

Nature's Healer: The phyto -Phyto-pharmacological profile of *Achyranthes aspera* linn Face Wash

Madhura Govind Khalkar¹, Prof.T.R. Kedar², Aishwarya Santosh kad³, Chaitanya Rohidas Hase⁴
^{1,2,3,4}*Kyvaik college of Pharmacy Nashik*

Abstract—Because of its antimicrobial, anti-inflammatory, and wound-healing qualities, *Achyranthes aspera* Tinn, also known as Apamarga, is a medicinal plant that is frequently employed in traditional Ayurveda. *Achyranthes aspera* Linn extract was used in this study to create a herbal face cleanser that is safe, effective, and natural. The extract is made with an appropriate solvent and mixed with other necessary components in a face wash base. The physical appearance, pH, foaming capacity, spreadability, washability, and stability of the prepared face wash were assessed. The product had an appropriate pH, according to the data. Overall, the *Achyranthes aspera* Linn face wash showed encouraging promise as a herbal cosmetic preparation that may gently cleanse the skin while offering calming and antibacterial properties.

Index Terms—Antioxidant *Achyranthes aspera* Linn, Medicinal plants, Herbal cosmetics, Face wash formulation, Anti-acne activity, properties, Phytochemical constituents, Anti-inflammatory activity, Anti-microbial activity, Saponins and alkaloids

I. INTRODUCTION

The weed *Achyranthes aspera* L. (Amaranthaceae) is found in tropical Asia, India, and other regions of the world. Leprosy, asthma, fistula, piles, arthritis, wounds, insect and snake bites, renal and cardiac dropsy, kidney stone, diabetes, dermatological disorders, gynecological disorders, gonorrhoea, malaria, pneumonia, fever, cough, pyorrhoea, dysentery, rabies, hysteria, toothache, and more are all treated with various parts of the plant. The plant is widely used as a folk cure in traditional medical systems across tropical Asian and African nations. According to reports, the plant has antimicrobial, larvicidal, antifertility, immunostimulant, hypoglycemic, hypolipidemic, anti-inflammatory, antioxidant, diuretic, cardiac stimulant, antihypertensive, anti-anasarca, analgesic, antipyretic,

antinoiceptive, prothyroidic, antispasmodic, and hepatoprotective properties. Sterols, alkaloids, saponins, saponinins, cardiac glycosides, ecdysterone, and other compounds were found by phytochemical analyses.[1]

From the general public's usage of herbal items as natural cosmetics and self-medication to scientific studies of plants' biological effects in humans, interest in medicinal plants has increased dramatically over the past 20 years. [2]

Over 80% of people worldwide receive their main healthcare from traditional herbal medicine, according to the WHO [3]. Plants are still a potential source for novel medications and compounds made from different plant sections [4].

In both developed and developing nations, there is a growing demand for plant-based medicines, health products, pharmaceuticals, food supplements, cosmetics, etc. because it is becoming more widely acknowledged that natural products are inexpensive, non-toxic, and have fewer side effects [5].

Achyranthes aspera Linn. Is an annual herb that grows all throughout India and is a member of the Amaranthaceae family, which includes 160 genera and over 2400 species of shrubs, herbs, and climbers. It is also known as rough chaff flower in English. Many traditional medicines contain various plant parts in addition to more potent treatments. Due to its hepatoprotective and diuretic qualities, *A. aspera* is used in traditional medicine to treat a number of illnesses, including diabetes, asthma, dysentery, malarial fever, and hypertension. Recent research on *A. aspera*'s therapeutic qualities has revealed that it possesses immunostimulatory qualities [6], wound healing activity [7], antioxidant activity, hemolytic activity [8], anti-inflammatory [9], antibacterial activity [10], and antifungal activity [11].

