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A STUDY ON THE ETHNOPHARMACOLOGICAL POTENTIAL OF *ALOE VERA* L.

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ABSTRACT: *Aloe vera Linn.* (Ghritokumari locally) has recently gained popularity due to its health benefits. The current ethnopharmacological review was carried out to assess the medicinal effects of *A. vera* using scientific data. It belongs to the *Liliaceae* family and is a perennial plant with 30-60cm long juicy leaves that grow across Bangladesh. Too far, more than 75 active compounds have been found in the inner gel of leaves, including aloes in, aloe emodin, acemannan, aloeride, methylchromones, flavonoids, saponin, amino acids, vitamins, and minerals. It contains anti-inflammatory, antioxidant, antibacterial, anticancer, anti-diabetic, immune-boosting, and hypoglycemic effects. This is beneficial as a daily supplement against stroke, heart attacks, leukemia, anemia, hypertension, AIDS, radiation burns, digestive issues, and other conditions. This research also discusses its taxonomy, distribution, morphology, and monograph.

INTRODUCTION: Herbal remedies have played an important role from antiquity to the present. Every ethnic group has a traditional healthcare system that is culturally structured. In rural areas, health care appears to be the first line of defense. The World Health Organization (WHO) has previously recognized the value of traditional health care in tribal populations. These medications have fewer negative effects, and humans may simply obtain the herbs from nature. It has been a source of medicinal agents for thousands of years and an impressive number of modern drugs have been formulated. Therapeutically, interesting and important drugs have been developed from plant sources that are being used in traditional systems of medicine.

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The use of plants as a therapeutic material due to their chemical substances of medicinal value has been very common all over the world since ancient periods [1-2]. The development of antibiotic resistance in pathogens has become a problematic issue due to the indiscriminate use of contemporary antibiotics [3-4]. Much research has been conducted on some plants, vegetables, and fruits because they contain high levels of antioxidants such as vitamins, carotenoids, polyphenolic chemicals, and flavonoids, which limit free radical damage and reduce the risk of chronic illnesses [5]. As a result, the demand for novel safe and effective antimicrobial medicines with broad-spectrum action derived from natural sources grows by the day [6].

Aloe vera L. (Ghritokumari locally), a member of the Xanthorrhoeaceae family, is a very important perennial medicinal plant found across Bangladesh. It is a stemless, drought-resistant succulent from the lily family. It is a xerophyte that may thrive in arid areas under rainfed circumstances. It is native to hot climates and has been used medicinally for

over 5000 years by Egyptian, Indian, Chinese, and European cultures for a variety of ailments, including dermatitis and cancer. The solid material of *A. vera* leaves contains over 75 biologically active compounds, including vitamins, minerals, enzymes, polysaccharides, phenolic compounds, and organic acids [7, 2] and has been claimed to have anti-inflammatory, antioxidant, immune-boosting, anticancer, anti-aging, sunburn relief, and antidiabetic properties [8]. *A. vera* gel has been shown in many trials to have anti-tumor action in terms of decreased tumor burden, tumor shrinkage, tumor necrosis, and longer survival rates. *A. vera* gel has been demonstrated to have chemo-preventative and antigenotoxic effects on benzo(α) pyrene-DNA adducts [7, 2]. One potential mode of action for Aloe polysaccharide's anticancer properties is immune response stimulation [9, 2]. The majority of the research papers, journals, and review papers were consulted and assembled. The present study summarises relevant information on the ethnopharmacological characteristics of *A. vera* that has been collected throughout time. It may be valuable for health practitioners, scientists, and academics working in the fields of pharmacology and therapeutics to produce evidence-based alternative medicine to treat various ailments in humans and animals Plant shown in **Fig. 1.**

FIG. 1: *ALOE VERA* PLANT

Monograph:

Bengali name	Ghritokumari
Common name	Barbados aloe, Common Aloe, Indian Aloe, Burn Aloe.
Scientific name	*Aloe vera (L.)*Family: *Liliaceae*.
Duration	Perennial.

Growth Habit: It thrives in bright sunlight and enjoys low water levels. It is suitable for loamy sand, sandy clay, sandy clay loam, and sandy loam soils. Bangladeshi ethnicity native.

Morphology: It is a member of the *Liliaceae* family. It is a cactus-like upright plant that grows to a height of 0.8m/2.6ft and a spread of 0.8m/2.6ft, with fleshy, tapering, spiky, marginated leaves filled with a clear viscous gel [10].

