

EXPLORING THE PHARMACO-THERAPEUTIC EFFICACY OF KUMARI (ALOE VERA L.) ON THE REPRODUCTIVE SYSTEM

¹*M. D. Sheba MD(Ay) PhD and ²Nimmy V. S. MD(Ay)

¹Principal, Vaidyaratnam Ayurveda College, Ollur, Kerala.

²Assistant Professor, Department of Dravyaguna Vijnana, Vaidyaratnam Ayurveda College
Ollur, Kerala.

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*Corresponding Author

M. D. Sheba MD(Ay) PhD

Principal, Vaidyaratnam
Ayurveda College, Ollur,
Kerala.

ABSTRACT

Kumari (Aloe vera Linn. Burm.), is one of the important medicinal herbs in Ayurveda. The term “Kumari” itself denotes the popularity of the herb among women owing to multitude of actions ranging from cosmetic effects to gynaecological effects. There are no references about it in *Brihattrayis* but all the *nighantus* have elaborately mentioned about the properties, action and therapeutic uses of Aloe vera. Various studies have explored therapeutic action of Aloe vera on skin conditions and wound healing, including psoriasis, dermatitis, oral mucositis, burn injuries, and surgical wounds. The Anti-diabetic, Anti-cancerous, Anti-ulcer, cathartic and anti-inflammatory effects of the

herb are also well documented. The present review seeks to throw light on the immense possibilities in the utilisation of this promising herb in Ayurveda in maintaining health of the human reproductive system.

KEYWORDS: Kumari, Aloe vera Linn., Ayurveda menstrual health, Ayurveda reproductive health.

INTRODUCTION

“Kumari” – 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. *Aloe vera* L. is a stemless plant with rosettes of very thick fleshy leaves.^[1] Popularly known as Common Indian aloe, Barbados aloe, Musabbar and Curacao Aloe in English and as Ghikuar in Hindi, the herb is utilised as single drug remedy and as an ingredient in various formulations. According to the National Medicinal Plant Board (NMPB), the Ayurveda drug

manufacturing industry uses more than 3200 million ton of *Kumari* under the trade names- Ghikanvar (leaf of *Aloe vera* Linn.) and Kanyasara (dried leaf juice of *Aloe vera* L.).^[2] *Kumari* also figures among the list of “36 Medicinal Plant Species in High Trade sourced largely from Cultivation” documented by NMPB.^[2]

Various studies have explored the therapeutic action of *Aloe vera* L. on skin conditions and wound healing, including conditions like psoriasis, dermatitis, oral mucositis, burn injuries, and surgical wounds.^[1] The anti-diabetic, anti-cancerous, anti-ulcer, cathartic and anti-inflammatory effects of the herb are also well documented.^[1] The present review seeks to throw light on the immense contributions and future possibilities in the utilisation of this promising herb in Ayurveda in maintaining health of the human reproductive system.

The term “*Kumari*” itself denotes the popularity of the herb among women owing to its cosmetic effects to gynaecological effects. *Grihakanya* and *Kanya* are synonyms that mark its value as a remedy in female health.^[3] Though not mentioned in Brihatrayis, the Nighantus in Ayurveda have ample information about the synonyms, properties and action of *Kumari* leaf and Kanyasara (dried juice of leaf of *Aloe vera* Linn.). Kanyasara is prepared by cutting the lower end of leaf blade to exude the juice, which was collected, pulverized and heated in low temperature up to complete evaporation of water and then vati kalpana is prepared. Finally Kanyasara appears as dark chocolate brown to black coloured, opaque, compact masses.^[4]

A thorough review of the properties and action of *Kumari* in the Nighantus reveals the multitude of actions bestowed on the herb.

Table 1: Rasapanchaka of *Kumari* (*Aloe vera* L.) in Nighantus.