Taxonomy:

- Kingdom: Plantae
- Subkingdom: Tracheobionota
- Super Division: Spermatophyta
- Division: Mangoliophyta
- Class: Caryophyllidae
- Order: Caryophyllales
- Family: Amaranthaceae
- Genus: Achyranthes
- Species: Aspera
- Botanical description: Synonyms
- Latin: Achyranthes aspera.
- Sanskrit: Aghata
- Hindi: Latjira,
- Chirchira Gujarati: Safad Aghedo
- Tamil: Shiru-kadaladi
- Telugu: Uttaraene
- Malayalam: Kadaladi
- Punjabi: Kutri
- Unani: Chirchitaa
- Ayurvedic: Apaamaarga, Chirchitaa, Shikhari, Shaikharika
- Persian: Khare-vazhun;
- Arabic: Atkumah;
- French: Achyranth à feuilles rudes, collant, gendarme.
- Spanish: molotillo, rabo de gato, rabo de chango, rabo de raton.



FIG NO 1

Geographical Origin

Up to an elevation of 2100 meters, it can be found as a weed on road sides, field boundaries, and waste sites in South Andaman Islands and throughout India [12, 13]. Additionally, Baluchistan, Ceylon, Tropical Asia,

Africa, Australia, and America are also home to the plant.

II. USE IN MEDICINE

For diarrhea, two to five grams of dried leaf powder are administered with honey. Skin conditions including scabies and pruritis can be effectively treated with leaf juice. Toxic bites are treated externally with leaf paste. Abdominal issues and bleeding piles can be effectively treated with whole plant ash. Root is used as a toothbrush to treat halitosis and clean the mouth. Twig infusion is also used as a toothache wash. For night blindness, root extract is applied as an eye drop before bed

Research on Phytochemistry Triterpenoid saponins with oleanolic acid as the aglycone are found in *A. aspera*. *Achyranthes aspera* also contains long chain alcohols and the insect moulting hormone ecdysterone [14].

Additional chemical components include pentatriacontane, 6-pentatriacontanone, hexatriacontane, tritriacontane, betaine, and achyranthine [15].

Conventional Applications

The herb has historically been used to treat cough and asthma. It is strong, antiphlegmatic, antiperiodic, and diuretic, laxative, and purgative; beneficial for boils, skin eruptions, oedema, dropsy, and piles etc. Pneumonia is treated by boiling crushed plant in water. The root infusion is a mild astringent in gastrointestinal issues. The seeds or flowering spikes are mashed and turned into a paste. Are applied externally with water to treat dangerous snake and reptile bites, utilized in skin conditions and night blindness [11].

Pharmacological Research

Activity of antioxidants Antioxidants, which are abundant in *A. aspera*, are vital for humans to maintain a balanced, healthy lifestyle. Although oxidation is a very significant activity, it is regrettably harmed by the production of reactive oxygen species (ROS). ROS is a byproduct of insecticides, metabolic activities, herbicides, air pollution, and immune responses to infections. Phytoconstituents, such as flavonoids and phenolic compounds, are essential for scavenging these ROS. The inflorescence portion of

the prickly *A. aspera*'s methanolic extract had a higher antioxidant capacity (93%). For *A.*'s n-hexane extract.[17]

Spermicidal action According to research, extracts from *A. aspera* roots have been shown to have spermicidal effects on rat and human sperm [16]. The most successful extracts for sperm immobilization and viability were determined to be hydroethanolic, n-hexane, and chloroform. Researchers discovered the ethanolic extract of the roots of *A. aspera* displayed post coital antifertility action in female albino rats [18]

Anti asthmatic

Apamarga *A. aspera* Antardhooma Bhasma on cases of Tamaka Shwasa bronchial asthma was found to be effective[20]. Effect of the plant on bronchial asthma was reported [19-20]. Toluene diisocyanate (TDI) induced occupational asthma in Wistar rats were found to be protected by ethanolic extract of the plant[21] indicating its bronchoprotective activity.

Anti spasmodic

The plant was reported to have anti spasmodic property[22].

Diuretic

While discussing Cystone®-a vegetable diuretic, the plant has been mentioned Antagonistic effect of *A. aspera* on uterine contractility induced by oxytocin was reported[23]. Saponins from the plant have shown diuretic activity[24-25].

The active compound responsible for the plant's diuretic property is achyranthine, marketed as Cystone®, a polyherbal formulation[25-26]. Effect of Cystone® on glycolic acid-induced urolithiasis in rats was investigated[27].

