CHAPTER – IV

DRUG REVIEW

India being a country of agriculture where earning of people mostly plant dependent. Plants are used as construction material of houses, fuel (for preparation of food), food (for eating and survival) and drug for alleviation of the diseases of man and animals. Since prehistoric days in all religious rites, ceremonies and sacrifices, plants play a great role in various forms.

Rigveda (6,000 BC) the oldest extent source of drugs, has shown plant kingdom and its exploitation for the benefit of the humanity. The oshadhi Sukta of Rigveda (10,97, 1-13) is the authoritative document of the knowledge about plant in that age.

The Atharveda (1,500BC) has advanced more to evaluate drug in increased number to treat diseases. The number of drugs go on increasing as the time progresses and in Atharvaveda it is quite larger than Rigveda.

The term Ayurveda is not directly available in Vedas, although the different branches of Ayurveda have their seeds in Vedas.

In Ayurveda, for the treatment of any diseases one should consider Dosha-Dushya involvement (etiopathogenesis) and then has to select a drug or remedy which can act through Dravya Prabhava, Guna prabhava or Dravya Guna prabhava.

Thus the present study has therefore planned to evaluate scientifically the efficacy of some medicinal plants in terms of Vranarapak (healing), Raktasodhak or Krimighna (antiseptic or antimicrobial), kapha-pitta-vata shamak (correcting neuropathy), Twak dosha hara or srotsodhak (correcting angiopathy), sothahar (anti-inflammatory), Pramehaghna (hypoglycemia), rasayan rejuvenative/antioxidant) and Balya (immunomodulator).
GUDUCHI

Botanical Name :  *Tinospora cordifolia* (Wild) Miers

Family : Minispermaceae

Chief characters:

1. Perennial climber
2. Simple cardiac shaped leaves with bitter taste, alternate phyllotaxy
3. Green and yellow coloured flower, unisexual flowers.
4. Racemese inflorescence
5. Fruit – Drupe

Synonyms:

Madhuparni, chinnaruha, chinnodbheva, amrita, vatsadani, kundali, jivanti, Tantrika, soma, somavalli, chandrahasa, vayastha, mandali, devanirmita, vishalya, Rasayani, chakralakshanika.

English : Gulancha tinospora

Hindi : Giloy

Bengali : Gulancha

Assamese : Siddhilata

Tamil : Seenthi

Properties:

Rakta : Tikta, Kashaya

Guna : Guru, Snigdha

Virjya : Ushna

Vipaka : Madhura
**Pharmacological action:**

Tridoshahara, Rasayana, Grahi, Depaniya, medhya, chakhusya

**Indication:**

Pandu, Kamala, Jwara, Daha, Trishna, Kustha, Prameha, Vatarakta, Krimi, chardi, Kasa.

**Parts used:**

Dried and green leaves, stems are used for medicinal purpose.

Hindu mythological legends often refer to a celestial elixir ‘Amrita’ and folklore has it that consumption of this drink rendered the celestial people not just immortal, but also externally young.

According to the Ayurvedic lexicons ‘Amrita’ refer to the Guduchi plant (already mentioned). The term ‘Amrita’ is attributed to this drug in recognition of its ability to impact youthfulness, vitality and longevity to its patron. It is therefore figures as one of an important Rasayana drug in the vedic scriptures.

**Pharmacological constituents:**

Guduchi has been extensively screened for different constituents. Studies have shows Guduchi to comprise of a glycoside, alkaloids, three crystalline substances, two bitter principles and a neutral fatty alcohol. Further photochemical investigation have revealed oetaeosand as one of the bitter principles while the other is gilenin. Columbin, chasmathin, and palmanin are the bitter principles identified with Tinospora cordifolia. In addition Guduchi also contains the glycoside giloin. The leaves were found to be rich in proteins, calcium and phosphates.

**Research Studies:**

1. A screening of Guduchi ferits hypoglycaemic actions by Raghunathan and Sharma, 1969) has demonstrated that an
aqueous extracts of Guduchi stem aided in lowering the blood sugar in alloxan induced hyperglycaemia animals. Wadood et al have further corroborated this insulin-like action of Guduchi extracts. The antidiabetic of the hypoglycemic effect of Guduchi is by virtue of the presence of pyrolidine in the stem and leaf extracts of Guduchi. Sharma P.V et al have showed that T.cordifolia inhibits the effects of adrenaline induced hyperglycemia.

2. Immunosupressin is often associated with dysfunctional hepatic function and sepsis. Under such condition the hepatoprotective and immunomodulatory properties of Guduchi helps in improving the surgical outcome by enhancing the phagocytic and killing capacities of neutrophils and thus strengthening the host defenses. As a further indicator of Guduchi’s immunomodulating affect has been the findings of Thatte, et. Al. Their study suggests that activation of macrophages by Guduchi leads to increase in the colony stimulating activity which further results in leucocytosis and improved neutrophil function. Studies by Shah et al have also established the efficacy of Guduchi as remarkable anti-inflammatory agent.

3. Oral administration of aqueous and alcoholic extracts of the plant caused reduction in fasting blood sugar in rabbits and rats. The bitter fraction of the aqueous extract caused in significant reduction in blood sugar level, it inhibited the adrenaline induced hyperglycaemia significantly. (Gupta et al. JJMR 55.7:733)

4. The anti hyperglycemic effect of aqueous and alcoholic extracts as well as lyophilized powders of Jambu (E.jambolana) and Guduchi (T.cordifolia) were evaluated in diabetic animals by using different doses for a duration of 21-120 days. After 3 and 25 weeks of treatment, 73.51 and 70.3% reduction in glucose levels was seen in animals receiving 400mg/kg per day of
aqueous extract of T. cordifolia. These drugs also evaluated in Moderate and Severe diabetes.


5. Guduchi (Tinospora cordifolia) 100mg/kg, Satavari (Asparagus racemosus) 390mg/kg, Amalaki (Emblica officinalis) 390mg/kg and Haritaki (Terminalia Chebula) 140mg/kg were studied against cisplatin induced changes in gastric motility and intestinal transit. Results showed T. cordifolia significantly (P<0.05) decreased the acceleration in intestinal motility induced by cisplatin and increased the delay in gastric emptying and decreased intestinal motility.


6. Guduchi (Tinospora cordifolia) was investigated for adaptogenic activity against biological stressors (such as infections induced by injecting a fixed no of organisms ex. Escherichia coli, staphylococcus aureus, Klebsiella pneumonia and Candida albicans and mixed abdominal infection was induced by ligating the caecum); Physical stressors like cold immobilization (4°C). The parameters assessed based on the gastric mucosal damage (measuring Evans blue leakage in gastric mucosa), plasma cortisol levels and phagocytic activity of peritoneal macrophages. Animals were pretreated with Guduchi (T.cordifolia), at the dosage of 100mg/kg p.o. for 15 days before subjecting to cold stress. Results showed reduction in mortality
due to single or mixed abdominal infections. T. cordifolia, significantly (P<0.001) reduced stress induced leakage. T.cordifolia, significantly (P<0.05) decreased plasma cortisol levels. Stress induced suppression of peritoneal macrophages function was decreased. Both the groups showed significant improvement in Agni and Ojas when compared to placebo treated groups.


7. Comparative biochemical studies on the effect of four Medhya Rasayana drugs described by Caraka on some central neurotransmitters in normal and stressed rats. Sing-RH,; Singh-BN; Sarkar-FH and Udupa-KN Jour-Res-Med-Yoga & Homeo. 1979; 14:3:6-13. The effect of four Medhya Rasayana drugs viz. Brahmi (B. Monniera), guduchi (T. cordifolia), Sankhapuspi (C. Pluricaulis Chois.), Yastimadhu (Glycyrrhiza glabra) on content of brain was studied in normal and stressed rats. These drugs decreased the Ach content of the whole brain homogenate but notably raised the Ach content in the cortex. The catecholamine and 5HT contents were also found raised. The histamine content was lowered in the whole brain homogenate while it was found raised in the cortex. The changes were pronounced in stressed rats. The above changes indicate that these drugs while acting as tranquilizers may also be producing improvement in mental function.

The aqueous, alcoholic, and chloroform extracts of the leaves of tinospora cordifolia were administered in doses of 50, 100, 150 and 200mg/kg body weight to normal and alloxan-diabetics rabbits. The blood glucose and total lipid levels after administration of the extract. The extract exerted before and 2, 4, 6, and 8 hours after administration of the extract. The extract exerted a significant (P less than 0.5) hypoglycaemic effect in normal as well as in alloxan-treated rabbits. The extracts, however, had no significant (P greater than 0.05) effect on total lipid levels in normal as well as in alloxan-treated diabetic rabbits. The doses used did not show acute toxicity or result in behavioural changes. From this study, it may be concluded that extracts of the leave of tinospora cordifolia have an insulin-like action and can significantly reduce the blood glucose but not the total lipid levels in normal rabbits and in alloxan-induced diabetic rabbits.