	BPN ^[5]	RN ^[6]	Sa. Ni ^[7]	KN ^[8]	PN ^[9]
Rasa	Tikta, madhura	Tikta	Madhura	Tikta, madhura	Tikta, madhura
Guna	Guru, Snigdha, Pichila				Sara
Virya	Seetha	Seetha		Seetha	Seetha
Vipaka	Katu	Katu		Katu	
Dosa karma	Vata Pittaghni	Kapha-Pittahara	Pittaghna		
VyadhiKarma	Visaghni, gulma, pleeha, yakrit, vridhhi, jwara, grandhi, agnidagdha, visphota, twak roga	Visaghni kasaghni, swasaghni, kushtaghni,	Krimighna	gulma, pleeha, yakrit, vridhhi, jwara, grandhi, agnidagdha, visphota, twak roga, krimihara,	gulma, pleeha, yakrit, vridhhi, rajorodha

Anyakarma	Bhedini, Netrya, Rasayani, brmhani, balya, vrsya,	Rasayani		Bhedini, Chakshusya, Rasayani, brmhani, balya, vrsya,	Rasayana
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There is difference in properties among the leaf of Kumari and dried leaf juice (Kanyasara), which is shown in the table given below:

Table 2: Difference in properties and action of Kumari and Kanyasara.

Rasapanchaka	Kumari	Kanyasara
Rasa	Tikta, Madhura	Katu
Guna	Guru, Snigdha, Picchila	Laghu, Ruksha, Tikshna
Veerya	Seetha	Ushna
Vipaka	Katu	Katu
Dosa karma	Kapha pittahara	Kapha vata hara
Karma	Bhedini, Chakshusya, Rasayani, brmhani, balya, vrsya	Vedanasthapana, Deepana, Pachana, Virechana, Raktashodhaka, Artavajanana, Garbhasravakara, Balya

While the leaves (patra) is the most used part of the herb, Ayurveda also documents the properties of the flower of Kumari:

i. Properties and action of “Kumari pushpa” as per Saligrama Nighantu^[7]

Pushpa- guru, vatapittaghna, krimighna,

ii. Properties of “Kumari pushpa” as per Kaiyadeva Nighantu^[8]-guru

In Ayurvedic classics, *Kumari* (Aloe vera L.) was firstly mentioned in the classical textbook, *Bhela Samhita* in the management of *vatavyadhi* and later on it was included in various other textbooks and is indicated for various ailments. Classical Ayurveda literature points out that Kumari is deepana (appetiser), pacana (digests metabolic toxins), balya (strengthening the tissues) in smaller doses and bhedana (cathartic), arthavajanaka (induces menstruation) in higher doses.^[10] Kumari is commonly used to manage irregular periods and excessive pain during menstruation. The expressed leaf juice of Aloe vera along with honey is utilised to relieve dysmenorrhoea.^[10,11] In the management of oligomenorrhoea, “Lehyam” or medicated jam prepared by boiling and concentrating a mixture of Aloe vera leaf juice, garlic (fried in ghee) and jaggery is administered in a dose of two tsp twice daily for 7 days.^[11]

In the context of the present review it is notable that Kumari is an ingredient of numerous formulations including *Rajah-pravartini vati*, *Kumaryasava* and *Kumari Taila* which are popularly used in disorders of reproductive system in both male and female.^[12] Kanyasara is

mentioned in Raja pravartani vati, Kumarika vati and Vijayadi vati indicated for the management of Kashtartava. It is also indicated as Pushpajanana (increase menstrual flow) in Ayurveda Vijnana.^[12]

Kumari is mentioned in *Bhaishjyarnavali /Yonivyapadachikitsa* in the formulation named as *Rajahpravartini vati* indicated for *Kashtartava* (dysmenorrhoea) and *Rajorodha* (amenorrhoea), where *Kanyasara* and *Kumari Swarasa* both are ingredients at the same place.^[13] *Rajah-pravartini vati* comprises of only 4 ingredients- *Kumari*(*Aloe vera*), *Hingu* (*Ferula asafoetida*), *Tankana* (Borax) and *Kasisa* (Green vitriol).^[13] *Kumari* is the foremost ingredient of the formulation which is used in treating Hypomenorrhoea and Oligomenorrhoea. Similarly, *Kumaryasava* a formulation explained in various Ayurveda Classics like *Sarngadhara Samhita*, *Yogratnakara*, *Gadnigraha* and *Ayurveda sara sangrah* is proven to be in correcting seminal disorders, menstrual irregularities, dysmenorrhea etc.^[14] It is also useful in diseases of GIT, renal-urinary disorders, diabetes mellitus, epilepsy etc. as per classics.