Renal disorders

Mineralization of urinary stones (calculi) like calcium oxalate, calcium carbonate and calcium phosphate were found to be inhibited by *A. aspera*[28].

Methanolic extracts were found to prevent lead induced nephrotoxicity in albino rats. Efficacy of the roots of the plant was tested on calcium oxalate crystal nucleation and growth in vitro and on oxalate induced injury in NRK-52E (rat renal tubular epithelial) cells[29]As an approach to antilithiasis, Inhibitory effect of hydroalcoholic extract of the plant on crystallization of calcium oxalate in synthetic urine was studied[30]

Antileprotic Effect of *A. aspera* in the treatment of leprosy has been studied[31-32]. The plant was also reported for its effectivity against lepromatous leprosy[33].

Anti fistula-in-ano and piles

Aspera is one of the ingredient of Ksharsutra- an Ayurvedic para-surgical measure is used in the treatment of fistula-in-ano[23-30]. Ksharsutra can be used as a non- operative treatment of high rectal fistula. The plant juice and ash were mentioned to be used to treat bleeding piles.[30]

Anti-arthritis

Anti-arthritis activity of Achyranthine from *A. aspera* has been reported[33-34]. Ethanolic plant extract has shown anti- arthritis activity. The plants efficacy in rheumatoid arthritis was also reported[35].

Wound healing activity

The plant has shown wound healing activity[31-32]. There has been a report on comparative protein profile of granulation tissues of burn, diabetic and immunocompromised wounds treated with 5.0% (w/w) ointment of methanol extract of the plant[36].



FIG NO 2

III. FACE WASH

The skin makes up to 15% of the body's total weight, making it the biggest organ. Skin serves a variety of virtual purposes.

This includes preventing excessive water loss from the body, protecting against physical, chemical, biological, and external threats, and playing a part in thermoregulation. [37]

A balanced diet is necessary to maintain healthy, clear, and shiny skin. In addition, hormonal changes, particularly during adolescence in both sexes, induce several physical changes. [38] Cosmetics and the blessings of natural beauty aid in showcasing and enhancing individual beauty and personality. For a healthy life, individuals now favor natural foods, herbal remedies, and natural healing methods. [39] Herbal cosmetics are preparations that contain phytochemicals from various botanical sources that affect skin function and supply the nutrients required for healthy skin. [40] Herbal cosmetics are made from natural herbs and their products that are utilized in cosmetic preparations for their aromatic value. [41]

The desire for natural goods and natural extracts in the creation of cosmetics has been sparked by herbal products. due to the widespread perception that chemical-based cosmetics are bad for the skin and can cause a variety of illnesses. The desire for natural goods and natural extracts in the creation of cosmetics has been sparked by herbal products. due to the widespread perception that chemical-based cosmetics are bad for the skin and can cause a variety of illnesses.

Since there are no negative effects from the herbal content, I have attempted to make a herbal face wash using natural herbs for the current project.

Various Face Types

- (1) Cream-based face wash
 - (2) gel-based face wash
 - (3) liquid-based face wash
 - (4) powder-based face wash
- characteristics of face wash.

1. Dead cells should be eliminated.
2. It ought to revitalise skin cells.
3. It should eliminate pollutants, oil, and debris.
4. It should be able to lessen the skin's microbiota.

5. Allow skin to breathe and remain fresh.
6. It should be simple to remove.
7. It shouldn't irritate people.

Detailed Method for Preparing *Achyranthes aspera* Linn Face Wash

Collection and Processing of Plant Materials

1. Fresh leaves of *Achyranthes aspera* Linn were picked from a nearby region in the early morning.
2. Washing with distilled water eliminated dust and undesirable substances.
3. Leaves were shade-dried for 7-10 days to preserve active components.
4. Dried leaves were powdered with a mechanical grinder and stored in an airtight container.

Plant Extract Preparation The Soxhlet Extraction Technique

1. A thimble was filled with 100 g of dry leaf powder.
2. The extraction solvent was either distilled water (500–700 mL) or ethanol (70–90%).
3. Extraction was carried out for six to eight hours, or until the syphon tube showed a clear solvent.
4. Whatman filter paper and muslin cloth were used to filter the extract.
5. A water bath (below 60°C) was used to evaporate the solvent, resulting in a semi-solid herbal extract.