Objective Immunosupression associated with deranged hepatic function and sepsis results in poor surgical outcome in extrahepatic obstructive jaundice. The effect of an ayurveda agent. Tinospora cordifolia (TC), which has been shown to have hepatoprotective and immunomodulatory properties in experimental studies, on surgical outcome in patients with malignant obstructive jaundice was evaluated. Methods: thirty patients were randomly divided into two groups, matched with respect to clinical features, impairment of hepatic function (as judge by liver function tests including antipyrine elimination) and immunosuppression (phagocytic and killing capacities of
neutrophils). Group I received conventional management, i.e. vitamin K, antibiotics and biliary drainage; group II received Tinospora cordifolia (16mg/kg/day orally) in addition, during the period of biliary drainage. Results: Hepatic function remained comparable in the two groups after drainage. However, the phagocytic and killing capacities of neutrophils normalized only in patients receiving tinospora cordifolia (28.2+/- 5.5% and 29.47 +/- 6.5% respectively). Post drainage bactobilia was observed in 8 patients in Group I and 7 in Group II, but clinical evidence of septicemia was observed in 50% of patients in Group I as against none in Group II (p<0.05). Post-operative survival in Group I and II was 40% and 92.4% respectively (p<0.01).

Conclusion: Tinospora cordifolia appears to improve surgical outcome by strengthening host defenses.


Tinospora cordifolia is an Indian medicinal plant with proven immunomudulatory activity. This study was performed to elucidate its possible mechanism of action. We measured CFU-GM colony forming units of the granulocyte-macrophage series in serum of mice treated with tinospora cordifolia. We found that 10 days treatment with tinospora cordifolia (100mg/kg/d) induced a significant (p<0.01) +/− 9.98. This suggests that activation of macrophages by Tinospora cordifolia leads to increase in GM-CSF which leads to leucocytosis and improved neutrophil function.
HARIDRA

**Botanical Name**: *Curcuma longa* Linn.

**Family**: Zingiberaceae

It consists of dried green and cured rhizomes; a perennial herb cultivated throughout India.

**Synonyms**: Peetadaru, Kadambaka, Vrittadala, Haridraka.

**Sanskrit**: Haridra, Rajini, Nisa

**Hindi/Assamese/Bengali**: Haldi/Halud

**Tamil**: Manjal

**English**: Turmeric

**Properties**:

- **Rasa**: tikta
- **Guna**: Laghu, Ruksha
- **Virjya**: Sita
- **Vipaka**: Katu

**Pharmalogical action**: Kapha pitta hara, balya, varnya.

**Indication**: Kustha, krimi, vrana.

**Therapeutic uses**:

Kustha (skin diseases) – the paste is useful for external application.

It is appetizer, stomachic, anti inflammatory, promotes complexion, antioxidant, antipoison (antiseptic)
Indicated in diabetes (prameha), skin diseases (orally) wounds, anaemia, urticaria, rhinitis, pruritus, cough, dyspnoea etc.

Chemical Constituents:

Curcumin, ar-turmerone, methylcurcumin, demothoxy, curcumin. Bisdemethoxy, sodium curcuminate.

Be it a cut, a bruise or a burn, in always Haldi to the recue. Drunk with hot milk to soothe sore throat and reduce inflammation, applied as a paste on injuries, taken orally with honey to ease gastric disorders, arthritics, pain, and all kinds of muscular problem, the age old therapeutic properties of Haldi are endless.

A traditional remedy in Ayurvedic medicine has been used through the ages to relieve discomfort and inflammation associated with wide spectrum of infection and autoimmune diseases.

Research Studies:

1. In December 1993, university of Mississippi Medical Centre, Mississippi, two physician, one immunologist Harihar Cohly and Plastic surgeon Suman Kumar Das had brought ‘Scientific Credibility to a traditional use of haldi – application on open wound.’

In March 1995, the University of Mississippi Medical Centre, Jakson USA finally gave the following views in the use of turmeric –

a. When applied to an open wound, function a painless antiseptic.

b. Used as Kumkum in all Hindu temples and a sign of matrimony

c. Many women across the country used it as a natural epilator.
d. Used in the treatment of diarrhea, arthritis and many skin diseases.

e. Turmeric, contains curcumin which is an astounding anti-cancer agent

f. Cox-2 inhibitor drugs have been known to block an enzyme called cyclooxygenase -2 which aggravates arthritis. Turmeric containing curcumin which inhibits this enzyme.

2. The immunomodulatory effect of Haridra ghrita – a poly herbal formulation at the dosage of 50, 100, 150 and 300 mg/kg was studied in male wistar albino rats. The animals were divided into five groups consisting of six animals each group. Group I served as control, Group II, Group III, Group IV and Group V administered with haridra ghrita 50, 100, 150, 200 and 300 mg/kg p.o respectively for 14 days. Significant increase in neutrophil adhesion was observed in a dosage of 300 mg/kg/day indicating the possible immunostimulant activity. With dose of 200 mg/kg/day and 300 mg/kg/day the delayed type hypersensitivity response was 10.52 ± 3.12 and 14.50 ± 2.38 respectively in comparison to corresponding value of 6.01 ± 1.85 for untreated control group. The differences in DTH response were statistically significant (P<0.05) which can be directly correlated to cell mediate immunity.


3. In a randomized, double blind, placebo controlled, cross-over study, a indigenous herbo mineral formulation containing Aswagandha, Sallaki, Haridra and Yasada Bhasma (600mg/twice daily) was evaluated for the efficacy in 20 Rheumatoid arthritis patients for a period of three months.
Treatment with indigenous group reported sero conversion in 9 subjects at the end of three months. Results suggested significant improvement (P<0.01) in early morning stiffness, joint score, Ritchie articular index, disability score and erythrocyte sedimentation rate (ESR). There was a significant improvement observed in grip strength however radiological assessment did not show any significant improvement. The onset of significant improvement started form the end of second week and lasted for till the end of the therapy. Out of 20 patients, 1 reported to have nausea, 1 had dermatitis and 4 reported pain abdomen, however these has not necessitated to discontinue the therapy.


4. In an open label study, Nisamalaki (combination of haridra – curcuma longa and Amalaki – Emblica officinalis) 1g. twice daily with water was administered to 100 patients of diabetes mellitus for a period of 6 weeks. Results showed good response in 45% of patients (i.e., >50% reduction in Random Blood Sugar levels) and 38% showed fair response (50% reduction in RBS), whereas 15% showed no response (<50% reduction in RBS).

NIMBA

Botanical Name : Azadirachta Indica A. Juss
Melia azadirachta Linn.

Family : Meliaceae

Vernacular Names :
Hindi : Nim,
English : Margosa tree or Neem tree

Synonyms : Arishtha, picumarda, picumanda, sarvatobhadra, Hinguniryasa, Yavaneshtha, Shukapriya, Neta, Subhadra, Prabhadra, Sutikta.

Local name:
Hindi : Neem
Bengali : Nim
Marathi : Kadunimb
Tamil : Vembu
Kannada : Bevu
Gujarati : Limado

Classical Catagorization : 
Caraka : Kandughna, Tiktaskandha
Sushruta : Aragvadhadi, Guducyadi, Lakshadi
Vagbhata : Aragvadhadi, Guducyadi, Lakshadi

Introduction :
- In the Vedic literature Nimba is recommended as tooth brush. Caraka delineated Nimba under Kandughna drugs (anti-pruritic drugs). Kaidarya mentioned among the Sanjnastrapana dravya
is considered to be Parvata Nimba according to Cakrapani. Caraka used the flowers of Nimba for shirovirecana (Nasya). He indicated it for the external use in skin disease as well.

- Sushruta prescribed it in Mutraghata (Urinary obstruction) treatment along with other plants. Vagbhata described its seed oil as effective in the treatment of grey-hair and hair fall as nasal drops for one month (with milk).

- It is also quoted as a Vamana (Emetic) by Caraka etc. Among Panca Tiktas (five betters), Nimba-mulatvak (root bark of the Neem) is mentioned.

**Properties:**

<table>
<thead>
<tr>
<th>Rasa</th>
<th>Tikta, Kashaya</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guna</td>
<td>Laghu, Ruksha</td>
</tr>
<tr>
<td>Virya</td>
<td>Shita</td>
</tr>
<tr>
<td>Vipaka</td>
<td>Katu</td>
</tr>
<tr>
<td>Karma</td>
<td>Kapha-pittahara, Dipana, Grahi, Krimighna, Netragna</td>
</tr>
</tbody>
</table>

**Indications:**


**Parts used:**

- Root bark, Stem bark, Gum, Flower, Leaves, Seeds, Seed oil.

