

A COMPREHENSIVE REVIEW AND PHARMACOGNOSTICAL STUDIES OF
AYURVEDIC MEDICINAL PLANT KUMARI (*ALOE VERA* LINN)

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ABSTRACT

Aloe vera is very known herb due to its multiple uses in pharmaceutical and cosmetic industries. It is a perennial dwarf fleshy leaved plant which can survive even in less supply of water owing to its cold property. It is cultivated throughout India as a commercial plant. *Aloe vera* belongs to the family Liliaceae commonly known as Ghritkumari or kumari in ayurvedic literature and indicated for the treatment of various diseases such as jwara (fever), Shula (colic), Agnimandya (indigestion), krimi roga (worm infestation), Splenomegaly (pliha vridhhi), Liver disorder (ykrit vikara), Skin diseases (Tvak vikara), Burn (Dagdha) etc. There are no references about it in Brihadtrayees but all the nighantus have elaborately mentioned about the properties, action and therapeutic uses of *Aloe vera*.

KEYWORDS: Review, *Aloe vera*, Kumari, Pharmacognostic Study.

INTRODUCTION

“Kumari”^[1] *Aloe vera* (Linn.) Burm.F. of Liliaceae family, also known as *Aloe barbadensis* Mill. (Liliaceae) is a principal herb in Ayurveda having plethora of actions on the human body. The name *Aloe vera* derives from the Arabic word “Alloeh” meaning shining bitter substances, while *Vera* in Latin means true. *Aloe*’s thick, tapered, spiny leaves grow from a short stalk near ground level.^[2] There are over 550 species of aloe grown around the world. However, only two species are grown today commercially, with *Aloe barbadensis* Miller and *Aloe aborescens* Miller being the most popular.

Aloe can be found in Mexico, India, South America, Central America, Australia and Africa. Historians opine that ‘Vedic Nighantu’ was the basis of ‘Nirukta’. The Nighantu contained only the synonyms words. The Ayurvedic Nighantu written during the initial phase of medical period followed the same pattern. In due course of time the properties and actions of drugs were added to the description of synonyms. The synonyms were coined basing on the similarity property therapeutic uses, time, place of origin and historical important.

The leaves of this wonderful medicinal plant are flooded with numerous vitamins, minerals, enzymes, natural sugars, amino acids etc. They are as well rich in various phytochemicals that exhibit emollient, purgative, antioxidant, anti-inflammatory, anti-helminthic,

antimicrobial, aphrodisiac, antiseptic and cosmetic values.^[3]

Botanical Name: *Aloe vera* (Linn.) Burm. f.**Taxonomical Classification**

- ❖ Kingdom: Plantae
- ❖ Subkingdom: Tracheobionta
- ❖ Superdivision: Spermatophyta
- ❖ Division: Magnoliophyta
- ❖ Family: Liliaceae
- ❖ Genus: *Aloe*
- ❖ Species: *Aloe vera*

Natural Order

Liliaceae

Classical Names

Kumari, Grihakanya, Ghritakumarika, Kanya.

Vernacular Names

Eng.-Indian aloe, Curacao aloe, Barbados aloe
Hindi- Ghikunwar, Ghikumari
Beng.- Ghritakumari, Kanya
Guj.- Kumarpathu, Kunawar
Kan.- Kathaliogida, Lolesara, Kumari
Mal.- Kattuvala, Kattarvala
Mar.- Korphad,
Punj.- Elwa
Tam.- Kattalai, Sirukattalai

Tel.- kalabanda,
Assam.- Musabhar, Machambar
Kash.- Musabbar
Oriya- Kumari, Mushaboro
Urdu- Musabbar, Ailiva, Siber

Kumari in Ayurvedic Literature

[A] Vedas are foremost ever written documents of knowledge; Kumari is not traced in Vedas and Brihadtrayee.

[B] Samhita Kala

In Bhel Samhita (1000B.C.)-

(Bhel Samhita/ Chikitsasthan/25/25)

Kumari was first described in Bhel Samhita as an ingredient of Rasna taila in Vatavyadhi chikitsa.

In Sharangadhara Samhita (13th century A.D.)

(Sharangdhara samhita/ Madyama khanada/1/15)

Kumari Swarasa with Nisha Churna has been indicated for Pliha roga and Apachi in 1 st chapter of Madhyama Khanda.