6. For future formulation, the extract was kept in a refrigerator at 4°C. --- 4.3 Herbal Face Wash Gel Formulation Ingredients Needed Extract from *Achyranthes aspera* 940 Carbopol Glycerin Glycol propylene SLS, or sodium lauryl sulphate Preservative (benzyl alcohol/methyl paraben) Colour + Fragrance Water with distillation.

Procedure

1. Carbopol dispersion Carbopol 940 was progressively distributed in distilled water while continuously stirring and allowed to hydrate for 1 hour.
2. Prepare the Gel Base Glycerin and propylene glycol were progressively added and stirred until a smooth gel formed.
3. Extract Incorporation The obtained *Achyranthes aspera* extract was dissolved in a tiny amount of solvent and gradually added to prevent lump formation.
4. SLS was added with moderate stirring to prevent excessive foaming.
5. Preservatives, perfume, and colour. These were added at the end of the process and mixed thoroughly.
6. pH Adjustment. To make the formulation more skin-friendly, the pH was changed to 5.5-6.5 with triethanolamine.
7. Filling and Storing The produced herbal face wash gel was packaged in clean, airtight containers and appropriately labelled.

FORMULA CHART — <i>Achyranthes aspera</i> Linn Face Wash (100 mL)			
Sr. No.	Ingredient	Function	Quantity (100 mL)
1	<i>Achyranthes aspera</i> Extract	Main herbal active	5 mL
2	Glycerin	Moisturizer / humectant	10 mL
3	Carbopol 940	Gel-forming agent	0.5 g
4	EDTA	Chelating agent	0.02 g
5	SLS	Foaming / cleansing agent	2 g
6	Propylene Glycol	Co-solvent & moisturizer	5 mL
7	Preservative	Prevents microbial growth	0.1 g
8	Perfume	Fragrance	Few drops
9	Distilled Water	Vehicle/base	q.s. to 100 mL

TABLE NO 1

IV. EXPERIMENTAL WORK

Evaluation Tests (What to do & how to record)

Physical Parameters

Appearance & Colour describe (eg, light green, viscous gel) PH measure with pH meter, ideal 5.5-6.5

Viscosity record (CP) using viscometer or describe as lowmediurn/ligh

Spreadability-time taken to spread fixed amount between glass plates

Foam test shake 10 ml with 10 ml. water un cylmder, recund fosan beight (cm) after 1 uun

Patch test on 10 volunteers (apply small sample on forearm, observe 24-48 hFor irritation.

V. RESULT & DISCUSSION

1. A herbal face wash successfully prepared using Achyranthes aspera Linn extract as the main active ingredient
2. Compared to chemical face washes, the herbal formulation showed Better skin compatibility Fewer side effects Milder but effective cleansing.

Parameter	Result
Appearance	Light green, smooth gel
Odour	Mild herbal smell
pH	5.5 – 5.8
Foam ability	Moderate foam
Washability	Easily washable
Stability	Stable, no separation (15 days)
Antibacterial test	Good activity vs S. aureus; moderate vs E. coli
Skin irritation test	No redness, itching, or irritation

TABLE NO 2

VI. CONCLUSION

This study indicates a strong market opportunity for eco-friendly goods, illustrates the efficacy of the produced face wash, and underlines the possibility for future research on herbal skincare. The goal of the study was to create a herbal face cleanser with extract from Achyranthes aspera Linn. Flavonoids, saponms, alkaloids, and tamuns are among the plant’s beneficial chemicals that exhibit antibacterial, anti-inflammatory, and antioxidant properties. Glycera, aloe vera, mild surfactant, and herbal extract were combined to create a 100 ml face cleanser. According to the study’s findings, Achyranthes aspera Lum is a natural, safe, and useful component for making herbal face cleanser.