Neem is known for its immeasurable medicinal properties and is used as a main ingredient in many home remedies. Commending the medicinal properties of neem, numerous Sanskrit names have been coined by our ayurveda acharyas. Few of them are mentioned below.

- It is known as Nimba as it boosts health.
- It is praised as Pichumarda as it destroys skin diseases.
• As it is used to ward off evil powers that harm our body. It is known as Arishta.

Chemical composition of Neem:

Neem tree has numerous medicinal properties by virtue of its chemical compounds. Seeds of the neem tree contain the highest concentration of Azadirachtin. Apart from Azadirachtin, salannin, gedunin, azadiron, nimbin, nimbidine, nimbicidine, nimbinol, etc are important liminoids of neem.

Medicinal properties of Neem:

The Neem tree has many medicinal uses. The chemical compounds present in neem have anti-inflammatory, antiarthritic, antipyretic, hypoglycaemic, Antifungal, Spermicidal, antimalarial, antibacterial and diuretic properties. Flower, leaves, bark and seeds of neem are used in home remedies and in preparation of medicines. Bark of neem acts as antipyretic and helps to reduce fever. Flowers are used in intestinal disorders. Juice from fresh leaves is very helpful in treating skin diseases, wounds and obesity. Oil from neem seeds is used in arthritis, skin diseases and muscular sprains. Neem is very effective in treating gum diseases.

The neem is proved to be beneficial in treating skin diseases because of its antibiotic, antifungal and blood purifying properties. According to ayurveda principles vitiated kapha and pitta cause skin diseases. Neem pacifies vitiated kapha and pitta, thus helps to cure skin ailments. It promotes wound healing as it is antibacterial and astringent. In psoriasis it reduce itching, irritation, roughness of skin and heals the psoriatic patches. In same way it heals exzema too. It reduces infection and inflammation of acne. Neem helps to maintain the health of scalp skin and prevents dandruff.
Due to its detoxifying properties it helps to keep organ system healthy, especially circulatory, digestive, respiratory and urinary systems.

Scientific studies have revealed that neem reduces blood sugar level. Hence its usage supports diabetic patients to keep their blood sugar level in control. Diabetes impairs blood circulation and causes gangrene in lower extremities. Numerous scientific researches have high lightened the role of neem in keeping circulatory system healthy, thus reducing the chances of gangrene. Recent studies have shown that neem reduces blood cholesterol level and keeps the heart healthy.

**Home remedies with Neem:**

- Apply Crushed fresh leaves of neem on acne. In case of body acne mix fine paste of fresh neem leaves in little water and smear this mixture on back, chest and shoulders.
- In itching, application of neem oil on affected areas helps. Boil neem leaves in a big bowl of water and mix this in bathing water. This reduces body itch.
- Massaging neem oil to scalp removes head lice and prevents formation of dandruff.
- Mix dry neem powder, shikakai and amla in water and apply this as pack on head. This pack has to be kept for 45 minutes and washed off later. This prevents hair loss and dandruff. Fresh neem leaves can also be used instead of dry neem powder.
- A freshly prepared paste of turmeric, neem and sesame seeds is recommended in ayurveda for fungal infection between toes.

Fumigating the house with smoke of dried neem leaves in evening 1-2 minutes is an excellent ayurvedic method to keep mosquitoes away.
Neem in Household:

Neem flower pachidi is prepared from roasted neem flower and is a famous dish in South India which is prepared during ugadi. Neem flower rasam improves digestion and is very popular in Andhra and Tamilnadu.

Extract of skin friendly neem is being used in manufacturing bathing soaps, hair gels, body lotions etc. These products are gaining popularity in market.

Structure:

Fast growing, ever green tree which reaches the height of 15 to 20 meters. Stem: Short, Straight, Leaf: Alternate, Pinnate

Habitat:

Needs hot climate to grow, grown mainly in Burma, India, Pakistan.

Research Studies:

- All parts of the tree are said to have medicinal properties (seeds, leaves, flower and bark) and are used for preparing many different medical preparations.
- The chemical constituents nimbidin and nimbin have some spermicidal activity.
- Neem oil is used for preparing cosmetics (soap, neem shampoo, balms and creams such as Margo soap) and many oral health products.
- Besides its use in traditional Indian medicine, the neem tree is of great importance for its anti-desertification properties and possibly as a good carbon dioxide sink.
- Practitioners of traditional Indian medicine recommend that patients with chicken pox sleep on neem leaves.
- Neem gum is used as a bulking agent and for the preparation of special purpose food.
- Traditional, slender neem branches have been chewed to clean one's teeth. Neem twigs are still collected and sold in markets for this use, and in India one often sees youngsters in the streets chewing on neem twigs.

- Neem blossoms are used in Andhra Pradesh, Tamil Nadu and Karnataka to prepare Ugadi pachchadi. ‘Bevina hoovina gojju’ (a type of curry prepared with neem blossoms) is common in Karnataka throughout the year. Dried blossoms are used when fresh blossoms are not available. In Tamilnadu, a rasam (veppam poo rasam) made with neem blossoms is a culinary specialty.

- A mixture of neem flowers and bella (jiggery or unrefined brown sugar) is prepared and offered to friends and relatives, symbolic of sweet and bitter events in the upcoming new year.

- Extract of neem leaves is thought to be helpful as malaria prophylaxis despite the fact that no comprehensive clinical studies are yet available. In several cases, private initiatives in Senegal were successful in preventing malaria. However, major NGOs such as USAID are not supposed to use neem tree extracts unless the medical benefit has been proved with clinical studies.

In India, the plant is variously known as ‘Sacred Tree’, ‘Heal All,’ ‘Nature’s Drugstore, ‘Village Pharmacy’ and ‘Panacea for all diseases’. Products made from neem trees have been used in India for over two millennia for their medicinal properties: neem products are believed to be anthelmintic, antifungal, antidiabetic, antibacterial, antiviral, contraceptive and sedative. Neem products are also used in selectively controlling pests in Plants. It is considered a major component in Ayurvedic and Unani medicine and is particularly prescribed for skin diseases.
MANJISTHA

Botanical Name : Rubia cordifolia Linn.
Family : Rubiaceae

Local Name:
- Bengali/Assamese : Manjistha
- Hindi : Manjit
- Marathi : Madar, Manjit, Manjistha
- English : Indian Madder
- Sanskrit : Aruna, Bhandi, chitra, Gauri, Kalameshika, Manjistha, Rasayani Samanga, Vastra ranjani, Vijaya, Vikasa, Yojana vallika.

Characteristics:

Perrenial herbaceous climber. Stems many yards long rough, grooved, woody at base, bark white.

Leaves : 3.8-9 by 1.6-3.5cm
Ovate, acute, lower leaves larger than the upper

Fruits:

4-6mm diam, globose, smooth, shining, purplish black when ripe. Roots long cylindrical with a thin red bark.

Habitat :

Throughout India, in hilly districts, Sri Lanka, Malaysia, Japan, Africa.

Parts used:

Root/leaf.
**Properties:**

Rasa : Tikta, Kashaya, Madhura,

Guna : Guru, Ruksha

Vipak : Katu

Virja : Ushna

**Indication:**

In samhitas, it has been described as vrana-ropak dravya as sandhaniya mahakashaya, varnya mahakashya, vishaghna mahakasaya.

In Susruta Samhita several preparation made on manjistha like ghrita, Taila, lepa are mentioned for the treatment of many disorders like prameha, vrana and naadi vrana etc.

In Uttarasthana of Asthanga Samgraha decoction on Manjistha has been prescribed for prakshalone of vrana along with other drugs which are useful for ropona on vrana (Utt. 30/53)

Acharya Priyavat Sharma in his text mentioned Manjistha by its synonym like Aruna, Lalika, Yojanavallika and advised to use as Rakta sodhak dravya, in vrana, prameha, visarpa, sotha, kustha. It is described in pippalayadi vargha.

**Research Studies:**


Y.B. Tripathy et al, Deptt of medicinal chemistry BHU found antiplatelet acting factor property of Rubia cordifolia on rabbit platelets.

Prof. J. K. Ojah et al found it very effective in cases of polycythaemia.
VIDANGA

Botanical Name : *Embelia ribes* Burm. f.

Family : Myrsinaceae

Vernacular Names :

Hindi : Vaividanga

Synonyms :

Krimighna, Citratandula, Amogha, Vella, Kairali, Tondula, Jantuhantri, Gahvara

Classical Categorization:

Caraka : Krimighna, Kushthaghnna, triptighna
Sushruta : Surasadi, Pippalyadi
Vaghata : Surasadi, Pippalyadi

Chief Characters:

1. Perennial shrub, limber
2. Simple leaf, alternate phyllotaxy
3. Light yellow coloured flowers
4. Panicle in florescence
5. Fruit – round black coloured small fruits.

