ISSN 2456-3110
Vol 7 · Issue 1
Jan-Feb 2022

JAiMS
INTERNATIONAL

Journal of Ayurveda and Integrated Medical Sciences

www.jaims.in

JAIMS

An International Journal for Researches in Ayurveda and Allied Sciences

Maharshi Charaka
Ayurveda

Indexed

Journal of
Ayurveda and Integrated Medical Sciences
ISSN 2456-3110
REVIEW ARTICLE Jan-Feb 2022

Cardioprotective activity of various Herbs - Research Update

Bharati S. Muddannavar[1], Anand Katti[2]

[1]*Post Graduate Scholar, Dept. of P.G. Studies in Dravyaguna, Government Ayurveda Medical College, Bengaluru, Karnataka, India.*

[2]*Associate Professor, Dept. of Samhita Siddhantha, Government Ayurveda Medical College, Bengaluru, Karnataka, India.*

ABSTRACT

Cardiovascular diseases are the one of the most leading cause for death in the all countries, which include diseases of heart and vascular system supplying to the vital organs, caused due to various factors like age, gender, high blood pressure, hyperlipidemia, diabetes mellitus, tobacco smoking, obesity, psychological factors, various dietary and life style modification, with prevalence of 17.9 million every year. Ayurveda, the life science, has holistic approach in maintaining health and in treating disease condition. *Hrudaya* is the one among the *Tri-marma* (*Sadhyopranahara*). *Hrudya Karma* mentioned in Ayurveda used in various cardiac conditions. *Dravyas* which are good for heart *(Hrudayaya Hitam)* are termed as *Hrudya*. The *Dravyas* which possess the *Hrudroga Hara* property are used in various cardiac conditions both in preventive as well as curative aspects. 58 *Hrudya Dravyas,* 19 *Hrudroga Hara Dravyas* were mentioned in *Bruhatrayi* & among those, 7 are *Dhatu* (metal) origin, 70 are plant origin. Hence the present study done to review various *Hrudya* and *Hrudroga Hara Dravyas* mentioned in *Bruhatrayi* (compilation done from *Charaka, Susrutha, Astanga Hrudaya Samhitas*), along with experimentally proven cardioprotective drugs (compilation was done through PubMed, Dhara, Ayurveda research portal, Google scholar and Google).

Key words: *Hrudya, Cardioprotective, Hrudroga Hara*

INTRODUCTION

Cardiovascular disease, one of the most leading cause for death in the all countries, which include diseases of heart and vascular system supplying to the vital organs, caused due to various factors like age, gender, high blood pressure, hyperlipidemia, diabetes mellitus, tobacco smoking, obesity, psychological factors, various dietary and life style modification, with prevalence of 17.9 million every year.[1]

Hrudaya is the one among the *Tri-marma*[2] *(Sadhyopranahara)*[3], and it is formed by *Shonita Kapha Prasada Bhaga.*[4] *Hrudaya* is the *Mula* for *Pranavaha* and *Rasavaha Srotas*.[5] It is the *Sthana* for *Aathma,*[6] *Rakta, Praana, Satva, Oja, Siras, Vyaan Vayu, Saadhaka Pitta, Avalambaka Kapha* and *Rasa* the essence by which all *Dhatu, Malaas* are formed.[7]

Ayurveda, the life science, has holistic approach in maintaining health and in treating disease condition *Hrudya Karma* mentioned in Ayurveda used in various cardiac conditions.