According to the study’s findings, Achyranthes aspera Lum is a natural, safe, and useful component for making herbal face cleanser. The ingredient reduced oil production, inhibited bacteria that cause acne, calmed the face, and offered gentle washing without drying it out. The finished product had excellent

potential as a herbal substitute for chemical face cleansers and was stable, skin-friendly, inexpensive, and simple to make

REFERENCES

- [1] Shibeshi W, Makonnen E, Zerihun L, Debella A, Effect of Achyranthes aspera L. on fetal abortion, uterine and pituitary weights, serum lipids and hormones, African Health Sciences, 6(2), 2006, 108-112.
- [2] Joy P, Thomas J, Mathew S, Skaria BP. Medicinal plants, Tropical Horticulture, 1998; 2:449-632.
- [3] John J.V. Reena, B. Parthipan, C. Renuka, Vijayan Arun, and V.B. Liju. Indian Journal of Y. Traditional Knowledge, 2007, 6(4), 589-5
- [4] Tijani, O. A. Salawu, and M. O. Uguru. African Journal of Biotechnology, 7(6), 696-2008 700.
- [5] Kalia AN. Text Book of Industrial Pharmacognosy. Oscar publication, 2005.

- [6] Rao YV, Govinda RD, Babu GS, Rao RA. Immunomodulatory activity of *Achyranthes aspera* on the elicitation of antigen-specific murine antibody Response. *Pharmaceutical Biology*. 2002; 40(3):175-178.
- [7] Edwin S, Edwin JE, Deb L, Jain A, Kinger H, Dutt KR, Amal RA. Wound Healing and antioxidant activity of *Achyranthes aspera*. *Pharmaceutical Biology*, 2008; 46(12):824-828.
- [8] Priya CL, Kumar G, Karthik L, Bhaskara Rao KV. Antioxidant activity of *Achyranthes aspera* Linn stem extracts. *Pharmacology online* 2010; 2:228-237.
- [9] Kumar SV, Sankar P, Varatharajan R. Anti-inflammatory activity of roots of *Achyranthes aspera*. *Pharmaceutical Biology*, 2009; 47(10):973-975.
- [10] Alam MT, Karim MM, Khan SN. Antibacterial activity of different organic Extracts of *Achyranthes aspera* and *Cassia alata*. *Journal of Scientific Research*. 2009; 1:393-398.
- [11] Elumalai EK, Chandrasekaran N, Thirumalai T, Sivakumar C, Therasa SV, David E. *Achyranthes aspera* leaf extracts inhibited fungal growth. *International Journal of Pharm Tech Research*. 2009; 1(4):1576-1579.
- [12] Anonymous. *The Wealth of India - Raw Materials*, Council of Scientific & Industrial Research, New Delhi, 2005, 55-57.
- [13] R.K. Gupta. *Medicinal & Aromatic Plants*. CBS publishers & distributors, 2010, 190.
- [14] *Indian Herbal Pharmacopodia Vol. II*, Page-5.
- [15] Saurabh Srivastav, Pradeep Singh, Garima Mishra, Jha KK, Khosa RL. *Achyranthes aspera*-An important medicinal plant: A review. *J. Nat. Prod. Plant Resour*. 2011; 1(1):1-14.
- [16] Paul D, De D, Ali KM, Chatterjee K, Nandi DK, Ghosh D *Contraception*, 2010; 81(4):355-361.
- [17] Vasudeva N, Sharma SK. *Journal of Ethnopharmacology*. 2006; 107(2):179-181.
- [18] Hasan S. Pharmacological and medicinal uses of *Achyranthes aspera*. *Int J Sci Environ Technol*. 2014; 3(1):123-9.
- [19] Charyulu GP, Effect of Apamarga *Achyranthes aspera* Antardhooma Bhasma on cases of Tamaka Shwasa Bronchial Asthma, *Indian Journal of Pharmaceutical Sciences*, 1982, 44.
- [20] Saad A, Siddiqui MMH, Aleem S, Jafri SAH, Effect of Namak Chirchita (*Achyranthes aspera* Linn.) in Zeeq-un-Nafs Sho'bi (Bronchial Asthma), *Hamdard Medicus*, 45, 2002, 37-40.
- [21] Shah GB, Parmar NS, Antiasthmatic property of polyherbal Preparation E-721 B, *Phytotherapy Research*, 17(9), 2003, 1092-1097.
- [22] Goyal BR, Mahajan SG, Beneficial effect of *Achyranthes aspera* Linn. In Toluene-di-isocyanate induced occupational asthma in rats, *Global Journal of Pharmacology*, 1(1), 2007, 06-12.
- [23] Aswal BS, Goel AK, Kulshrestha DK, Mehrotra BN, Patnaik GK. Screening of Indian plants for biological activity. Part XV., *Ind. J. Exp. Biol.*, 34, 1996, 444-467.
- [24] Subramaniam R, Cystone – a vegetable diuretic, *The Antiseptic*, 2, 1961, 103-106.
- [25] Gupta SS, Khanijo I, Antagonistic effect of *Achyranthes aspera* on Uterine contractility induced by oxytocin, *Indian Journal of Physiology And Pharmacology*, 14, 1970, 63.
- [26] Ram AK, Gupta SS, Diuretic activity of *Achyranthes aspera* saponin, *Indian Journal of Physiology and Pharmacology*, 14, 1970, 47.
- [27] Gupta SS, Verma SC, Ram AK, Tripathi RM, Diuretic effect of the Saponin of *Achyranthes aspera* (apamarga), *Indian J. Pharmacol.*, 4, 1972, 208-214.
- [28] Maurya DK, Devasagayam TP, Nair CK, Some novel approaches for Radioprotection and the beneficial effect of natural products, *Indian Journal of Experimental Biology*, 44(02), 2006, 93-114.
- [29] Bhutani KK, Gohil VM, Natural products drug discovery research in India: Status and appraisal, *Indian Journal of Experimental Biology*, 48(03), 2010, 199-207.
- [30] Mitra SK, Gopumadhavan S, Venkatarangananna MV, Sundaram R, Effect of Cystone, a herbal formulation, on glycolic acid-induced Urolithiasis in rat, *Phytotherapy Research*, 12(5), 1998, 372-374.
- [31] Farook NAM, Rajesh S, Jamuna M, Inhibition of mineralization of Urinary stone forming minerals by medicinal plants, *E-Journal of Chemistry*, 6(3), 2009, 938-942.
- [32] Aggarwal A, Tandon S, Singla SK, Tandon C, Reduction of oxalate-Induced renal tubular epithelial (NRK-52E) cell injury and inhibition of Calcium oxalate crystallisation in vitro by