(Sharangdhara samhita/ Madyama khanada/10/15)

Kumaryasava and its uses have been mentioned in 10th chapter of Madhyam Khanda.

In Rajamartanda (11 century A.D.)

Ghritha Kumari has been documented in Rajamartanda (23/3) for external use only.

[C] Nighantu Kala

Table Showing Classification of Kumari as per Nighantu,^[4] Texts.

Sr. No	Name of the texts	Name of Varga
1.	Amarkosha	Vana Ausadhi varga
2.	Madhava Dravyaguna	Vividha Ausadhi varga
3.	Madanpala Nighantu	Abhayadi varga
4.	Kaideva Nighantu	Ausadhi varga
5.	Bhavaprakasha Nighantu	Guduchyadi varga
6.	Arkaprakasha	Netrya Gana
7.	Raja Nighantu	Parpatadi varga
8.	Shaligrama Nighantu	Guduchyadi varga
9.	Priya Nighantu	Shatapushpadi varga

In Astanga Nighantu (8 century A.D.)

(Astanga Nighantu / Viprakirana Varga-278)

Kumari has been mentioned in Viprakirana varga of Astanga Nighantu.

In Dhanvantari Nighantu (10th - 13th century A.D.)

(Dhanantari Nighantu/133/182/184)

Kumari has been written as synonym of Taruni and Kumarika as synonym of Vandhyakarkotaki and Karkotaki.

In Madanpala Nighantu (14th century A.D.)

(Madanpala Nighantu /Abhyadi Varaga331&332)

Ghritha kumari has been mentioned in Abhyadi Varaga with its synonyms and uses.

In Rasarnava (12th century A.D.)

(Rasaarnava/5/10)

Author has mentioned Kumari as Nirjeevkaraka drugalong with other drugs.

In Gadanigraha (12th century A.D.)

(Gadanigraha/8/23)

In Kayachikitsa (Kumar Tantra, Stanrogadhikar) Shodhal has advised to apply the paste of Haridra and Kumari root on breast to relieve pain caused due to death of baby. He has also mentioned it as main ingredient of Kumaryasava.

In Rasa Ratna Samuchchaya (13th century A.D.)

(Rasaratnasamuchya/25/18)

Application of the paste of Kumari juice with Jiraka has been indicated to pacify the burning sensation and suppuration in Lingapaka.

In Yoga Ratnakara (17th century A.D.)

(Yoga Ratnakara/Gulma chikitsa/1)

Kumari is the main ingredient of Kumaryasava which has been mentioned in Gulmadhikara.

In Bhaisajyaratnavali (18th century A.D.)

(Bhaisajyaratnavali/yonivyapad chikitsa 67/65-67)

Kanyasara (Musabbar) has been mentioned as the component of VijyadiVati which is useful in Kricharaja satruti (Dysmenorrhoea).

In Kaideva Nighantu (15th century A.D.)

(Kaideva Nighantu/Ausadhi varga/1638/1639/1640)

Kaideva has mentioned properties and synonyms of Kumari along with the indication of its flower as Guru, Vata, Pitta and Krimihara in its Ausadhi Varaga.

In Bhavaprakasha Nighantu (16th century A.D.)

(Bhavprakash Nighantu/Guduchyadi varga)

Shri Bhava Mishra has mentioned Kumari in Guduchyadi Varga with synonyms as Gruhakanaya, Kanya, Ghritha Kumari and mentioned its rasa as Tikta – Madhura and indicated it as Vatahara.

In Arkaprakasha (16th century A.D.)

(Araka Prakasha)

Ravna in Arkaprakasha has written in Netrya gana that Girikanya's Arka is useful in leprosy, pain, wounds and poisoning. He has again mentioned that Kumari is indicated in burning etc.

In Rajanighantu (17th century A.D.)

(Rajanighantu/Parpatadi Varaga)

Narhari pandit has mentioned Ghrita Kumari under Parpatadi Varaga with its twenty one synonyms. These are Grahakanya, Kumari, Kanyaka, Dirghapatrika, Sthaleruha, Mrudu, Kanya, Bahupatra, Amara, Ajara, Katakapravrta, Vira, Bhrgmgesta, Vipulasrava,

Vranaghni, Taruni, Rama, Kapila, Ambudhisrava, Sukantaka and Sthuladala. He further said that it reduces Kapha, Pitta, Kasa, Shwasa and Kustha.

In Priya Nighantu (20th century A.D.)

