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Potential antimicrobial agents of Charakokta Mahakashaya – A review

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Abstract

Acharya Charaka has classified the dravya as per pharmacological actions into 50 mahakashayas (50 groups of dravyas) of 10 herbs each with a particular action. These 50 mahakashaya serves as a ready reckon for the practice of Ayurvedic medicine. Out of these 50 mahakashaya Krimighna mahakashaya is the 15th mahakashaya. The name of dravya mentioned in this mahakashaya are Aksheeva, Maricha, Gandeera, Kebuka, Vidanga, Nirgundi, Kinihi, Swandanstra, Vrishparnika and Akhuparnika. Current researches also supported the krimighna action of these ten drugs as all these drugs have antibacterial, anthelmintic, antiprotozoal activity. They should be used singly or in combined form in different pharmaceutical forms. Among all the Krimighna dravyas described in Krimighna mahakashaya of Charaka Samhita, maximum drugs have katu and tikta rasa and most of the drug have ushna veerya (potency). It can also be said that the drugs having above qualities removes kleda, reduces kapha and do srotoshodana. In this paper an effort has been made to highlight the current researches of these herbs and establish their therapeutic activity.

Keywords: Krimighna, Pharmacological action, Charakokta mahakashaya, Antimicrobial property

Introduction

In Charaka samhita fifty groups of mahakashaya are explained based on their pharmacological activity. Among these mahakashaya Krimighna mahakashaya is the 15th mahakashaya^[1]. The literal meaning of 'Krimi' is 'worms' or 'micro organisms' in Sanskrit. The drug which kills or destroys the worms is called Krimighna. Out of ten krimighna dravyas Vidanga is explained as agrya (the best) Krimighna dravya. The aim of the study was to critically evaluate the herbs mentioned in Krimighna Mahakashaya as potential antimicrobial agents.

Materials and Methods

Krimighna Mahakashaya contains ten herbs such as Aksheeva, Maricha, Gandeera, Kebuka, Vidanga, Nirgundi, Kinihi, Swandanstra, Vrishparnika and Akhuparnika^[2].

Results and Discussion

The aim of this study was to critically evaluate the herbs mentioned in krimighna mahakashaya for their potent anti microbial action. Ayurvedic classics, journals and other research articles were reviewed. Charaka samhita stated krimighna mahakashaya that can be used to obtain antimicrobial action. It includes Aksheeva, Maricha, Gandeera, Kebuka, Vidanga, Nirgundi, Kinihi, Swandanstra, Vrishparnika and Akhuparnika. Most of the dravyas belonging to krimighna mahakashaya have laghu, ruksha, tikshana guna, katu, tikta, kasaya rasa, Katu vipaka and ushna virya and are scientifically proven for their anti-inflammatory, wormicidal, antimicrobial and anti helmenthic potentials. Almost of the drugs of mahakashaya contain phytochemical constituents like Alkaloids, tannin, flavonoids, essential oils etc to which antimicrobial action can be attributed. Among all the ten drugs vidanga is mentioned as best krimighna dravya. Apart from therapeutic utility these drugs can also be used in organic farming where these antimicrobial agents help in treatment of diseased plants, control the pests and insects and also give a good yield.

Research on *Piper nigrum* results suggest that Piper extracts could be used effectively as

contact botanical insect control agents to protect potato plants from developing *L. decemlineata* larvae at concentrations less than 0.1%. There is also potential for Piper extracts to control insecticide resistant populations in conjunction with other integrated pest management (IPM) strategies used in conventional and organic agriculture [13].

Use of powders of *Solanum indicum*, *Sesamum indicum*, *Embelia ribes* and *Brassica juncea*, milk, ghee and cow dung

has been mentioned in almost all the texts for protection during storage. Retreatments for vegetative propagation have also been described in the texts. Anointing the stem cuttings or whole plants with cow dung, ghee, *Sesamum indicum*, *Embelia ribes* or honey are some of the treatments. Furthermore, type of cutting and ideal season for planting the cuttings has been clearly stated [14].

Table 1: Showing details of plants mentioned in Krimighna mahakashaya

S. No	Sanskrit name	Common name	Latin name	Family	Habit	Part used
1	Aksheeva	Nugge mara	<i>Moringa oleifera</i>	Moringaceae	Tree	Root bark, seeds
2	Maricha	kalumenasu	<i>Piper nigrum</i>	Piperaceae	Climber	Fruits
3	Gandira	kalligida	<i>Euphorbia antiquorum</i>	Euphorbiaceae	Shrub	Latex
4	Kebuka	Chengaluva	<i>Costus speciosus</i>	Scitaminae	Herb	Rhizome
5	Vidanga	Vayu vidanga	<i>Embelia ribes</i> Burm.	Myrsinaceae	Shrub	Seeds, root
6	Nirgundi	Lakki	<i>Vitex negundo</i>	Verbenaceae	Tree	Leaves, root
7	Kinihi	Uttarani gida	<i>Achyranthes aspera</i>	Amaranthaceae	Herb	Seeds, root, leaves, whole plant
8	Gokshura	Neggina mullu	<i>Tribulus terrestris</i>	Zygophyllaceae	Herb	Root, fruit
9	Vrsaparnika	Iikivi gida	<i>Ipomea reniformis</i>	Convolvulaceae	Creeper	Whole plant
10	Akhuparnika	Tigade, Valliharuhi	<i>Merremia emarginata</i>	Convolvulaceae	Creeper	Whole plant