Caraka delineated Vidanga as the best among the Krimighna Dravya (C.S.25), sushruta quoted it for Krimi, Kushtha, Prameha, Shiroroga etc. (S.S.45). He also explained that Vidanga acts as Rasayana if administered along with Yasti Curna (S.C.27).
In the earlier texts Vidanga is mainly promoted as antimicrobial as well as anthelmintic (Krimighna). However later texts have emphasized its role as an anti-fertility agent. CCRAS and Govt. Res. Dept. of Ayurveda, Hyderabad have tried it along with Pippali and Tankana for oral contraception. There are reports about the nephrotoxicity of E.ribes. It may be the reason for indicating that Vidanga may be used after one year but not in fresh state.

Properties:

<table>
<thead>
<tr>
<th>Rasa</th>
<th>Katu, Kashaya</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virya</td>
<td>Ushna</td>
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<tr>
<td>Guna</td>
<td>Laghu, ruksha, tikshna</td>
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<tr>
<td>Vipaka</td>
<td>Katu</td>
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<tr>
<td>Karma</td>
<td>Visha-Krimighna, dipana</td>
</tr>
<tr>
<td>Indication</td>
<td>Krimi, Udara, Adhmana, Sula, Kushtha</td>
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</tbody>
</table>

Part used:

Fruits, Root, Leaves:

Research Studies:

The dried fruits are being used for the preparation of medicine. The plant is widely used as anti-helminthic, anti-carminative, antibacterial, anti-inflammatory, anti-diuretic and anti-astringent as reported in various literatures. A study was conducted by the Council over a period of 19 years (1984-2003) in various potencies, viz. Q, 6c, 30c & 200c, to clinically verify the symptoms, which were found during the Homoeopathic pathogenetic Trial, carried out by the council. It was evident from the trial that Embella ribes was found to be a very effective medicine in the treatment of helminthiasis, irritability, morose and fretful conditions of mind, coryza, grinding of teeth during sleep,
anorexia, ravenous hunger, abdominal colic, intestinal worms, constipation, diarrhea, itching in anus, bed wetting in children, dry cough & pyrexia, as reported in various homoeopathic literatures. Beside these, symptoms like anxiety, headache, premature grey hair, vitiligo, tendencies to take cold, halitosis, acidity, craving for indigestible articles, gastritis, alternate constipation & diarrhea, pain in calf muscles, lumbago, night emission, screaming at night during sleep and infective dermatitis etc. were also cured or markedly improved during the course of treatment, which can be considered as additional clinical symptoms of the medicine.

Embelia ribes, commercially known as Vidanga or Baibirang, in one of the important medicinal plants of India, having a fair demand in national and international market. The fruit is astringent, carminative and stimulant. The seeds are used for maintaining healthy skin and to support the digestive function. It is also used as antifungal agent in ringworm infection and other chronic dermatitis. It has laxative activity and used as anthelmintic agent. Seed extract possess antioestrogenic and contraceptive properties. The principle chemical constituent of seed is embelin, which occurs in golden yellow needle-like crystals. Currently, the fruits are using in more than 75 Ayurvedic commercial formulations. The present review comprises of various aspects of E. ribes research, including distribution, morphology, medicinal properties, chemical constituents, traditional and pharmacological uses.

**Chemical composition:**

- The most studied chemical in Vidanga is embelin (embolic acid), or rather, potassium embelate (2,5-dihydroxy, 3-undecyl-1, 4-benzoquinone). A related quinine found in vidanga is vilangin, a structure of two embelin molecules attached with a CH₂ bridge.
Other constituents include the alkaloid christembin e, a volatile oil, quercitol, tannins and fatty acids (Yoganaasimhan 2000, 211 Kapoor 1990, 174)

- Chemical constituents: embelin, uercitol, tannin, embolic acid, volatile oils, vilangin.

**Fertility:**

The Indian Council of Medical Research in New Delhi reports that Embelia ribes has been found to be safe and effective as a female contraceptive, with encouraging results in phase-I clinical trials (Sharma et al 2001). In one a one year clinical trial of 48 fertile women, ages 26-42, 400mg of E. ribes was given each morning for 10 days beginning on the fifth day of menstruation, the total dosage being 10 tablets for one menstrual cycle. The researcher reports no pregnancies, side-effects, or symptoms of toxicity. The paper hypothesizes that E. ribes antagonizes the effects of estrogen on the uterus so that the fertilized ovum cannot implant and develop properly (Shah 1971). Vidanga has also been shown to have negative effects on male fertility. In one study embelin isolated from E.ribes was found to significantly reduce the sperm count and, sperm motility, weight of the testes in male albino rats (Seth et al 1982), confirmed by a later study, in which embelin was found to alter testicular histology as well as lower glycogen, sperm counts and accessory sex gland fructose when administered subcutaneously in male rats over a 35 day period (Agrawal et al 1986). A recent paper examining the activity of equal parts powders of Embelia ribes, Piper longum and borax fed to pregnant rats resulted in low birth, with cases of herniation of the intestines into the umbilical cord, with mothers gaining less weight during gestation (Chaudhury et al 2001).
Antitumor:

Researchers investigated the effect of embelin on its lipid lowering activity in experimental fibrosarcoma. Methylcholantherene-induced fibrosarcoma was transplanted in rats, and after 30 days, embelin (50 and 100mg/kg, p.o) was administered for a period of 20 days. Blood samples were collected on the 21st day and the liver and the kidney were examined to determine the lipid profile in the serum and tissues. The levels of total cholesterol, phospholipids, triglycerides and free fatty acids were found to be markedly elevated in the serum of tumour bearing rats, with significant alterations observed in the lipid profile of liver and kidney. These changes however were significantly reversed in embelin (100mg/kg) treated animals (Chitra et al 2003).

Analgesic:

The analgesic activity of embelin derived from embelia ribes was studied on intrathecal administration in rats and mice. Both the mono and dipotassium salts of embelin displayed a higher activity in visceral evoked responses when compared with thermal evoked responses. The study also demonstrated naloxone-resistant specific binding sites for potassium embelate in the spinal cord through which the antinociceptive response is modulated. Although earlier studies indicated that mixed mu and kappa binding sites in the brain may be involved in its analgesic activities, neither mono and dipotassium embelate affected motor function on intrathecal administration (Zutshi et al 1989; Zutshi et al 1986). Researchers examined the analgesic effect of potassium embelate in rats and mice. Potassium embelate was found to be an effective analgesic comparable with morphine when given orally or upon intravenous or intramuscular administration. Although potassium embelate was found to act centrally its effect was not antagonized by naloxone, indicating a different central site of
action. A peripheral site of action was ruled out it was found to lack any demonstrable anti-inflammatory action. Researchers also noted that there was no precipitation of abstinence syndrome as observed with morphine (Atal et al 1984).

**Antioxidant:**

Researchers investigated the lipid-lowering and antioxidant potential of an ethanolic extract of E.ribes in streptozotocin-induced diabetes in rats. Over a twenty day period of feeding the extract (200mg/kg) to diabetic rats resulted in significant decrease in blood glucose, serum total cholesterol, and triglycerides, and increase in HDL cholesterol levels when compared to controls. Further, the extract also lowered the liver and pancreas thiobarbituric acid reactive substances (TBARSs) values when compared to TBARS values of liver and pancreas of in the control animals (Bhandari et al 2002)

**Antimicrobial:**

The benzoquinone-derivative embelin isolated from embelia ribes was examined for its in vitro antimicrobial activity against 12 different strains of bacteria. Emebelin exhibited a significant inhibitory activity against five different strains and moderate activity against three strains of the 12 bacteria tested (Chitra et al 2003).
**KALMEGH**

**Botanical Name**: *Andrographis paniculata* (Burm f.) wall ex Nees

**Family**: Acanthaceae

**Vernacular Names**:
- Hindi: Kalmegh

**Synonyms**:
- Bhunimba, Yavakaraphala, Yavitikta

**Local Names**:
- Assamese: Chiorta
- Arabic: Quasabhuva
- Marathi: Kadu kirayata, Oli-kiryata
- Bengali: Kalmegh
- Oriya: Bhunimba
- Chinese: Chuan Xin Lian
- English: Green Chirayta, creat, king of bitters, andrograhis, India Echinacea
- Persian: Naine – havandi
- Gujarati: Kariyatu
- Sanskrit: Kalamegha, Bhunimba.
- Hindi: Kirayat

**Properties**:
- **Rasa**: Tikta
- **Guna**: Laghu, Ruksha
Virjya  :  Shita
Vipaka  :  Katu
Karma  :  Kaphapittahara, Dipana

Indication :

Kamalal, Pandu, Shotha, Jvara, Krimi, Kustha, Vrana

Potent hepatoprotective and antifebrile agent.