(Priya Nighantu/ Shatapuspadi Varga)

Acharya Priyavrata has written the Kumari under Shatapuspadi Varga. He is of the opinion that Kumari possesses Madhura (sweet) and Tikta (bitter) Rasa (taste), SheetaVirya and Rasayana Karma. reduces Gulma, Plihavridhi, Yakritavridhi and Rajorodha.

Table showing Different Ayurvedic texts have been mentioned kumari with its various synonyms as

Syn	A.K. ^[5]	A.N. ^[6]	Si. N. ^[7]	BP.N. ^[8]	K.N. ^[9]	P.N. ^[10]	R.N. ^[11]
Akshikirasa	-	-	-	-	+	-	-
Ajara	-	-	-	-	-	-	+
Amara	-	-	-	-	-	-	+
Ambudhisarava	-	-	-	-	-	-	+
Aphala	-	-	-	-	-	-	-
Bahupatra	-	-	-	-	-	-	+
Bala	-	-	-	-	-	-	-
Bhrgmgeshta	-	-	-	-	-	-	+
Bhringani	-	-	-	-	-	-	+
Dirghpatri	-	-	-	-	-	-	-
Dirghpatrika	-	-	-	-	-	-	+
Falamatasaya	-	-	-	-	+	-	-
Garalasthi	-	-	-	-	-	-	-
Gruhkanaya	-	-	+	+	+	+	+
Girikanaya	-	-	-	-	-	-	-
Ghrita kumari	-	-	-	+	+	+	-
Katakapravrut	-	-	-	-	-	-	+
Kapila	-	-	-	-	-	-	+
Kanya	-	+	-	+	+	-	-
Kumari	+	+	+	+	+	+	+
Mandala	-	-	+	-	+	-	-
Mata	-	-	+	-	+	-	-
Mrudu	-	-	-	-	-	-	+
Picchasamvrita	-	-	-	-	-	-	-
Pruthu	-	-	-	-	-	-	-
Saha	+	-	-	-	-	-	-
Sara	-	-	-	-	-	-	-
Sthalruha	-	-	-	-	-	-	+
Sthuldala	-	+	-	-	-	-	+
Spichilla	-	-	+	-	-	-	-
Sukantaka	-	-	-	-	-	-	+
Surasa	-	-	-	-	-	-	-
Taruni	+	-	-	-	-	-	+
Vilayika	-	-	-	-	-	-	-
Vipulsrava	-	-	-	-	-	-	+
Vistari	-	-	-	-	-	-	-
Vishala	-	-	-	-	-	-	-
Vyaghracharna	-	+	-	-	-	-	-

Note-A.K.-Ananda khandi;A.N.-Astanga Nighantu; A.S.-Ayurveda Saikhyam;BP.N.-Bhavprakash Nighantu;K.N.-Kaidev Nighantu;P.N.-Priya Nighantu;. (+) denotes- Present; (-) denotes- Abscent.

Table showing Rasapanchaka of Kumari.

Rasa	Guna	Virya	Vipak
Tikta	Guru	Sheeta	Katu
Madhur	Snigdha		
	Pichilla		

Rasa

Rasa	So.N.	K.N.	BP.N.	R.N.	P.N.
Tikta	+	+	+	+	+
Madhur	-	+	+	-	+

Note- So.N.- Sodhal Nighantu; K.N.-Kaidev Nighantu; BP.N.-Bhavprakash Nighantu; R.N.-Raj Nighantu,P.N.-Priya Nighantu. (+) denotes-Present; (-) denotes Abscent.

Guna

Guna	So.N.	K.N.	BP.N.	A.S.	P.N.
Guru	-	+	-	-	+
Snigdha	-	-	-	-	+
Pichilla	+	-	+	+	+

Note- So.N.-Sodhal Nighantu; K.N.-Kaidev Nighantu; BP.N.-Bhavprakash Nighantu; A.S.-Astanga Samgraha;P.N.-Priya Nighantu. (+) denotes-Present; (-) denotes Abscent.

Virya

Virya	So.N.	M.D.	Mp.N.	K.N.	BP.N.	R.N.	P.N.
Sheeta	+	+	+	+	+	+	+

Note- So.N.-Sodhal Nighantu;M.D.-Madhav Nidan;Mp.N.- MadanpalaNighantu;K.N.-Kaideva Nighantu; BP.N.-Bhavprakash Nighantu;R.N.-Raj Nighantu;P.N.-Priya Nighantu.