Distribution: The species is found in the southern part of the Arabian Peninsula, North Africa (Morocco, Mauritania, and Egypt), Sudan and neighbouring nations, and the Canary, Cape Verde, and Madeira Islands.

The species was introduced to China and other regions of southern Europe in the 17th century [11]. The plant is widely naturalised in temperate and tropical locations such as Australia, Barbados, Belize, Nigeria, Paraguay, India, and the United States [12, 2].

Taxonomy of *A. vera*: The botanical categorization of *A. vera* is as follows:

Kingdom	Plantae
Order	Asparagales
Family	Xanthorrhoeaceae
Genus	*Aloe*
Species	*A. vera*
Binomial name	*Aloe vera* (L.)
Kingdom	Plantae
Order	Asparagales

Phytochemistry: *A. vera (L.)* includes several phytochemicals that are helpful to human health. The chemical components of *A. vera* are listed in **Table 1.**

Folk Remedies and Traditional Uses: For over 5000 years, *A. vera* has been used to treat a variety of ailments. The conventional applications are listed in **Table 2.**

Pharmacology: Following the folk and traditional applications of *A. vera*, scientific research is being conducted to validate its ability to heal and treat many ailments. Some of the documented pharmacological actions of *A. vera* are listed in **Table 3** and **4.**

Adverse Effects: Numerous side effects have been reported; however they are often modest and reversible [57]. According to animal research, oral use of *A. vera* may cause colonic cancer [58], while topical use may accelerate UV light-induced skin cancer [59].

TABLE 1: CHEMICAL CONSTITUENTS OF *A. VERA* LEAF

Constituents	Chemicals	References
Amino Acid	Phenylalanine, arginine, tyrosine, aspartic acid and histidine	13, 14, 15
Anthraquinone	Emodin, aloetic acid, aloin, anthracine, anthranon, barbaloin, chrysophanic acid, emodin, ethereal oil, ester of cinnemonic acid, isobarbaloin, and resistannol.	15, 16
Enzyme	Aliiase, alkaline phosphotase, amylase, carboxypeptidase, catalase, cellulase, lipase and peroxidase	14, 15
Hormone	Auxins and gibberllins	14, 15
Minerals	Calcium, chromium, copper, iron, magnesium, manganese, potasium, sodium and zinc	14, 15, 13, 17
Sterol	Cholesterol, campesterol, lupeol and beta sitosterol	14, 15, 16
Sugar	Monosaccharide **(**glucose and fructose) and polysaccharide (glucomannans and polymanose)	14, 15
Vitamin	Vitamin A, C, E, B, choline and folic acid.	14, 15, 13, 17

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TABLE 2:

Uses	Plant Parts	Method Used	References
Cuts	-	-	18
Burns	Leaf extract	-	19, 20, 21, 18, 22, 23, 16, 13, 24
Eczema	Leaf extract + licorice root	-	22, 13
Ulcerative colitis	Whole plant Juice	-	19
Beauty regimes / cosmetic	Leaf extract	-	16, 25
Antihelminthic	Leaf extract	-	25
Laxative	Leaf extract	Aloe resin	26, 25
Hemorrhoid remedy	Leaf extract	-	25
Uterine stimulant	Leaf extract	-	25
Hair treatment	Leaf extract	-	20, 27
Skin care	Leaf extract	-	26, 22, 27, 24
Scar removal	Leaf extract	-	27
Minimizing frost bite damage	Leaf gel	-	24
Insomnia	Leaf gel	-	19
Psoriasis	Leaf gel	-	19, 22, 13
Digestive disorders	Leaf	-	28
Cleanses stomach	Leaf	-	22
Heals tonsil	Leaf gel	-	22
Diseases of mouth and eyes	Leaf gel	-	22
Fever and convulsions inchildren	Leaf gel	-	22
Inflammatory bowel disease	Leaf gel	-	29, 30

TABLE 3: PHARMACOLOGICAL ACTIVITIES OF *A. VERA*

Disease/Effect	Plant parts andMethods	Tested organism	Doses	References
Cardiovascular	Leaf	Male *Calotes Versicolor* Daudin	100 mg/kg body weight/day	31
Wound healing activity	Leaf	Male *Calotes Versicolor* Daudin	100 mg/kg body weight/day	19, 32, 21, 33, 16, 31,34, 17, 25, 24
Hypertension	Leaf	Male *Calotes Versicolor* Daudin	3-6 mg/kg/day for 21 days.	31
Hypolipidaemic effect	Leaf gel extract	Rat		35, 24
Diabetes	Leaf gel extract	Rat		35, 24