Parts Used :

Whole plant

Research Studies :

Since ancient times, A. peniculata is used in traditional Siddha and Ayurvedic\textsuperscript{[3]} systems of medicine as well as in tribal medicine in India and some other countries for multiple clinical applications. The therapeutic value of Kalmegh is due to its mechanism of action which is perhaps by enzyme induction. The plant extract exhibits antityphoid and antifungal activities. Kalmegh is also reported to possess antihepatotoxic, antibiotic, antimalarial, antihepatitic, antithrombogenic, antiinflammatory, anti-snake venom, and antipyretic properties to mention a few, besides its general use as an immunostimulant agent. A study conducted at Bastyr University, showed a significant rise in the mean CD4 lymphocyte level of HIV subjects after administration of 10 mg/kg andrographolide, the chief constituent extracted from the leaves of the plant.

The herb has shown an ability to reduce inflammation (heat) and fight viral infection, and is used as a principal ingredient in traditional Chinese medicinal formulas for lung support from colds.

Andrographolide is a bitter water-soluble lactone exhibiting protective effects in carbon tetrachloride induced hepatotoxicity in rats. Its LD\textsubscript{50} in male mice was 11.46 gm/kg, ip. This bitter principle was
isolated in pure form by Gorter (1911). Such other activities as liver protection under various experimental conditions of treatment with galactosamine, paracetamol etc. are also attributed to andrographolide. The hepatoprotective action of andrographolide is related to activity of certain metabolic enzymes.

Andrographis paniculata plant extract is known to possess a variety of pharmacological activities. Andrographolide, the major constituent of the extract, is implicated in its pharmacological activity. A study has been conducted on the cellular processes and targets modulated by andrographolide treatment in human cancer and immune cells. Andrographolide treatment inhibited the in vitro proliferation of different tumor cell lines, representing various types of cancers. The compound exerts direct anticancer activity on cancer cells by cell cycle arrest at G0/G1 phase through induction of cell cycle inhibitory protein p27 and decreased expression of cyclin dependent kinase 4 (CDK4).

Immunostimulatory activity of andrographolide is evidenced by increased proliferation of lymphocytes and production of interleukin 2. Andrographolide also enhanced the tumor necrosis factor α production and CD marker expression, resulting in increased cytotoxic activity of lymphocytes against cancer cells, which may contribute for its indirect anticancer activity. The in vivo anticancer activity of the compound is further substantiated against B16F0 melanoma syngenic and HT 29 xenograft models. These results suggest that andrographolide is an interesting pharmacophore with anticancer and immunomodulatory activities and hence has the potential for being developed as a cancer therapeutic agent.

In one Chilean study, the herb had a significant drying effect on the nasal secretions of cold sufferers who took 1,200 milligrams of andrographis extract daily for five days. A systematic review of the literature and meta-analysis of randomized controlled trials also
suggested the herb alone or in combination with eleuthero may be an appropriate alternative treatment of uncomplicated acute upper respiratory tract infection.

The herb is the well-known drug Kalmegh 'green chiretta', and forms the principal ingredient of a household medicine ('alui'), used as a bitter tonic and febrifuge.

The Tamils have been using Nilavempu - as it is called in Tamil - for centuries. In Siddha medicine, Andrographis Paniculata is used widely to treat fevers like chikengueina, swine-flu, typhoid etc.

A recent (2011) randomised, double-blind, multicentre, study found Andrographis paniculata as effective as mesalamine (mesalamine) in ulcerative colitis. Further, andrographolide inhibits interleukin-6 expression and suppresses prostate cancer cell growth in vitro.

Andrographis has been shown to be a safe traditional botanical for supporting upper respiratory tract health, per analysis of seven double-blind controlled trials. The herb has been shown to inhibit RANTES secretion in inflamed bronchial cells. RANTES is a chemoattractant for eosinophils, monocytes and lymphocytes that is stored in, and released by, platelets and activated T-cells. In related research: Andrographolide, an active ingredient in Andrographis, has been shown to be responsible for the herb's inflammatory modulating actions, including the reduction of cytokine and peritoneal deposition of neutrophils, and modulation of lung inflammation in vivo. Extracts of Andrographis exhibit potent inflammatory modulating and antioxidant actions in mouse models.

Andrographis paniculata extracts are mosquito repellent and can also be adulticidal to mosquitoes, viz., Culex quinquefasciatus and Aedes aegypti.
KUMARI

**Botanical Name** : *Aloe barbadenst's Mill*

**Family** : Agavaceae

**Chief Characters:**

1. Perennial shrub.
2. Ensiform leaves, leaves are fleshy with a ghee like mucous substance.
3. Yellowish pink flowers.
4. Fruit - loculicidal capsule.

**Synonyms** :

Ghritakurnari, Sthuladala, Vipulesrava, Gruhakanya, Kanya.

**Gana** :

Guduchyadi. (B.P.)

**Properties** :

- Rasa : Tikta, Madhura
- Guna  : Guru, Snigdha, Picchila;
- Virya : Sheeta and
- Vipaka : Katu.

**Pharmacological Actions** :

Kaphavatahara, Bhedana, Rasayana, Brimhana, Balya, Vrishya, Chakshusya.

**Indications** :

Yakrita widdhi, Pleeha widdhi, Gulma, Shoola, Vibandha, Kushta, Granthi, Agnidagdha wana.
Therapeutic Uses:

1. **Spleenomegaly**: The juice of kumari mixed with haridra powder alleviates splenomegaly and scrofula. (S.G.)

2. **Dysuria**: If there is dysuria during fever, one should take the juice of kumari. (V.D.)

3. **Mastitis**: Kumari root mixed with haridra is applied as paste on breast to relieve pain. (B.P.)

**Part Used**: Leaf, Root.

Often called the Miracle Plant, “The Burn Plant” or the “Natural Healer”, Aloe Vera is a plant of many surprises. This amazing medicinal herb has benefited mankind for over 400 years. In many ancient cultures, Aloe Vera was respected as if a gift from God and in some cases, was referred to as a lilly of paradise.

Ancient records show that the benefits of Aloe Vera have been known for centuries. Its therapeutic advantages and healing properties have survived more than 5000 years.

Nowadays, although chemical medicines are very effective in healing, long term use and complicated interactions with other drugs can cause terrible side effects for patients. Consequently more scientists are turning back to look at more traditional, and often natural, therapies which, for so long, have been neglected. As a result, Aloe Vera is again attracting attention as it can provide many benefits to our health and lifestyle.

It is only recently that Aloe Vera has been "re-discovered" and has corned back into general use. Ironically enough, it was the invention of the X-ray and the atom bomb which again focused attention upon the plant. It was found early in the search for protection against radiation burns that the best treatment was Aloe Vera gel. As chemical, medical and physical scientific research as progressed,
many old remedies have been found to be worthless because they were based upon faulty information and reasoning. Some, however, have been discovered to be infinitely superior to many synthetics. Aloe Vera is one of the old natural remedies that have come into their own in the Space Age as one of the modern "miracle" drugs.

The true Aloe has been endowed with such marvelous properties that over the years around the world it has been given many wonderful names such as Burn Plant, medicine Plant, Wand of Heaven and Plant of Life.

**What is Aloe Vera?**

Aloe is derived from the Arabic word "alloeh" which means "bitter and shiny substance". Vera, which means true in Latin, was added to the appellation of this particular specimen in order to distinguish its primacy among the aloe plants.

Aloe is second only to vitamins and minerals in respect to the amount of research conducted in the medical and nutritional communities. The proven workability of Aloe vera has created over 4,000 scientific papers to be written on the subject. There is no other plant that has been so thoroughly studied for its beneficial qualities to the human system.

The bulk of the aloe leaf is filled with a gel, 96% water with the other 4% containing 75 nutrients and 200 active compounds, including 20 minerals, 18 amino acids, and 12 vitamins.

**Research Study:**

Since the inclusion of Aloe in the first United States Pharmacopoeia in 1820, a great number of investigators have studied its efficacy in a wide range of clinical applications.

- Collins and Collins in 1935, first described Aloe Vera in the treatment of radio-dermatitis, a condition very difficult to treat. They describe the healing of the condition on the forehead of a 31 year old woman in three months with minimal residual injury.
Wright in 1936, described the use of Aloe in the treatment of radiation ulcers.

In 1940 Row and associates noted that Aloe helped heal burns faster than any other treatment available at that time.

In 1945 Filatov, from Russia reported effective treatment of skin conditions caused by parasites.

Studies showing Aloe's effectiveness in healing radiation, burns, and frostbite continued in the 1950s' 60 and '70s by such scientists as CC Lushbaugh – showing further evidence of improved wound healing in radiation dermatitis and ulcers. K. Somova in Russia and E. Zimmerman in the U.S. separately showed treatment of periodontal disease with Aloe; Blitz and Smith used Aloe in the treatment of 18 patients with peptic ulcer disease, with 17 of 18 patients recovering from symptoms.