Doshakarma

Dosha	Mp.N.	K.N.	BP.N.	A.S.	R.N.	P.N.
Vatahara	-	++(flower)	+	-	-	+
Pittahara	+	++(flower)	+	+	+	-
Kaphahara	-	+	+	+	+	+

Note- Mp.N- Madanpal Nighantu, K.N- Kaiyadev Nighantu, BP.N- Bhavprakash Nighantu, R.N- Raj Nighantu, P.N- Priya Nighantu. (+) denotes-Present; (-) denotes Abscent.

Table showing Therapeutic Indication of kumari.

Karma	BH.S	So.N	KN	BP.N	RN	AP	AS	SB.M	PN
Apasmara	-	-	-	-	-	-	-	+	-
Agnidagdha	-	-	+	+	-	+	+	-	-
Apachi	-	-	-	-	-	-	-	-	-
Bhedna	-	-	+	-	-	-	+	-	-
Balya	-	-	+	+	-	-	-	-	-
Brimhana	-	-	-	+	-	-	-	-	-
Chakshuya	-	-	+	+	-	+	-	-	-
Daha	-	-	-	-	-	-	-	-	-
Gulma	-	+	+	+	-	-	-	-	+
Granthi	-	-	+	+	-	+	-	-	-
Jwara	-	-	+	+	-	-	+	-	-
Kamala	-	+	-	-	-	-	-	-	-
Krimihara	-	-	+	-	-	-	-	-	-
Kasa	-	-	-	-	+	-	-	-	-
Kustha	-	-	-	-	+	-	-	-	-
Mutrakricchya	-	-	-	-	-	-	-	-	-
Paka	-	-	-	-	-	-	-	-	-

Plihavridhdihara	-	-	+	+	-	-	+	-	+
Raktapittahara	-	-	+	+	-	-	+	-	-
Rasayana	-	-	+	+	+	-	-	-	+
Rajarodha	-	-	-	-	-	-	-	-	+
Shool	-	-	-	-	-	+	-	-	-
Twakaroga	-	-	+	+	-	-	+	-	-
Vatavyadhi	+	-	+	+	-	-	-	-	-
Visha	-	-	+	+	+	+	-	-	-
Visphota	-	-	+	+	-	+	+	-	-
Vidradhi	-	-	-	-	-	-	-	-	-
Vrana	-	-	-	-	-	+	-	-	-
Vrishya	-	-	+	-	-	-	-	-	-

Note- BH.S- Bhel Samhita, So.N- Sodhal Nighantu, KN- Kaiyadev Nighantu, BP.N- Bhavprakash Nighantu, RN- Raj Nighantu, AP- Aurved Prakash, AS- Astanga Samgraha, SB.M- Siddha Bhaishajyamanimala, PN- Priya Nighantu. (+) denotes-Present; (-) denotes Abscent.

Botanical Description

The cactus-like succulent aloe vera belongs to the genus of the liliaceous plants. The plant is either stem-less or very short-stemmed (stem up to 25 cm long) with an average about 20 leaves in a straight, dense rosette. The leaves grow to up to 40 – 50 cm long and 6 – 7 cm wide. The leaves are rather thick, fleshy, water retaining; concave on the top side, grey-green often reddish and young plants are often speckled.^[12] The underside of the leaf is convex with a pale pink rim that is dressed with 2 mm long thorny teeth spaced at every 10 – 20 mm. One leaf can weigh as much as 1.5 to 2 kg. The succulent leaf of the aloe is an adaptation to the very dry conditions of its habitat. The roots of the aloe are relatively short and lay flat embedded in the earth.

The inflorescence is simple or a simple or double raceme and grows up to 60 – 90 cm. The raceme is dense, cylindrical and narrowing towards the top. The racemes grow up to 40 cm long. The perophylls are white, the blossoms about 3 cm long and bright yellow to red. The fruit of the plant are loculicilade capsules. The aloe grows numerous adventitious buds which the plant later uses for reproduction in a vegetative way. All approximately 200 different species of aloe are protected by the Washington Convention as of March 3, 1973, in their natural habitats. Exempt are, in addition to seeds and cell cultures and the like, “single leaves as well as parts and products thereof which derive from plants outside of their natural distribution area or from artificially reproduced aloe plants of the species “vera”.



