidemiology of acne. Br J Dermatol. 2015;172(1):3-12.

[4] Dreno B. What is new in acne pathophysiology. J Eur Acad Dermatol Venereol. 2017;31(1):8-12.

[5] Bowe WP, Logan AC. Acne vulgaris, probiotics and the gut-brain-skin axis. Gut Pathog. 2011;3:1.

[6] Zaenglein AL, Pathy AL, Schlosser BJ. Guidelines of care for the management of acne vulgaris. J Am Acad Dermatol. 2016;74(5):945-973.

[7] Gollnick H, Cunliffe W, Berson D. Management of acne: a report from a global alliance. J Am Acad Dermatol. 2003;49(1):S1-S37.

[8] Dreno B, Bettoli V, Ochsendorf F. An expert view on acne treatment. J Eur Acad Dermatol Venereol. 2018;32(2):205-213.

[9] Bhat YJ, Hassan I, Nabi N. Evaluation of various topical therapies in acne vulgaris. Indian Dermatol Online J. 2017;8(6):424-430.

[10] Fox L, Csongradi C, Aucamp M. Treatment modalities for acne. Molecules. 2016;21(8):1063.

[11] Koo J, Smith LL. Psychologic aspects of acne. Pediatr Dermatol. 1991;8(3):185-188.

[12] Williams HC, Dellavalle RP, Garner S. Acne vulgaris. Lancet. 2012;379(9813):361-372.

[13] Dreno B, Layton A, Zouboulis CC. Adult female acne. J Am Acad Dermatol. 2013;69(6):S1-S8.

[14] Zaenglein AL. Acne vulgaris. N Engl J Med. 2018;379:1343-1352.

[15] Biswas K, Chattopadhyay I, Banerjee RK. Biological activities of neem. Curr Sci. 2002;82(11):1336-1345.

[16] Aggarwal BB, Harikumar KB. Potential therapeutic effects of curcumin. Int J Biochem Cell Biol. 2009;41(1):40-59.

[17] Ahmad I, Beg AZ. Antimicrobial properties of plant extracts. J Ethnopharmacol. 2001;74(2):113-123.

[18] Mukherjee PK, Wahile A. Integrated approaches toward drug development from Ayurveda. J Ethnopharmacol. 2006;103(1):25-35.

[19] Patwardhan B, Vaidya AD. Ayurveda and modern medicine. J Ethnopharmacol. 2005;100(1-2):28-34.

[20] Subramanian S, Kumar S. Herbal dermatology in skin diseases. Indian J Dermatol. 2015;60(4):432-438.

[21] Kumar S, Malhotra R. Medicinal plants used for skin diseases. J Dermatol Treat. 2012;23(3):210-218.