During the last two decades numerous researchers have shed extensive light on the beneficial properties of Aloe in the treatment of various problems.

- Wolfe – 1980: Aloe highly effective against various microorganisms including Staph, Strep, Candida and even in relieving pain and irritation off Herpes.
- Heggers and Robson – 1985: demonstrated the improved healing in thermal wounds due to the anti-prostaglandin activity of aloe.
This was confirmed later in human patients at the King Saud University in Saudi Arabia.

- Burns – 1987: described how the sap of Aloe leaves decreased pain and increased healing in herpes Zoster blister breakouts.
- Fulton – 1998: showed faster healing off full-face dermabrasion patients when treated with Aloe Vera.
- Robson and Heggers – 1992: showed increased won’t healing in rats with burn injuries when treated with Aloe.
- Davis – 1994: suggested that mannose sugars in Aloe contribute to increased wound healing.
- Miller and Koltai – 1995: showed increased tissue survival in frostbite injury when treated with Aloe Vera.
- Robson and Heggers – 1996: showed accelerated wound contraction, increased collagen activity and enhanced breaking strength of wounds treated with Aloe.

Since aloe was included in the first United States Pharmacopoeia, in 1920, a great number of investigators have studied its efficacy in a wide range of clinical applications.

**Aloe Vera – Biologic components:**

The components of aloe Vera can be divided into the following groups:

1. **Vitamins:**

   It is rich in all vitamins excluding Vitamin D, especially the antioxidant vitamins A (beta-carotene), C and E and even contains a trace of Vit. B12, one of the very few plant sources of this vitamin.
2. Enzymes:

Bradykinase, helps to reduce excessive inflammation when applied to the skin topically and therefore reduces pain, whereas others help digest any dead tissues in wounds.

3. Minerals:

Calcium, sodium Potassium, Managanese, Magnesium, copper, Zinc, Chromium and the anti-oxidant Selenium.

Although minerals and trace elements are only needed in very small quantities, they are essential for the proper functioning of various enzyme systems in different metabolic pathways.

4. Sugars:

These are derived from the mucilage layer of the plant which surrounds the inner gel and are known as mucopolysaccharides, which enhance the immune system and help to detoxify. Aloe Vera contains both mono and polysaccharides, but the most important are the long chain sugars involving glucose and mannose or the gluco-mannans. In topical preparations the sugars are also the mani moisturizers.

5. Anthraquinones:

There are twelve of these Phenolic compounds which are found exclusively in the plant sap. The important ones, Aloin and Emodin, act as painkillers. They also function as anti-bacterials and anti-virals. They also help block damaging uv rays.

6. Lignin:

This in itself is an inert substance but when included in topical preparations it endows Aloe Vera with a singular penetrative effect so the other ingredients are absorbed into the skin.
7. Saponins:

These soapy substances from about 3% of the Aloe Vera gel and are capable of cleansing, having antiseptic properties. These act powerfully as anti-microbial against bacteria, viruses, fungi and yeasts.

8. Fatty Acids:

Cholesterol, Campesterol, b.Sisosterol and Lupeol. These four plant steroids are important anti-inflammatory agents.

9. Salicylic Acid:

An aspirin-like compound possessing anti-inflammatory and anti-bacterial properties.

10. Amino acids:

The body needs 22 amino acids the gel provides 20 of these. More importantly, it provides 7 out of the 8 essential amino acids which the body cannot synthesis.

**Anti-Microbials in aloe Vera:**

Agents that prevent or destroy parasitic infection. Essential nutrients for tissue regrowth and function.

<table>
<thead>
<tr>
<th>Cinnamonic Acid</th>
<th>Anti-microbial, kills germs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salicylic Acid</td>
<td>Anti-microbial, kills germs, aspirin-like compound, painkiller</td>
</tr>
<tr>
<td>Traumatic Acid</td>
<td>Anti-microbial, wound hormone in plants, heals wounds</td>
</tr>
<tr>
<td>Urea Nitrogen</td>
<td>Anti-microbial, kills germs</td>
</tr>
<tr>
<td>Phenol</td>
<td>Anti-microbial, kills germs, painkiller</td>
</tr>
<tr>
<td>Substance</td>
<td>Function</td>
</tr>
<tr>
<td>-------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Lupeol</td>
<td>Anti-microbial, kills germs, painkiller</td>
</tr>
<tr>
<td>Allantoin</td>
<td>Anti-microbial, kills germs, heals wounds</td>
</tr>
<tr>
<td>Campesterol</td>
<td>Reduces inflammation or swelling, fatty acid</td>
</tr>
<tr>
<td>B-Sitosterol</td>
<td>Anti-inflammatory, fatty acid, hormone</td>
</tr>
<tr>
<td>Cholesterol</td>
<td>Anti-inflammatory, essential substance in steroid hormone synthesis by the adrenal cortex and bile acid production in the liver, fatty acid.</td>
</tr>
<tr>
<td>Lectins</td>
<td>Protein, necessary for proper immune function, powerful immune modulator (stimulator), anti-tumor agent, anti-microbial, helps prevent infection.</td>
</tr>
<tr>
<td>Emodine</td>
<td>Powerful immune modulator (stimulator), anti-tumor agent, vaso dilator</td>
</tr>
<tr>
<td>Gibberellins</td>
<td>Powerful immune modulator, anti-inflammatory, Hormone</td>
</tr>
</tbody>
</table>

**Carbohydrates in aloe Vera:**

<table>
<thead>
<tr>
<th>Carbohydrate Type</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glycoprotein’s</td>
<td>Polypeptide chains, immune stimulators</td>
</tr>
<tr>
<td>Lipids</td>
<td>No information found</td>
</tr>
<tr>
<td>Glycolipids</td>
<td>Simple sugars, polypeptide chains, immune stimulator</td>
</tr>
<tr>
<td>Triglycerides</td>
<td>Carry the fat soluble vitamins, supply fatty acids; essential for growth and general health of all body tissue-especially the skin, help supply energy, derived from glycerol and three fatty acid radicals, the chief component to fats and oils, blood lipid.</td>
</tr>
<tr>
<td>Simple sugar</td>
<td>Fructose, Dextrose, Galactose, Arabinose, D-Mannose Maltose, Sucrose, Lactose, D-glucose, Xylose</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Diuretic</td>
<td></td>
</tr>
<tr>
<td>Major source of energy</td>
<td></td>
</tr>
<tr>
<td>Very sweet taste, used in diabetic food.</td>
<td></td>
</tr>
</tbody>
</table>

**Minerals in aloe Vera:**

Minerals are vital in body growth and essential to function of all body systems. (**most abundant minerals in Al**)

<table>
<thead>
<tr>
<th>Sodium</th>
<th>Promote retention of water in tissues, significant role in the absorption of carbohydrates, regulates the osmotic pressure inside body.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potassium</td>
<td>Diuretic, most abundant purifier of the intracellular fluids. Important for a healthy nervous system and a regular heart rhythm, aids in maintaining stable blood pressure.</td>
</tr>
<tr>
<td>Calcium</td>
<td>Promotes strong bones, healthy teeth, activates series of enzymes that are essential in the fat and carbohydrate metabolism in the body.</td>
</tr>
<tr>
<td>Magnesium</td>
<td>Painkiller, anti-inflammatory, reduces inflammation and swelling, aids in carbohydrate metabolism</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>Essential trace element, antioxidant properties, important for metabolizing carbohydrates</td>
</tr>
<tr>
<td>Sulfur</td>
<td>Anti-microbial, kills germs, biologically important mineral helps maintain healthy flexible cells</td>
</tr>
<tr>
<td>Chloride</td>
<td>Anti-microbial, kills germs</td>
</tr>
<tr>
<td>Element</td>
<td>Description</td>
</tr>
<tr>
<td>----------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Tin</td>
<td>May aid hearing and growth to hair</td>
</tr>
<tr>
<td>Nickel</td>
<td>Lowers requirement for B12</td>
</tr>
<tr>
<td>Copper</td>
<td>Essential trace element, enhances the use of iron, may help in reducing sugar levels, promotes maturation of the red blood cells and increases their life span.</td>
</tr>
<tr>
<td>Zinc</td>
<td>Used as a protective ointment, treats acne, exzema, and other skin diseases, external would healer, causes contraction.</td>
</tr>
<tr>
<td>Silicone</td>
<td>Necessary for the formation of collagen for bones and connective tissue for healthy nails, skin, and hair.</td>
</tr>
<tr>
<td>Aluminum</td>
<td>Used as a protective ointment, an astringent</td>
</tr>
<tr>
<td>Germanium</td>
<td>An anti-cancer agent. Immune stimulator</td>
</tr>
</tbody>
</table>

**Vitamins of Aloe Vera:**

Essential for normal activity and growth of the body. Obtained naturally from plant and animal foods.