Fig. Aloe vera plant.



Fig. Aloe vera plant.



Fig. Aloe vera Flower.



Fig. Aloe vera Jel.

Distribution

Cultivated throughout india, grow wild on the coasts of Bombay, Gujarat and South india.

Parts Used

Leaf, leaf-juice, dried juice of leaf.

Actions and Uses

The plant is bitter, sweet, cooling, anthelmintic, aperient, carminative, deobstruent, depurative, diuretic, stomachic, emmenagogue, ophthalmic, alexeteric. Juice is used in dyspepsia, amenorrhoea, burns, colic, hyperadenosis, hepatopathy, spleenopathy, skin diseases, constipation, dysmenorrhea, abdominal tumours, dropsy, carbuncles, sciatica, lumbago and flatulence.^[13] The dried juice is used for helminthiasis in children and as purgative, anthelmintic and emmenagogue. It is used for local application in painful inflammation, chronic ulcers and catarrhal and purulent ophthalmia.

Ayurvedic Properties^[14]**Leaf****Dried Juice**

Rasa- Tikta, Madhura Tikta, Madhura

Guna- Guru, Snigdha, Pichchhila Laghu, Ruksha, Teekshna

Veerya- Sheeta Usna

Vipaka- Katu Katu

Doshagnata- Kaphapittashamaka

Rogagnata- Shotha, Jeernavrana, Pleehavidhi, Netrabhishyanda, Shiroroga, Netraroga, Agnimandya, Gulma, Yakritvidhi, Vibandha, Krimi, Raktavikara, Mootrakrichchhra, Shukradaurbalya, Rajorodha, Charmaroga, Jeernajwara.

Karma- Shothahara, Vedanasthapana, Vranaropana, Deepana, Pachana, Bhedana, Yakriduttejaka, Virechana, Krimighna, Raktasodhaka, Mootrala, Vrishya, Artavajanana, Garbhasravakara, Twakadoshahara, Jwaraghna, Balya, Brimhana.

Pharmacognosy

Acaulescent herbs. Leaves radical, 30-60 cm long, fleshy, in rosettes, sessile, glaucous- green, often crowded with horny prickles on margins, narrowed from base to apex.

Macroscopic Study**Macroscopic character of leaf pulp of Kumari**

Leaves large, succulent, subulate, sessile, 20-50 cm long and 5-10 cm wide. Apex in the form of a sharp and acute spine. Both the surfaces are strongly cuticularized.



Fig. Macroscopic picture of leaf pulp of Kumari.

Macroscopic character of leaf powder of kumari

Dark chocolate brown in colour, very bitter taste, and course in consistency.



Fig. Macroscopic structure of powder of kumara.

Microscopic study**Powder microscopy of leaf pulp of Kumari**

The Powder of dried juice when mounted in glycerine or lacto phenol and examined under microscope, show

innumerable crystalline, yellowish brown to chocolate-coloured particles of varying size and shape.

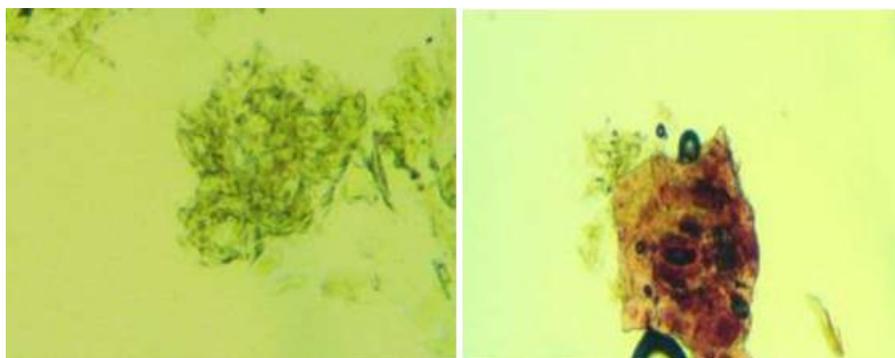


Fig. Powder microscopy of leaf pulp of kumara.

Microscopic character of cross section of leaf pulp of Kumari

In transverse section pericyclic cells are thin walled, large, contain yellow fluid. The fluid under microscope

shows crystals in the form of innumerable needles varying in size and shape.



Fig. Microscopic (Cross section) of leaf pulp of Kumari.