Hrudya

Dravyas which are good for heart (*Hrudayay Hitam*)[8] are termed as *Hrudya.* In *Ayurveda Hrudya Dravya* are mentioned under various context. Number of *Hrudya* drugs mentioned in *Bruhatrayi* are 58 , (according to

Address for correspondence:
Dr. Bharati S. Muddannavar
Post Graduate Scholar, Dept. of P.G. Studies in Dravyaguna, Govt. Ayurveda Medical College, Bengaluru, Karnataka, India.
E-mail: bharati10111995@gmail.com

Submission Date: 12/01/2022 Accepted Date: 17/02/2022

Access this article online

Quick Response Code

Website: www.jaims.in

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Charakaacharya 10[9], *Acharya Susruta* 10[10], *Astanga Hrudaya* 38.[11,12]

Hrudrog Hara

Hrudroga is the diseases of heart and its vascular system, which are classified under 5 types (*Vataja, Pittaja, Kaphaja, Sannipataja,* and *Krimija*).[13] which are caused due to unhealthy dietary and lifestyle modifications. The *Dravyas* which possess the *Hrudroga Hara* property are used in the above mentioned conditions both in preventive as well as curative aspects. Total 19 drugs mentioned as *Hrudrog Hara* in *Susruta Samhita.*[14-16]

Table 1: *Hrudya Dravyas* mentioned in *Bruhatrayi*

SN	Name of the Drug	*Samhita*	Scientific name	Family	*Rasa*	*Guna*	*Virya*	*Vipaka*	*Karma*	Remarks
1.	*Aamra*	*Charaka*	*Mangifera indica* Linn.	Anacardiaceae	*Madhura, Amla*	*Guru, Snigdha, Laghu, Ruksha*	*Shita*	*Katu*	*Brumhana , Vrushya*	*Kaphapitta Shamak*
2.	*Aamraataka*	*Charaka*	*Spondias mangifera*	Anacardiaceae	*Amla, Kashaya*	*Guru*	*Ushna*	*Madhura*	*Deepana, Kantya*	*Vata Pitta Shamaka*
3.	*Likoocha*	*Charaka*	*Artocarpus lakoocha* Roxb.	Moraceae	*Madhura, Amla, Kashaya*	*Guru, Ruksha*	*Ushna*	*Amla*	*Vrushya*	*Pitta Shamaka*
4.	*Karamarda*	*Charaka*	*Carissa corundus* L.	Apocynaceae	*Amla, Madhura*	*Guru, Snigdha*	*Ushna*	*Amla*	*Mutra Kruchra*	*Vata Shamaka*
5.	*Vrukshamla*	*Charaka*	*Garcinia indica* (Thouars) Choisy	Guttifereae	*Amla, Kashaya*	*Guru, Ruksha*	*Ushna*	*Amla*	*Deeapana , Grahi*	*Vata Shamaka*
6.	*Aamlavetasa*	*Charaka*	*Garcinia pedunculate* Roxb. ex Buch.-Ham.	Guttifereae	*Amla*	*Laghu, Ruksha, Tikshna*	*Ushna*	*Amla*	*Bhedana, Brumhana*	*Kapha Vata Shamaka*
7.	*Kuvala*	*Charaka*	*Ziziphus sativa* Gaertn.	Rhamnaceae	*Madhura, Amla*	*Guru*	*Shita*	*Madhura*	*Bhedana, Deepana*	*Pitta Karaka*
8.	*Badara*	*Charaka*	*Ziziphus jujuba* Mill.	Rhamnaceae	*Madhura, Amla*	*Guru*	*Ushna*	*Madhura*	*Deepana, Pachana*	*Kapha Pitta Karaka*
9.	*Dadima*	*Charaka*	*Punica granatum* L.	Lytheraceae	*Madhura, Amla, Kashaya*	*Laghu, Snigdha*	*Anushna*	*Madhura*	*Grahi, Chardi Nigraha*	*Vata Pitta Shamaka*