<table>
<thead>
<tr>
<th>Vitamin</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beta Carotene</td>
<td>Helps prevent ance and other skin disorders</td>
</tr>
<tr>
<td>Thiamin</td>
<td>Also acts as an antioxidant</td>
</tr>
<tr>
<td>Riboflavin</td>
<td>Involved in the metabolism of carbohydrates, fats, and protein and in oxidant process in the cells, it alleviates eye fatigue.</td>
</tr>
<tr>
<td>Niacin</td>
<td>All living tissue needs niacin for normal metabolism, involved in tissue respiration</td>
</tr>
</tbody>
</table>
Choline  
Plays a role in helping the body metabolize amino acids, it aids in hormone production and is needed for proper transmission of nerve impulses from the brain through the central nervous system.

Folic Acid  
Needed for energy production and the formation of red blood cells, strengthens immunity by aiding in the proper formation and functioning of white blood cells, important for healthy cell division and replication.

Vitamin C  
Antioxidant, immune modulator, anti-inflammatory, vital for tissue growth.

### Enzymes in Aloe Vera:

Enzymes are catalysts that speed up reactions. They are essential for the chemical reaction of vitamins, minerals, and hormones in the body.

<table>
<thead>
<tr>
<th>Enzyme</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bradykininase</td>
<td>Reduces inflammation and swelling, a potent vasodilator</td>
</tr>
<tr>
<td>Lactate</td>
<td>A result of carbohydrate metabolism, the liver converts lactate into glucose.</td>
</tr>
<tr>
<td>Phenolase</td>
<td>Anti-microbial, possible anti-tumor agent</td>
</tr>
</tbody>
</table>

### Amino acids in Aloe Vera:

Needed for good health. Responsible for protein synthesis.* One of the essential amino acids that the body cannot synthesize and has to be supplemented through dietary intake.
<table>
<thead>
<tr>
<th>Amino Acid</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>*Lysine</td>
<td>Aids in tissue repair</td>
</tr>
<tr>
<td>*Histidine</td>
<td>Significant in the growth and repair of tissue, essential for body to build other needed amino acids, the second most abundant essential amino acid in Aloe Vera, protects body from radiation.</td>
</tr>
<tr>
<td>Arginine</td>
<td>Abundant amino acid in Aloe Vera retards the growth of tumors and cancer by enhancing immune function, increases size and activity of thymus gland which manufactures T-lymphocytes (T cells), it is found in high concentrations in the skin and connective tissue, helps heal damaged tissue.</td>
</tr>
<tr>
<td>Aspartic Acid</td>
<td>Combines with other amino acids to form molecules that absorb toxins, enhances immunoglobulins and antibodies.</td>
</tr>
<tr>
<td>Asparagines</td>
<td>Maintains balance in the central nervous system, helps stabilize nervous system.</td>
</tr>
<tr>
<td>*Threonine</td>
<td>Essential for body to build other needed amino acids, aids in production of antibodies.</td>
</tr>
<tr>
<td>Serine</td>
<td>Maintains healthy immune system, natural moisturizer.</td>
</tr>
<tr>
<td>Glutamine</td>
<td>Helps maintain proper body pH/alkalinity, aids the body during stressful times to repair, prevents muscle-wasting that leads to serious disease.</td>
</tr>
<tr>
<td>Hydroproline</td>
<td>Used in the structures of protein, including collagen</td>
</tr>
<tr>
<td>Proline</td>
<td>Strengthens joints, aids skin and cartilage healing.</td>
</tr>
<tr>
<td>Amino Acid</td>
<td>Description</td>
</tr>
<tr>
<td>-------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Glycine</td>
<td>Used as a sweetener, one of the simplest structured amino acids, abundant in aloe vera, useful for repairing damaged tissue and promotes healing.</td>
</tr>
<tr>
<td>Alanine</td>
<td>Aids in metabolism of glucose a simple carbohydrate that the body uses for energy.</td>
</tr>
<tr>
<td>Cysteine</td>
<td>Sulfur-containing amino acid that aids in skin formation and detoxifies, helping protect the body from radiation damage, helpful in the treatment of rheumatoid arthritis.</td>
</tr>
<tr>
<td>*Valine</td>
<td>Essential for body to build other amino acids, needed for muscle metabolism, tissue repair, and energy source for muscles.</td>
</tr>
<tr>
<td>*Methionine</td>
<td>Essential for body to build other amino acids, detoxifies heavy metals.</td>
</tr>
<tr>
<td>*Isoleucine</td>
<td>Essential for body to build other amino acids, aids in repair of damaged tissue.</td>
</tr>
<tr>
<td>*Leucine</td>
<td>Essential for body to build other amino acids.</td>
</tr>
<tr>
<td>Tyrosine</td>
<td>Aids in production of melanin.</td>
</tr>
<tr>
<td>Glutamic acid</td>
<td>Helps detoxify.</td>
</tr>
<tr>
<td>*Phenylalanine</td>
<td>Essential for body to build other amino acids, helps decrease pain.</td>
</tr>
</tbody>
</table>

**Healing properties of Aloe Vera:**

Aloe Vera contains Glucomannan, a special complex polysaccharide composed largely of the sugar mannose. It interacts with special cell-surface receptors on those cells which repair...
damaged tissues, called fibroblasts, stimulating them, activating their faster growth are replication. Plant hormones in aloe, called gibberellins, also accelerate healing by stimulating cell replication. These combined actions make aloe a uniquely potent healing Herb.

**The Ways in which Aloe Influences the healing Processes:**

It is necessary to turn now to the specific “Healing” effect of Aloe. The latter effect, calls for the inhibiting of certain processes, such as cholesterol synthesis, the inhibiting of prostaglandin formation, or the inhibiting of bradykininase enzyme. By complete contrast with this, a healing action calls, for the positive stimulation of those cells which grow and multiply to effect the formation and physical strengthening of would tissues. The process of healing has more in common with the process of immune stimulation – since both are positive stimulatory processes, not inhibitory.

**The antibiotic effect of aloe vera:**

According to Dr Greg Hendeson, as described in the book Aloe Vera: nature’s Legendary healer, “High quality aloe vera is still effective against such organisms as salmonella streptococci and staphylococci.” Its antibiotic effect can be explained by what it contains. Its contents include the antibiotics aloin and aloetic acid. Aloe emodin that is found in aloe vera is bactericidal. Cinnamic acid found in aloe vera is a germicide. Bradykinase, also found in aloe vera is an enzyme that stimulates the immune system. Acemannan, a mucopolysaccharide found in aloe vera stimulates macrophages to produce interferon and interleukin.

**Aloe Vera- for skin rejuvenation:**

It achieves this in several different ways. Firstly the polysaccharides act as moistures, hydrating the skin. Secondly, aloe is absorbed into the skin and stimulates the fibroblasts to replicate
themselves faster and it is these cells that produce the collagen and elastin fibres, so the skin becomes more elastic and less wrinkles.

Aloe also makes the surface of the skin smoother because of its cohesive effect on the superficial flaking epidermal cells by sticking them together. It also possesses the ability to interfere with the enzyme that produces melanin deposits in the skin, preventing the formation of ‘liver spots’ which tend to form in ageing skin.

If Aloe Vera is applied regularly and for long enough it will often cause established sports to disappear.

**Absorption of Aloe:**

Aloe, when applied directly, has a sticky or almost oily feel. But this aloe is quickly adsorbed, within a minute or two into the skin and that sticky feeling goes away. That is a sign of a product with true high concentration, good quality aloe.

Water based products, when applied immediately, tend to dry up, as the water simply evaporates quickly once the hands are rubbed together. Sometimes, these products have oil based substances in them, such as petroleum, etc. this will give it somewhat of any oily feel and, depending on the concentration of these oil based ingredients, the stickiness will not go away after a few minutes until you have used your hands for a while and some of the oil is rubbed off.

**Aloe Vera Clinical applications:**

- Psoriasis
- Contact dermatitis
- Wound healing
- Stretch marks
- Hyperpigmentation
- Atopic Dermatitis
Research Studies:

1. **Report of Effect of Aloe Vera on Certain Micro-Organisms:**

   Sims, Ruth M; Zimmermann ER

   Dr. E.R. Zimmermann and Dr. Ruth Sims of Dallas Microb tested Aloe Vera for its germicidal potentials against a number of organisms, including one fungal and two viral agents. The viral agents were staphylococcus aureus (the most virulent strain of staph infection), and Strep viridians (a highly pathogenic strain of strep virus). The fungal agent was the now infamous Candida albicans, a monilial fungus that infects the mucous membranes, most notably the mouth, throat and vaginal areas. Additionally, aloe vera was tested against corynebacterium xerosis, a parasitic bacteria present in such skin pathologies as seborrhea. The organisms were tested in culture mediums ranging from solutions containing 25% Aloe Vera Gel to solutions containing 90% Aloe Vera gel. After through testing, sims and Zimmermann offered the following conclusions.