Phytochemical study

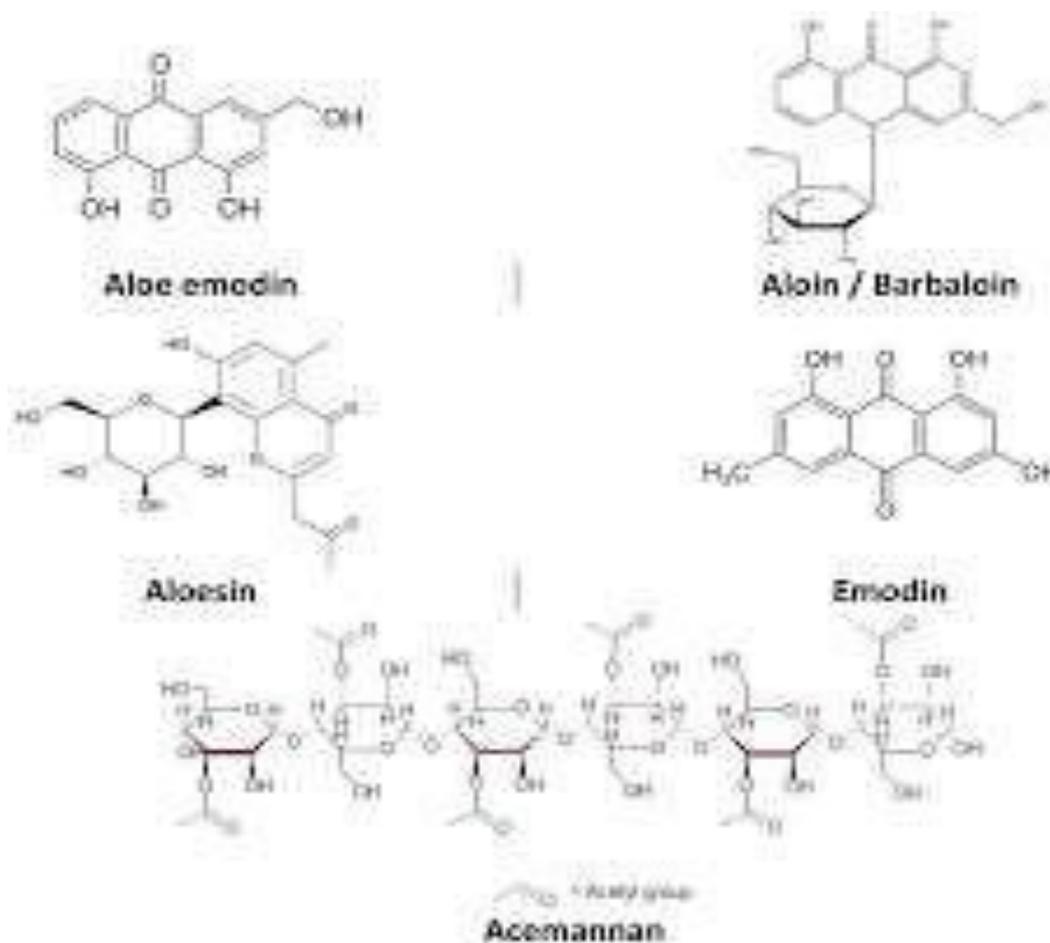
Table Showing- Phytochemical analysis of Research drug Kumari (*Aloe vera* ex.Linn.) in Aqueous Extract.

Phyto-constituents	Name of the Reagent(s)	Observation	Result
Alkaloid	Dragendroff Orange red ppt	Orange red ppt	+(ve)
	Mayer's Cream colour ppt	yellow colour sol	-(ve)
Carbohydrate	Fehling Brick red ppt	Brick red ppt	+(ve)
	Benedict Red/Brown colour ppt	Green colour sol	-(ve)
Protein/Amino acid	Ninhydrin Blue colour sol	colourless sol	-(ve)
Phytosterole	Liebermann-Burchard's Test Bluish red to cherry red colour in chl layer	yellow colour sol	-(ve)
Saponins	Foam Test 1cm layer of foam	colourless sol	-(ve)
Tannins	Ferric Chloride Solution Deep blue black colour	Brown colour sol	-(ve)
Fixed Oil	Spot test Oil stains on paper	No oil stains present	-(ve)
Flavonoids	Alkaline reagent test Intense yellow colour then colourless	Colourless sol	+(ve)

Chemical Constituents

The chief constituents are hydroxyanthraquinone-barbaloin (a mixture of aloin A and B, the diastereoisomeric 10-C glucoside of aloe-emodin

anthrone) and hydroxyaloin isomers.^[15] The other constituents include aloe emodin, chrysophanol, chromone derivatives-aloesin B with its p-coumaryl derivatives oleoresin A and C and the aglycone aloesone.