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10.	*Maatulunga*	*Charaka*	*Citrus medica* L.	Rutaceae	*Madhura, Amla*	*Laghu, Snigdha*	*Ushna*	*Amla*	*Deepana, Medya*	*Pitta Shamaka*
11.	*Parushaka*	*Susrutha*	*Grewia asiatica* L.	Malvaceae	*Madhura, Amla, Kashaya*	*Guru, Snigdha*	*Shita*	*Madhura*	*Brumhana*	*Vata Shamaka*
12.	*Draksha*	*Susrutha*	*Vitis vinifera* L.	Vitaceae	*Madhura, Kashaya*	*Guru, Snigdha,*	*Shita*	*Madhura*	*Brumhana*	*Vatapitta Shamaka*
13.	*Katphala*	*Susrutha*	*Myrica nagi* Thumb.	Myricaceae	*Katu, Tikta, Kashaya*	*Laghu, Tikshna*	*Ushna*	*Katu*	*Shothagn a*	*Vata Kapha Shamaka*
15.	*Rajadana*	*Susrutha*	*Mimusops hexandra* Roxb.	Sapotaceae	*Madhura, Kashaya*	*Guru, Snigdha*	*Shita*	*Madhura*		*Tridhosa Hara*
16.	*Kataka Phala*	*Susrutha*	*Strychnos potatoru m* Linn.	Loganiaceae	*Madhura, Kashaya, Tikta*	*Gura*	*Shita*	*Madhura*	*Chakshush ya*	*Kaphavata Shamaka*
17.	*Shakaphala*	*Susrutha*	*Tectona grandis* L.f.	Lamiaceae	*Kashaya*	*Laghu, Ruksha*	*Shita*	*Katu*	*Rakta Shodaka*	*Vatapitta Hara*
18.	*Amalaki*	*Susrutha*	*Emblica officinalis* Gaertn.	Phyllanthaceae	*Amla, Kashaya, Madhura, Tikta, Katu*	*Ruksha, Laghu*	*Shita*	*Madhura*	*Rasayana, Vayasthap ana*	*Tridosha Shamaka*
19.	*Haritaki*	*Susrutha*	*Terminali a chebula* Retz.	Combrataceae	*Kashaya, Tikta, Madhura, Amla, Katu*	*Laghu, Ruksha*	*Ushna*	*Madhura*	*Deepana, Pachana*	*Tridosha Shamak*
20.	*Vibhitaki*	*Susrutha*	*Terminali a bellerica* Roxb.	Combrataceae	*Kashaya*	*Ruksha, Laghu*	*Ushna*	*Ma Dhura*	*Bhedana, Kustagna*	*Tridhoshah ara*
21.	*Vidari*	*Astanga Hrudaya*	*Pueraria tuberosa* (Willd.)DC	Fabaceae	*Madhura,*	*Guru, Snigdha*	*Shita*	*Madhura*	*Mutral*	*Pitta Vata Shamaka*
22.	*Panchangula*	*Astanga Hrudaya*	*Ricinus communis* L.	Euphorbiaceae	*Madhura, Katu, Kashaya*	*Guru, Snigdha, Tikshna*	*Ushna*	*Madhura*	*Shothahar a*	*Vata Shamaka*
23.	*Vruschikali*	*Astanga Hrudaya*	*Pergularia axtensa* (Jacq.) N. E. Br.	Apocynaceae	*Katu, Kashaya*	*Laghu, Snigdha*	*Ushna*	*Katu*	*Vamaka*	*Vataham*