Various clinical studies justify and carve out the efficacy of *Kumari*, *Kanyasara* and their formulations in managing conditions of dysmenorrhea, hypomenorrhea, oligomenorrhoea etc.

- i. **Effect of *Kumari swarasa* and *Kanyasara* in management of kashtartava^[12]:** A clinical study comparing the effect of *Kumari swarasa* and *Kanyasara* in management of *kashtartava* shows interesting results. 30 patients of age group 15-35 were selected randomly, group 1 (15 patients) was given *Kumari Swarasa* 10 ml BD and group 2 (15 patients) was given *Kanyasara Vati* 250 mg BD for 10 days before expected commencement of Menstrual cycle for 3 menstrual cycles. Study showed that *Kanyasara* is 47.73% better than *Kumari Swarasa* in pain intensity, 38.8% better in duration of pain, 75% better in respect of amount of flow and 25.11% better in overall symptoms whereas *Kumari swarasa* is better in associated symptoms like giddiness, nausea, vomiting and anorexia. Hence *Kanyasara* is better than *Kumari Swarasa* but *Kanyasara* and *Kumari Swarasa* in combination can prove the best line of treatment by relieving cardinal as well as associated symptoms of *Kashtartava*.
- ii. **Clinical evaluation of *Kumaryasava* and *Rajahpravartani Vati* in primary dysmennorhaea^[15]:** A study evaluated the efficacy of *Kumaryasava* and *Rajahpravartani Vati* in primary dysmennorhea and it was found that both the

formulations were safe and effective in pain associated with the condition. The study also revealed that *Rajahappravartini Vati* showed more effect on overall symptoms of dysmenorrhea including pain and menstrual pattern though *Kumaryasava* was found to be more effective in associated sign and symptoms of dysmenorrhea.^[15]

iii. Effect of “Kumari Taila” Uttar Basti on fallopian tube blockage^[16]: Another interesting clinical study explores the effect of Kumari Taila Uttar Basti on fallopian tube blockage.^[5] Kumari Taila is mentioned by Bhava Mishra in Shirorogadhikar. The dose of Uttar Basti was 5 ml with duration of two consecutive cycles (six days of Uttar Basti in each cycle with an interval of three days in between). The tubal blockage was removed in 80% of the patients, and 40% of the patients had conceived within the follow-up period of two months.^[5] The formulation Kumari Taila was selected for its Vata Kapha Shamaka and Lekhana properties. It was found that Kumari Taila helps in the scraping of the obstructing substance and also removes the endometrial lining of the tubes and uterus by virtue of these properties and action.

A thorough review of the research studies that validate the efficacy of Aloe vera Linn. in managing disorders of the reproductive system support and justify the utilisation of the herb in Ayurveda for managing such disorders.

1. Effect of Aloe vera L. on primary menstrual pain^[17]

The present study was directed to assess the effects of oral aloe vera gel pills supplementation on the intensity of menstrual pain. A randomized, single-blind clinical experimental plan was conducted amongst 150 single students aged 20 to 26 years who suffered from menstrual pain. The extent of pain was evaluated using the Cox Menstrual Symptom Scale (CMSC). At the end of study it was concluded that Aloe vera gel pill as a novel herbal pain killer and represents an effective treatment for the menstrual pain with no important side effects.

2. Effect of Aloe vera on polycystic ovarian syndrome rat model^[18]

In the present study, 5 month old Charles Foster female rats were orally fed with letrozole, a non-steroidal aromatase inhibitor, to induce PCOS. The rats were then treated orally with the Aloe vera gel formulation (1 ml dose daily for 45 days). This restored their oestrus cyclicity, glucose sensitivity, and steroidogenic activity. Co-treatment of the inductive agent (letrozole) with the Aloe vera gel prevented the development of the PCO phenotype.

3. Antifertility Activity of Ethanolic and Aqueous Extracts of Aloe Vera Mill on female wistar rats^[19]: Antifertility activity of plant extracts were evaluated with the help of

reproductive outcome, anti-implantation, abortifacient, estrogenic and anti-estrogenic study was also performed, which further supported by the hormonal analysis.