   “Incorporation of Aloe Vera at a concentration of 70% would appear highly efficient at reducing skin contaminants S. aureus, S. viridians, and C. xerosis. And an even lower concentration (50%) is sufficient to greatly diminish the population of yeast cells (C.Albicans).”

2. **A Bacteriological Study:**

   Shupe-Ricksecker, Kathleen

   In 1994 a biologist and assistant professor at the University of Dallas, Dr. Shupe recently undertook a series of in vitro bacteriological examinations testing various percentages of Aloe Vera solutions against tissue cultures of four common
pathogens Streptococcus pyogenes, Staph aureus, Pseudomonas aeruginosa (pseudomonas) and Eschericha coli (more popularly known as E. Coli). Strep pyogens are particularly known to be present in cross-infections and side-infections from improper wound healing, as are pseudomonas. Pseudomonas aeruginosa are also present in a number of secondary urinary tract infections in men and is commonly found as a second microorganism present in prostatitis. E.coli is a potent bacteria common to the rectal cavity of every living mannal. Well behaved in that singular context, once it is released and exposed to outside air it can wreak absolute havoc especially when exposed to wounds, mucous membranes or adjacent to foodstuffs such as meat. Uncaught and untreated, E. coli can be one of the most dangerous bacteria known to medicine.

In her findings, Dr. Shupe noted that all these microorganisms were killed within twenty four hours of exposure to high levels of Aloe Vera (85%). The Strep pyogens and Staph aureus strains were virtually killed (99.5%) within the twenty four hour period. The more resistant strains, E.Coli and pseudomonas, were killed upon an increase of Aloe percentages to 90%, and at that there was a 90% bactericidal ratio in the same period of time.

Dr. Shupe studies the germicidal effects of Aloe Vera on Propionibacterium acnes (ATCC strain 6919). This is a casual agent in the formation of acne, often resulting from the introduction of a comedogenic agent such as an improper oil-base ingredient to the skin. In vitro testing with samples using various percentages of aloe Vera revealed that a 100% killing
ratio against the bacteria could be achieved within that twenty-four hours period.

3. Effect of Aloe Vera Gel On Mycotic Organisms

Sims R; Zimmerman ER

In 1970, a set of tests were performed on the effect of Aloe Vera gel on Mycotic organisms (fungi). In these experiments, the organisms tested were Trychophyton mentagrophytes (also known as tinea pidea, the prime cause of athlete’s foot), and Trichophyton rubrum or tinea unguim (the cause of nail fungus and ringworm of the nails). Testing in agar plate samples, sims and Zimmermann found that Aloe Vera gel in percentages of 85% or more killed these persistent and difficult to treat fungi.

4. Anti-Inflammatory Activity of Aloe Vera Against A Spectrum or Irritants:

The authors have evaluated the spectrum of anti-inflammatory activity of A. Vera in a number of models of inflammation in the hind paw of the experimental rat induced by kaolin, caolin, carrageenan, albumin, dextran, gelatin, and mustard. Croton oil was used in a topical model of inflammation to determine the oral activity and time-dependent dosing of A. Vera. The authors found that A. Vera was active in all models of inflammation. Of the various irritants tested, A. Vera was especially active against gelatin-induced and Kaolin-induced edema and, in contrast, had minimal activity when tested against dextran-induced edema. Oral activity of A. vera was demonstrated to be dependent on the presence of anthraquinones. The various irritant-induced edema models...
provided a broad spectrum of anti-inflammatory activity for A.Vera.

5. **Aloe Vera-Drug interactions:**

Topical aloe Vera enhances the effect of topical corticosteroids and allows a reduction in the amount of the steroid being used.

6. **Aloe Vera-Percautions:**

Aloe vera gel is generally safe for topical use, but it is best to apply it to a small area first to test for possible allergic reaction. Stinging and generalized dermatitis may result in individuals who are sensitive to it. the vast majority of the warnings apply only to products containing anthraquinones, such as aloin and barbaloin (as well as the numerous others), which are found in the latex layer of the plant.

**Comment on Drug Review :**

1. **Guduchi –** (*Tinospora cordifolia*)

Different research studies on Guduchi done by scientists such as (Raghunath and Sharma 1969), (Wadood et al), Sharma P.V. et al), (J.K. Grover et al) give clear indication of Hypoglycaemic effect of Guduchi. The present study also shows synergistic effect along with other hypoglycaemic agents. It is itself a potent hypoglycaemic drug.

The immunomodulatory property of Guduchi has also been proven by scientist like Thatt et al. It means indirectly it acts as an antimicrobial agent (orally as well as locally).

2. **Manjistha –** (*Rubia cordifolia*)

In Samhitas manjistha has been described as Vrana ropak Dravya by synonyms like samanga, yajanavalli.
Susruta Samhita has described several preparations like ghrita, Taila and lepa in the treatment of prameha, vrana and nadivrana etc.

In uttara sthana of Astanga Samgraha, manjistha has been described for the prakshalana (dressing) of vrana (ulcer) along with other drugs which are useful for ropana of Vrana.

Acharjya P.V. Sharma has advised to use manjistha as Raktashodhak Dravya (antiseptic) in Prameha, vrana, Visarpa, sotha, kustha, (priya nighantu P.V Sharma 1983).

All such references clearly indicate role of manjistha in prameha (diabetes mellitus) and vrana (ulcer).

3. Kumari – Aloevera

Topical application of aloevera (pulp of leaves) containing several glycoprotein’s and salicylates, and substances that stimulates, growth of skin and connective tissue and number of vitamins, mineral like Vit C, Vit E, zinc those are necessary to heal promotes healing of a wound. So Aloevera in often called the ‘Miracle plant’ ‘the Burn plant’ or the ‘natural healer’. In this study also histopathological evidence justify the statement.
4. Haridra – *Curcuma longa* Linn.

Scientific studies by different scientist reveals Haridra on immunomodulator, anti-inflammatory (in arthritis) Hypoglycamic and good antiseptic in healing of wounds.

The present study shows antiseptic action and within seven days the offensive smell was completely absent in the ulcer.

5. Nimba – *Azadiracta Indica*:

The Neem in very good antidiabetic drug (pramehagna). Since ancient times it has been used as antibacterial, antiviral, antifungal drug. It is also an antiseptic.

The skin diseases including ulceration (vranas) are as a whole said to be caused by vitiated kapha and pitta. Ayurveda recognizes neem pacifying kapha and pitta helps to cure skin ailments. It promotes wound healing by its antibacterial and astringent property.

In diabetes several researches revealed the use of neem leaf extract which corrects impaired blood circulation and not allowing to form gangrene in lower extremities. Numerous scientific study already high lightened the role of neem is keeping circulatory system healthy, thus reducing the chances of gangrene. Recent study also reveals its hypolipidaemic action.

The pus culture before treatment shows presence of infection in diabetic foot. The histological study gives clear indication in the healing of wound where neem definitely play an important role to make it germ free. But more study has to be conducted in this aspect.

6. Kalamegha – *Andrographis paniculata*:

It is also a powerful drug having krimighna property. Here it means antimicrobial action. Extract of andrographis exhibit potent inflammatory modulating and antioxidant action in mouse models. Pus
culture study and histopathological study clearly denotes its value in the ulcer to make it germ free helping in healing of the ulcer.

7. Vidanga – *Embelia ribes* Burm:

It is drug used routinely as anthetmintic drug (Krimighna). Here in this study it has been choosen to find out its role as an antimicrobial agent. Study already reveals that the benzoquinone derivative embelin from embelia ribes found significant inhibitory activity against 12 different strains of bacteria in vitro. (Chitra et al 2003). But separate study has to be conducted further to establish its antimicrobial action.

**Other drugs used as Hypoglycaemic drug in Ayurveda:**

1. Meshasringi (Gymnema sylvestra)
2. Karavellaka (Mamordica charantia)
3. Methika (Trigonella foenum graecum)
4. Shilajit (Black bitumen)
5. Vijaysar (Ptero Carpus marsupium)
6. Jambu (Syzgium cumini)
7. Tejpatra (Cinnamomum tamala)
8. Twak (Cinnamomum Zeylinica)
9. Bimbi (Coccinia Grandis)
10. Khadirasara (Acacia Catechu)
11. Kalphala (Myrica Nagi)
12. Kakamaci (Solanum Nigrum)
13. Debadaru (Cedrus deodara)
14. Amalaki (Phyllanthus emblica)