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24.	*Vruschiva*	*Astanga Hrudaya*	*Boerhavia diffusa* Linn.	Nyctaginaceae	*Madhura, Tikta, Kashaya*	*Ruksha*	*Ushna*	*Madhura*	*Deepana, Shotha Hara*	*Vatashlesh ma Hara*
25.	*Devahvaya*	*Astanga Hrudaya*	*Cedrus deodara* (Roxb.) Loud	Pinaceae	*Tikta*	*Laghu, Snigdha*	*Ushna*	*Katu*	*Deepana*	*Kaphavatas hamaka*
26.	*Mudgaparni*	*Astanga Hrudaya*	*Vigna trilobata* (L.) Verdc.	Fabaceae	*Madhura*	*Laghu, Ruksha*	*Shita*	*Madhura*	*Shukra Janana*	*Tridoja Shamaka*
27.	*Mashaparni*	*Astanga Hrudaya*	*Teramnus labialis* Spreng.	Fabaceae	*Madhura, Tikta*	*Laghu, Snigna*	*Shita*	*Madhura*	*Grahi, Balya*	*Vatapita Shamaka*
28.	*Kandukari*	*Astanga Hrudaya*	*Mucuna pruriens* (l.)DC.	Fabaceae	*Madhura, Tikta*	*Guru, Snigdha*	*Shita*	*Madhura*	*Mutrala*	*Vata Pitta Shamaka*
29.	*Abhiru*	*Astanga Hrudaya*	*Asparagus racemosu s* Willd.	Asparagaceae	*Madhura, Tikta*	*Guru, Snigdha*	*Shita*	*Madhura*	*Shothajita*	*Vata Pitta Shamaka*
30.	*Vira*	*Astanga Hrudaya*	*Terminali a arjuna* W. &A.	Combrataceae	*Kashaya*	*Ruksha, Laghu*	*Shita*	*Katu*	*Medohara*	*Kapha Pitta Shamaka*
31.	*Jivanti*	*Astanga Hrudaya*	*Leptadeni a reticulata* W&A.	Aselepiadacea e	*Madhura*	*Laghu, Snigdha*	*Shita*	*Madhura*	*Grahi, Balya*	*Tridosha Hara*
32.	*Jivaka*	*Astanga Hrudaya*	*Microstyli s wallichii* Lindl.	Orchidaceae	*Madhura*	*Snigdha, Picchila*	*Shita*	*Madhura*		*Kaphakara, Vatapittah ara*
33.	*Rushabaka*	*Astanga Hrudaya*	*Microostyl is muscifera* (Lindl. Ridl.	Orchidaceae	*Madhura*	*Guru*	*Shita*	*Madhura*		*Kaphakara, Vatapittah ara*
34.	*Bruhati*	*Astanga Hrudaya*	*Solanum indicum* L.	Solanaceae	*Katu, Tikta*	*Laghu, Ruksha*	*Ushna*	*Katu*	*Deepana, Pachana*	*Kaphavata Shamaka*
35.	*Kantakari*	*Astanga Hrudaya*	*Solanum xanthocar pum* Schad.& H. Wendl.	Solanaceae	*Katu, Tikta*	*Laghu, Ruksha*	*Ushna*	*Katu*	*Mutral, Deepana, Pachana*	*Kaphavata Shamaka*

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36.	*Shalaparni*	*Astanga Hrudaya*	*Desmodium gagenticum* (L.)DC.	Fabaceae	*Tikta, Madhura*	*Guru*	*Ushna*	*Madhura*	*Shotha Hara*	*Vatapitta Shamaka*
37.	*Prushnaparni*	*Astanga Hrudaya*	*Uraria picta* (Jacq.)DC.	Fabaceae	*Madhura, Tikta*	*Laghu, Snigdha*	*Ushna*	*Madhura*	*Deepana, Grahi*	*Vata, Pitta Shamaka*
38.	*Gokshura*	*Astanga Hrudaya*	*Tribulus terrestris* Linn.	Zygophyllaceae	*Madhura*	*Guru, Snigda*	*Shita*	*Madhura*	*Deepana, Mutrala*	*Vatapitta Shamaka*
39.	*Gopasuta*	*Astanga Hrudaya*	*Hemidesmus indicus* (L.)R.Br.ex Schult.	Apocynaceae	*Madhura, Tikta*	*Guru, Snigdha*	*Shita*	*Madhura*	*Grahi*	*Tridosha Shamaka*
40.	*Tripadi*	*Astanga Hrudaya*	*Adiantum lunulatum* Cav.	Pteridaceae	*Madhura, Tikta,Kashaya*	*Guru, Snigdha*	*Shita*	*Madhura*	*Vishaghna, Raktadoshagna*	*Vatapita Shamaka*
41.	*Shyama*	*Astanga Hrudaya*	*Operculina turpethum* (Linn.)	Convolvulaceae	*Madhura, Katu, Tikta, Kashaya*	*Ruksha, Laghu, Tiksha*	*Ushna*	*Katu*	*Rakta Shodaka*	*Kaphapitta Shamak*
42.	*Danti*	*Astanga Hrudaya*	*Baliospermum montanum* Muell-Arg.	Euphorbiaceae	*Katu*	*Tikshna, Sara, Laghu*	*Ushna*	*Katu*	*Rechana*	*Kaphavata Sha Maka*
43.	*Dravanti*	*Astanga Hrudaya*	*Croton tiglium* L.	Asparagaceae	*Madhura*	*Guru, Snigdha*	*Shita*	*Madhura*	*Rechana*	*Pitta Kapha Shamaka*
44.	*Kramuka*	*Astanga Hrudaya*	*Viburnum nervosum* Hook.f.&Thoms.	Viburnaceae	*Kashaya, Tikta*	*Laghu, Ruksha*	*Shita*	*Katu*	*Virechaka*	*Kapha Pitta Shamaka*
45.	*Kutarana*	*Astanga Hrudaya*	*Ipomoea turpethum* R. Br.	Convolvulaceae	*Madhura, Katu, Tikta, Kashaya*	*Ruksha, Laghu, Tikshna*	*Ushna*	*Katu*	*Shothagna*	*Kaphapitta Shamaka*
46.	*Shankhini*	*Astanga Hrudaya*	*Euphorbia dracunculoides* Lam.	Euphorbiaceae	*Tikta, Kashaya*	*Laghu, Ruksha, Tikshna*	*Shita*	*Katu*	*Rechana*	*Kaphapitta hara*
47.	*Carmasahva*	*Astanga Hrudaya*	*Euphorbia pilosa*	Euphorbiaceae	*Tikta*	*Laghu, Ruksha*	*Shita*	*Katu*		*Kaphapitta Hara*
48.	*Swarnakshiri*	*Astanga Hrudaya*	*Euphorbia thomsoniana* Boiss.	Euphorbiaceae	*Tikta*	*Laghu, Ruksha*	*Shita*	*Katu*	*Bhedana*	*Kapha Pitta Hara*