Improve plasma insulin	Leaf gel extract	Rat	300 mg/kg bodyweight per day	35
HypoglycemicAction	Leaf extract	Adult male albino rat		36, 35, 37, 38
Antihyperglycemic activity	-	Normoglycemic rat		39
Decrease plasma and tissue cholesterol	Leaf gel extract	Rat	300 mg/kg bodyweight per day	35
Reduction hepatictransaminases	Leaf gel extract	Rat	300 mg/kg bodyweight per day	35
Reduction free fatty acids and phospholipids	Leaf gel extract	Rat	300 mg/kg bodyweight per day	35
Fertility	Aqueous leaf extract	Adult male sprague-dawley rat	70-100 mg/kg body weight	40
Blood pressure	Plant extract	Rat	0.5-3.0 mg/kg	41
Cancer	Plant extract	Woman	-	42, 43, 44
Antitumor activity	Leaf extract	-	-	25
Lung cancer	Leaf gel	-	-	24
Leuke	Leaf gel	-	-	13
Chronic venous legulcers aid healing	Plant extract	Patient	-	26
Dentistry	Leaf extract	Thirty adult subjects	-	45, 46, 25
Protective effects on skin exposed to UV and gamma radiation	Leaf	-	-	25, 24
Inflamation	Leaf extract	Normoglycemic rats	-	32, 27, 16, 47, 39, 48, 17, 25, 28
Effects on the immunesystem	Leaf extract	-	-	25
Stimulates immune system	Leaf	Male *Calotes Versicolor* Daudin	100 mg/kg body weight/day	31
Moisturizing and antiaging effect	Leaf extract	-	-	25
Antiseptic effect	Leaf extract	-	-	25
Arthritis	Leaf extract	-	-	27
Pain	Leaf extract	-	-	47, 27, 34
Ulcerative colitis	Leaf extract	-	-	27
Antioxidant activity	Leaf extract	Normal glycemic rats, normal Male albino mice, albino rabbits	300-400 mg/kg	32, 49, 50, 39, 37, 17, 44, 51
AIDS	Leaf gel	-	-	52, 13, 24
Immune boosting	Leaf	-	-	37
Sickle cell disease	Leaf gel	-	-	13

TABLE 4: ANTIMICROBIAL ACTIVITIES OF *A. VERA*

Microbes		Scientific name	Plant Parts and methods	Doses	References
Bacteria	Cocci Gram$^+$	*S. mutans**	Acetone leafextract	12.5 µg/ml	10, 28
	Acid fast Gram $^+$	*M. tuberculosis*			53
	Bacilli Gram$^+$	*B. subtilis*			54
	Bacilli Gram	*P. aeruginosa*, E. coli, P. gingivalis*, A. actinomycetemcomitans, B. fragilis, K. pheumoniae, S. typhosa, P. vulgaris, P. aeruginosa, S. typhi*	Acetone leaf extract		
Fungus	Yeast	*T. mentagrophytes**			[55]
	Mould	*A.niger*, A. flavus*, F. oxysporum, B. theobromae, R. oryaze, F. solani, C. albicans*	Acetone leaf extract		[10, 56, 54]
Virus	RNA	Human immunodeficiency virus (HIV)			[52, 13, 24]

*Best activity

DISCUSSION AND CONCLUSION: Plants have been utilized for medicinal purposes since the beginning of humanity. These medicines held a separate role in life from the early time to the present day and supplied knowledge on the use of plants or plant products as medicine [78]. Medicinal plants have been used to treat a variety of disorders for centuries due to their phytochemical contents [79].

It is critical to have accurate documentation of medicinal plants and understand their potential for improving health and cleanliness through an environmentally friendly approach. As a result, a thorough and systematic ethno medicinal study is necessary for plant identification, categorization, and recording, which may provide a valuable avenue for promoting traditional herbal medical knowledge. According to the literature, *A. vera* is an extremely essential plant due to its numerous medical characteristics as well as medicinally important compounds such as amino acid, anthraquinone, enzyme, hormone, sterol, and vitamin.

The plant has a wide range of pharmacological effects, including antioxidant, antibacterial, immune-boosting, anticancer, hypoglycemic, hypolipidemic, wound healing, cardiovascular, and anti-diabetic properties. Many traditional applications are also documented such burn injury, eczema, cosmetic, inflammatory, fever which are being explored till now and additional study has to be done. Thus, it is highly promising as a versatile medicinal agent; nevertheless, further experiments are required to isolate and clarify the bioactive compounds utilizing current equipment like as HPLC, HPTLC, and NMR, as well as to expand clinical trials on the route to developing innovative medications.

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