- aqueous extract of *Achyranthes Aspera*, International Journal of Green Pharmacy, 4(3), 2010, 159-164.
- [33] Pareta SK, Patra KC, Harwansh R, In-vitro calcium oxalate Crystallization inhibition by *Achyranthes indica* Linn. Hydroalcoholic Extract: an approach to antilithiasis, International Journal of Pharma and Bio Sciences, 2(1), 2011, 432-437.
- [34] Tripathi SN, Chaturvedi GN, Dube GP. Effect of *Achyranthes aspera* in the treatment of leprosy, J. Med. Sci. (BHU), 4, 1963, 103-112.
- [35] Ojha D, Tripathi SN, Singh G, Role of an indigenous drug (*Achyranthes aspera*) in the management of reactions in leprosy: Preliminary observations, Lepr. Rev., 37(2), 1966, 115-120.
- [36] Ojha D, Singh G, Apamarga (*Achyranthes aspera*) in the treatment Of lepromatous leprosy, Lepr. Rev. 39, 1968, 23-30.
- [37] Kanitakis, J., anatomy histology and immunohistochemistry of normal human skin, European Journal of Dermatology. 2002;12(4):390-401.
- [38] Brown, S.K., Shalita, A., *Acne vulgaris*, lancet, 1998; 351(9119): 1871 – 1876
- [39] Kapoor, V. P., herbal cosmetics for skin and hair care, national botanical research institute. 2005;4(4):306 – 313.
- [40] Larsson, S.C., Bergkvist, I.; Wolk, A. vitamin A retinol and carotenoids and the risk of gastric cancer: a prospective cohort study. Am. J. clin. Nutr, 2007; 85(2): 497 – 503.
- [41] Ashish, Baldi., herbal cosmetics: used for skin and hair inventi rapid journals, 2012;(1):1 – 7.