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49.	*Gavakshi*	*Astanga Hrudaya*	*Citrullus colocynthis* Schrad.	Cucurbitaceae	*Tikta*	*Laghu, Ruksha, Tiksna*	*Ushna*	*Katu*	*Rechana*	*Kaphapitta Shamaka*
50.	*Shikhari*	*Astanga Hrudaya*	*Achyranthes aspera* Linn.	Amaranthaceae	*Katu, Tikta*	*Tikshna, Sara, Laghu, Ruksha*	*Ushna*	*Katu*	*Medhohara*	*Kaphavata Shamaka*
51.	*Rajanaka*	*Astanga Hrudaya*	*Mallotus philiphinensis* Muell. Arg	Euphorbiaceae	*Katu*	*Laghu, Ruksha, Tikshna*	*Ushna*	*Katu*	*Rechaka*	*Kaphavata Shamaka*
52.	*Chinnaruha*	*Astanga Hrudaya*	*Tinospora cordifolia* (Wild) Meirs.	Menispermaceae	*Tikta*	*Guru, Snigda*	*Ushna*	*Madhura*	*Deepana, Grahi*	*Tridosha Shamaka*
53.	*Karanja*	*Astanga Hrudaya*	*Pongamia pinnata* (Linn.) Pierre	Fabaceae	*Katu, Tikta, Kashaya*	*Tikshna*	*Ushna*	*Katu*	*Vrana Shodhaka*	*Kaphapitta Shamaka*
54.	*Bastantri*	*Astanga Hrudaya*	*Argeria speciosa* Sweet.	Convolvulaceae	*Kashay, Katu, Tikta*	*Laghu, Snigdh*	*Ushna*	*Katu*	*Shothagna*	*Kaphavata Shamaka*
55.	*Vyadhighata*	*Astanga Hrudaya*	*Cassia fistula* Linn.	Fabaceae	*Madhura*	*Guru, Mrudu, Snigdha*	*Shita*	*Madhura*	*Samsrana*	*Vatapiha Shamaka*
56.	*Bahala*	*Astanga Hrudaya*	*Moringa oleifera* Lam.	Moringaceae	*Katu*	*Laghu, Ruksha, Tikshna*	*Ushna*	*Katu*	*Grahi, Deepana*	*Kapha Vata Shamaka*
57.	*Bahurasa*	*Astanga Hrudaya*	*Saccharum officinarum* Linn.	Poaceae	*Madhura*	*Guru, Snigdha*	*Shita*	*Madhura*	*Mutrala*	*Vata Shamaka*
58.	*Tishnavruksha*	*Astanga Hrudaya*	*Salvodora persica* Linn.	Salvodoraceae	*Madhura, Tikta*	*Laghu, Snigdha*	*Ushna*	*Katu*	*Deepana, Bhedana*	*Kaphavata ghna*