Pharmacological Activities

Anti-inflammatory, antiulcerogenic, anaesthetic, fertility, antifertility, hepatoprotective, antibacterial, anti-prostaglandin effect, cathartic, hypotensive, antispasmodic, spasmogenic are reported.

Doses- Leaf juice- 10-20 ml, Dried juice- 100-300mg.

Formulations and preparations

Kumaryasava, Kumaripaka, Chandrashura rasa, pradarantaka rasa, Brihad-chandrodaya makaradhwaja, Hemagarbhapottali rasa, Kumari taila, Kumari vati, Kumarika vati.

Substitutes and Adulterants

Marketed drug may be adulterated with black catechu (*Acacia catechu* Willd.), pieces of irons and stones. These can be detected by the apparent increase in alcohol insoluble extract.

Propagation and Cultivation

It can be easily cultivated in almost all parts of India, even under constant drought conditions. It is propagated

through suckers. It tolerates poor marginal soils and higher pH with high Na and K salts. However, its growth is faster on moderately fertile heavier soils viz. black cotton soil. An aloe plantation gives commercial yield from 2nd year to an age of 5 years, whereafter it needs replantation. It can also be propagated by tissue culture technique.

CONCLUSION

Aloe vera (Linn.) Burm.F is highly regarded as a universal panacea in the Ayurvedic medicine. It is one of the most versatile plants having a wide spectrum of medicinal activities. The versatile medicinal plant is the unique source of various types of compounds having diverse chemical structure. Very little work has been done on the plausible medicinal applications of these compounds and hence extensive investigation is needed to exploit their therapeutic utility to combat diseases.

REFERENCES

1. P. C. Sharma, M. B. Yelne and T. J. Dennis, Database on medicinal plants used in Ayurveda, vol.

- 1; Central Council for Research in Ayurveda & Siddha, Department of Indian system of medicine, Govt. of India, New Delhi, 2000; 225-227.
2. Bunyapraphatsara N, Yongchaiyudha S, Rungpitarangsi V and Chokeychajaroenporn O. Antidiabetic activity of *Aloe vera* L. juice. *Phytomedicine*, 1996; 3: 245-248.
3. Surjushe, A., Vasani, R., & Saple, D.G. *Aloe vera*: a short review. *Indian journal of dermatology*, 2008; 53(4): 163-166. <http://doi.org/10.4103/0019-5154.44785>.
4. Sharma. P.V, *Dravya Guna*, 2nd part, Choukhamba orientalia, Varanasi, 446.
5. Tripathi Indradev, *Amar kosha*, Krishnadas academy, 1982.
6. Astanga Nighantu, of Vagbhatta, Edited with the Vidyotini Hindi commentary by Kaviraja Atrideva Gupta, Choukhamba Sanskrit Sansthan, Varanasi, 13th Edition, 2000.
7. Shaligram vaidya, *Shaligram Nighantu*, Srivenkateswaryantralaya, 1981.
8. Singh. Amritpal, *Bhavprakash Nighantu*, Choukhamba orientalia, Varanasi, 1st ed, 2007.
9. Sharma. P. V, *Kaiyadev Nighantu*, Choukhamba orientalia, Varanasi, 1979.
10. Tripathi Indradev, *Priya Nighantu*, Krishnadas academy, 1982.
11. Tripathi Indradev, *Raj Nighantu*, Krishnadas academy, 1982.
12. P. C. Sharma, M. B. Yelne and T. J. Dennis, *Database on medicinal plants used in Ayurveda*, vol. 1; Central Council for Research in Ayurveda & Siddha, Department of Indian system of medicine, Govt. of India, New Delhi, 2000; 225-227.
13. Dr. Prakash L. Hegde, Dr. Harini A., *A Textbook of Dravyaguna Vigyana*, Choukhamba Sanskrit Sansthan, Pune, Vol 2nd, Reprint, 2018
14. Sharma. P.V, *Dravya Guna*, 2nd part, Choukhamba orientalia, Varanasi, 448.