The study found that the herb could be used as a natural, safe, contraceptive which had no teratogenic effect. Postcoital antifertility study showed the anti-implantation activity in the treated animals. Treated animals delivered litters which, was significantly less than control.

4. Protective role of Aloe vera against X-ray induced testicular dysfunction^[20]

The present enquiry was carried out to evaluate the possible radioprotective potential of an Aloe vera extract against whole-body X-ray irradiation-induced testicular alterations in mice. The study group consisting of “irradiated animals pre-treated with Aloe vera extract” revealed an improvement in antioxidant status, inhibition of lipid peroxides, apoptotic cell formation and enhanced testicular parameters when compared to the X-ray-exposed group. These findings suggest that Aloe vera extract could ameliorate X-ray-induced damage due to its free radical scavenging properties and its potential to boost cellular antioxidant defence machinery.

5. Effects of Aloe vera on rat ovaries^[21]

Effects of Aloe barbadensis, a type of Aloe vera, on ovaries were investigated in female Wistar albino rats during pregnancy. Vascular increase and the hyperaemic form of ovary in the group administered with Aloe barbadensis were notable. Decrease in primary follicle numbers, increase in secondary follicle numbers, and diminishment of secondary follicle diameters occurred in ovaries. The histological changes imply an angiogenesis effect of Aloe barbadensis and an effect like that of follicle-stimulating hormone in ovaries.

6. Effects of different concentrations of Aloe vera extract on the proliferation of uterus cervical cancer cells (hela) of humans^[22]

The anti-cancer properties of the extracts of Aloe vera against the Hela cells of human was evaluated in tissue culture, in this study. The toxicity effects of different concentrations 16, 17, 18, 19, 20 and 21 mg/ml of extract of Aloe vera on the Hela cells of human, were evaluated using Trypan blue and MTT methods, on 24, 48 and 72 hours after exposure to a medium containing 1% serum and extracts. The final results show that 20 mg/ml concentration of Aloe vera extract was effective in inhibiting the proliferation of Hela cells of human.

DISCUSSION

The present review of the herb *Aloe vera* L. through Ayurveda classics and recent research updates clearly points the huge potential of the drug in treating menstrual disorders like Dysmenorrhea and Oligomenorrhea. Aloin is the main component of *aloe vera* which acts as mild laxative and also act as anti-prostaglandin.^[23] The other components called lysine has analgesic and antispasmodic effect which helps in reducing headache, lower abdomen pain and lowback ache. Minerals like Ca, Fe etc., Vitamins like A, B, B2, B6, B12, C, E, Folic acid improves the general health and enhances the pain threshold of the patient.^[12] Tryptophan being another component of *Kanyasara* is known to calm certain areas of the brain leading to a sensation of drowsiness.

The herb *Aloe vera* L. proves to be a novel component for managing the Polycystic Ovarian Syndrome (PCOS) phenotype. *Aloe vera* gel formulation exerts a protective effect in against the PCOS phenotype by restoring the ovarian steroid status, and altering key steroidogenic activity.^[24] The phytochemicals in the Non-polar fraction of *Aloe vera* L. have proven to manage PCOS by modifying steroidogenic targets.^[24] The huge possibilities in the area are further substantiated by studies that prove the angiogenesis effect of *Aloe vera* L. and its therapeutic effect like that of follicle-stimulating hormone in ovaries. Further the Oral administration of *Aloe vera* L. reduced circulating blood glucose concentrations to a normal level, significantly decreased plasma insulin, and lowered triglyceride levels in the liver and plasma in mice models.^[25] The ability of the herb to safely induce menstruation, and prevent implantation adds to its effect as a safe herbal contraceptive. Studies also show that the herb could be used to remove fallopian tube blockage and inhibits the proliferation of uterus cervical cancer cells of humans.

CONCLUSION

Aloe vera L. has a long history of use in Ayurveda as a single drug remedy and an ingredient in various popular formulations used to manage gynaecological disorders. The present study showcases the vast possibilities of the herb in managing diseases of reproductive system including Dysmennorrhea, Oligomenorrhea, Fallopian tube blockage and PCOS. The utility of the herb in managing conditions like Uterine cervical cancer needs further clinical study and exploration. Further the study shows that *Aloe vera* can be used a safe herbal post-coital contraceptive agent whose contraceptive actions are reversible.

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