Table 2: *Hrudrogahara Dravyas* mentioned in *Bruhatrayi.*

SN	Name of the Drug	*Samhita*	Scientific name	Family	*Rasa*	*Guna*	*Virya*	*Vipaka*	*Prabhava*	Remarks
1.	*Bruhati*	*Susrutha*	*Solanum indicum* L.	Solanaceae	*Katu, Tikta*	*Laghu, Ruksha*	*Ushna*	*Katu*	*Deepana, Pachana*	*Kaphavata Shamaka*
2.	*Kantakari*	*Susrutha*	*Solanum xanthocarpum* Schad.& H. Wendl.	Solanaceae	*Katu, Tikta*	*Laghu, Ruksha*	*Ushna*	*Katu*	*Mutral, Deepana, Pachana*	*Kaphavata Shamaka*

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3.	*Kutaja Phala*	*Susrutha*	*Holarrhena antidysentrica* Wall.	Apocynaceae	*Tikta Kashaya*	*Lagh, Ruksha*	*Shita*	*Katu*	*Deepana, Grahi*	*Kaphapitta Shamaka*
4.	*Patha*	*Susrutha*	*Cissampelos pareira* Linn.	Menispermaceae	*Katu, Tikta*	*Laghu,Tikshna*	*Ushna*	*Katu*	*Vishaghna*	*Kaphavata Shamaka*
5.	*Madhuka*	*Susrutha*	*Glycyrrhiza glabra*	Fabaceae	*Madhura*	*Guru, Snigdha*	*Shita*	*Madhura*	*Shukrala*	*Kaphavata Shamaka*
6.	*Utpala*	*Susrutha*	*Nymphaea stellata* Wild.	Nymphaeaceae	*Madhura, Kashaya, Tikta*	*Laghu, Snigdha, Picchila*	*Shita*	*Madhura*	*Vishaghna*	*Kaphapitta Shamaka*
7.	*Raktotpala*	*Susrutha*	*Nymphaea rubra*	Nymphaeaceae	*Madhura, Kashaya, Tikta*	*Laghu, Snigdha, Picchila*	*Shita*	*Madhura*	*Trishna Nigraha*	*Kaphapitta Shamaka*
8.	*Kumuda*	*Susrutha*	*Nymphaea alba* L.	Nymphaeaceae	*Madhura, Tikta*	*Laghu, Snigdha, Picchila*	*Shita*	*Madhura*	*Grahi, Balya*	*Kaphapitta Hara*
9.	*Saugandhika*	*Susrutha*	*Nymphaea* sp.	Nymphaeaceae	*Madhura, Kashaya, Tikta*	*Laghu, Snigdha, Picchila*	*Shita*	*Madhura*	*Daha Shamaka*	*Kaphapitta Shamaka*
10.	*Kuvalaya*	*Susrutha*	*Nymphaea* sp.	Nymphaeaceae	*Madhura, Kashaya, Tikta*	*Laghu, Snigdha, Picchila*	*Shita*	*Madhura*	*Varnya*	*Kaphapitta Shamaka*
11.	*Pundarika*	*Susrutha*	*Nelumbium speciosum*	Nelumbonaceae	*Madhura, Kashaya, Tikta*	*Laghu, Snigdha, Picchila*	*Shita*	*Madhura*	*Vishaghna*	*Kaphapitta Shamaka*
13.	*Trapu*	*Susrutha*	Stannum		*Kashaya, Lavana, Tikta*	*Ruksha, Laghu*	*Ushna*	*Katu*	*Balya, Pachana*	*Vata Kapha Hara*
14.	*Sisa*	*Susrutha*	Plumbum		*Tikta*	*Snigdha*	*Ushna*	*Katu*	*Kleda Nashana*	*Tridosha Hara*
15.	*Tamra*	*Susrutha*	Cuprum		*Tikta , Kashaya, Amla*	*Laghu, Ruksha*	*Ushna*	*Madhura*	*Deepana, Pachana*	*Pitta Kapha Hara*
16.	*Rajata*	*Susrutha*	Argentum		*Amla, Kashaya*	*Guru, Snigdha*	*Ushna*	*Madhura*	*Medya, Deepana*	*Vatakapha Hara*
17.	*Suvarna*	*Susrutha*	Aurum		*Madhura, Kashaya ,Tikt*	*Guru, Snigdha*	*Shita*	*Madhura*	*Medya, Balya*	*Tridhisa Hara*
18.	*Krushnaloha*	*Susruthaa*	Ferum		*Tikta, Kashaya, Madhura*	*Guru, Ruksha*	*Shita*	*Madhura*	*Chakshushya*	*Kaphapitta Hara*