Table 2: Pharmacodynamics and Chemical Constituents of Krimighna Mahakasaya

S. No	Sanskrit name	Rasapanchaka \ Pharmacodynamics	Chemical Constituent
1.	Aksheev	Rasa- Katu, Madhura Guna –Laghu, Ruksha Virya- Usna Vipaka- Katu	Phenolic acids, flavonoids, alkaloids, phytosterols, saponine, tannin and natural sugars, vitamins, minerals, and organic acids. The antibacterial effect is attributed to the presence of saponine, tannin and alkaloid phytoconstituents [3].
2.	Maricha	Rasa- Katu Guna-Laghu, Teekshna Virya- Usna Vipaka- Katu	Piperine, Phenolics, flavonoids, alkaloids, amides and steroids, lignans, neolignans, terpenes, chalcones etc and many other compounds., essential oil up to 3.5%. Piperine is the major constituent of Maricha responsible for Anti-microbial action [4]
3.	Gandira	Rasa- Katu Guna –Laghu, snigdha Virya- Usna Vipaka-Katu	Diterpenes, Triterpenes and Flavonoids with diverse structural classes such as the Jatrophane, Lathyrane, Tigliane, Ingenane, Myrsinol and Ingol types. Diterpenoids showed important antimicrobial activity [5].
4.	Kebuka	Rasa-Tikta Guna – Laghu Virya- Sheeta Vipaka- Katu	Costusic acid costunolide eremanthin saponins and sapogenins, alkaloids, The high antibacterial activity may be due to the presence of diosgenin, an alkaloid which is the precursor for the synthesis of steroidal hormone [6].
5.	Vidanga	Rasa-Katu, Kashaya Guna - Laghu, Ruksha Virya- Usna Vipaka- Katu	<i>Embelia ribes</i> berries contain several chemical constituents like embelin, volatile oil, fixed oil, resin, tannin, christembine (alkaloid), phenolic acids like caffeic acid, vanillic acid, chlorogenic acid, cinnamic acid, o-cumaric acid. 4.33% of the embelin content is observed in the berries of <i>Embelia ribes</i> . The major bioactive constituent of <i>Vidanga</i> is embelin found to have antimicrobial activity [7]
6.	Nirgundi	Rasa-Katu, Kashaya Guna - Laghu Virya- Usna Vipaka- Katu	Phlobatannins, carbohydrates, tannins, glycosides, volatile oils, resins, balsams, flavonoids and saponins, flavonoids present in the leaves have antimicrobial action ⁸ .
7.	Kinihi	Rasa- Katu, Tikta Guna –Laghu, Ruksha Virya- Usna Vipaka- Katu	Carbohydrates, protein, glycosides, alkaloids, tannins, saponins, flavonoids, lignin etc The antibacterial activity of <i>Kinihi</i> can be attributed to the alkaloids [9].
8.	Gokshura	Rasa- Madhura Guna –Guru, Snigdha Virya- Sheeta Vipaka-Madhura	Flavonoids, flavonol glycosides, steroidal saponins, and alkaloids. Steroidal saponins are responsible for antimicrobial action [10]
9.	Vrsaparnika	Rasa-Kashaya, Katu, Tikta Guna - Laghu, Ruksha Virya- Usna Vipaka- Katu	Ferulic & sinapic acid, caffeic Scopoletin Scopoletin is the one of most prominent phytoconstituent present in the <i>Ipomea reniformis</i> plant which may be responsible for anti-microbial activity [11].
10.	Akhuparnika	Rasa- Kashaya, Katu, Tikta Guna – Laghu, Ruksha Virya- Usna Vipaka- Katu	Terpenes, steroids, polyphenols, glycosides, flavanoids, carbohydrates and proteins The antibacterial activity of may be attributed to the presence of flavonoids, terpenoids, amino acids, glycosides [12].

Conclusion

The above ten drugs are assigned with the Krimighna action and have very good role in the treatment of worms. Thus these herbs which are known for their antimicrobial, insecticidal properties can also be utilized for sustainable organic farming in terms of effective pest control, cultivation and conservation aspects effectively.

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