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19.	*Lohamala*	*Susrutha a*	Ferric oxide		*Tikta, Kashaya, Madhura*	*Guru, Ruksha*	*Shita*	*Madhura*	*Balya*	*Kaphavata Hara*

Acharya Susrutha said the *Bruhati* and *Kantakari* as *Hrudrog-hara* while *Acharya Vagbhata* mentioned these as *Hrudya.*

After an exhaustive review through PubMed, Dhara, Ayurveda research portal, Google scholar and Google, by using key word - cardioprotective and *Hrudya*, among these above said *Hrudya* and *Hrudrog-hara* drugs, mentioned in various context of *Bruhatrayi,* we found some cardioprotective drugs, which are proven experimentally are as follows.

Table 3: Experimentally proven Cardioprotective Drugs

SN	Drug Name	Part Used	Extraction Form	Induction Method	Disease Condition	Animal Model	No.of Groups	Study Duration	Result	Drug Dose
1.	*Amra*[17]	Leaf	Alcoholic (100mg/Kg Orally)	Doxorubicin 15mg/Kg,Ip For 21 Days)	Cardiac Stress	Rats	4	21 Days	Positive Cardiopretective	100mg/Kg Orally
2.	*Vrukshamla*[18]	Fruit Rind	Decoction	Isoprenaline 80mg/Kg Sc 21st Day	Cardiotoxicity	Albino Rats	3	21 Days	Significant	4.5ml/Kg Orally
3.	*Dadima*[19]	Seed	Juice Extract	Isoprenaline 85mg/Kg	Myocardial Infarction	Wistar Rats	8	21 Days	Significant	100,300 mg/Kg Orally
4.	*Matulunga*[20]	Fruit	Ethanolic	Isoprenaline 85mg/Kg s c	Cardiomyopathy	Male Wistar Albino Rats		15 Days	Significant	250,500 mg/Kg Orally
5.	*Draksha*[21]	Fruit	Polyphenol Concentrate 25mg/Kg Ssintra Gastric Route	Doxorubicin 8mg/Kg b.w.i p	Cardiotoxicity	Wistar Albino Rats	3	8 Days	Positive Cardiopretective	25mg/Kg Intragastric
6.	*Kataka Phala*									
7.	*Amalaki*[22]	Fruit	Hydroalcoholic	Isoprenaline 85mg/Kg s c	Myocardial Infarction	Male Wistar Albino Rats	8	30 Days	Significant	100,250, 500mg/Kg Orally
8.	*Harataki*[23]	Fruit	Ethanolic	Isoproterenol 20mh/100g s c		Male Wistar Albino Rats	4	30 Days	Significant	500mg/Kg
9.	*Vibhitaki*[24]	Fruit	Methanolic	Doxorubicin 15mg/Kg,Ip	Cardiotoxicity	Rats			Positive Cardiopretective	250,500 mg/Kg Orally

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10.	*Patha*[25]	Root	Ethanolic	Isopreterenol 5mg/Kg i p	Cardiac Dysfunction	Male Wistar Albino Rats	8	30 Days	Significant	100,200 mg/Kg
11.	*Vruschiva*[26]		Ethanolic	Angiotensin 2	Cardiac Hypertropy	Male Wistar Rats			Positive Cardiopretective	
12.	*Kandukari*[27]	Seed	Methanolic	Isoproterenol 85mg/Kg s.c	Myocardial Necrosis	Rats	5	30 Days	Significant	
13.	*Vira*[28]	Bark	Aqueous	Doxorubicin 20mg/Kg b.w.Intra Plueral		Mice			Positive Cardiopretective	
14.	*Shalaparni*[29]	Root	Aqueous	Isoproterenol 10mg/Kg b.w. i p	Cardiac hypertropy	Male Wistar Albino Rats	5	30 Days	Significant	100mg/Kg Orally
15.	*Gokshura*[30]	Fruit	Aqueous	Isoproterenol	Myocardial Necrosis	Male Wistar Rats	7	28 Days	Significant	200 And 300mg/Kg b.w.Orally
16.	*Gopasuta*[31]	Root	Methanolic	Doxorubicin 25mg/Kg b.w. i p	Oxidative stress	Adult Male Swiss Albino Mice	4	15 Days	Significant	50mg/Kg b.w.
17.	*Shikhari*[32]									
18.	*Chinnaruha*[33]	Whole Plant	Alcoholic		Myocardial Infarction	Sprague Dawley Rats Of Either Sex	4	8 Days	Significant	250, 500, 1000mg/Kgorally
19.	*Bahala*[34]	Leaf	Hydroalcoholic	Isopreterenol 85mg/Kg s c	Myocardial Infarction	Male Wistar Albino Rats	3	30 Days	Significant	200mg/Kg Orally
20.	*Karamarda*[35]		Methanolic	Saline	Cardiac Hypertropy	Rats			Significant	
21.	*Kantakari*[36]		Hydro Ethanolic	Isoproterenol Hydrochoride 85mg/Kg b.w.	Myocardial Infarction	Adult Female Wistar Rats	4	30 Days	Significant	200mg/Kg Orally

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22.	*Badara*[37]	Fruit	Hydroalcoholic	Ng-Nitro-L-Arginine Methyl Ester 10mg/Kg i v	Hypertention	Rats	6	28 Days	Positive Cardioprotective	100mg/Kg Orally
23.	*Amlavetasa*[38]	Fruit	Aqueous	Isoprenaline 200mg/Kg s c	Myocardial Infarction	Male Wistar Albino Rats	3	15 Days	Significant	400mg/Kg Orally
24.	*Madhuka*[39]			Surgical	Myocardial Infarction	Rats			Significant	
25.	*Bruhati*[40]	Fruit	Ethanolic	Ng-Nitri-L-Arginine Methyl Ester	Hypertention	Rats		28 Days	Positive Cardioprotective	100 And 300mg/Kg Orally
26.	*Abhiru*[41]		Aqueous	Doxorubicin 20mg/Kg b.w.Intra Peritonial		Albino Rats	5	21 Days	Significant	250 And 500mg/Kg Orally
27.	*Gavakshi*[42]	Peel	Hydroalcoholic	Adrenaline 2mg/Kg s c	Myocardial Infarction	Rabbits	4	15 Days	Positive Cardioprotective	100,200, 300mg/Kg Orally
28.	*Karanja*[43]	Leaf	Hydroalcoholic	Isoproterenol 20mh/100g s c	Myocardial Infarction	Wistar Albino Rats	6	30 Days	Positive Cardioprotective	100,200, 300mg/Kg Orally
29.	*Bastantri*[44]	Roots	Ethyl Acetate, Aqueous	Isoproterenol 200mg/Kg s c	Myocardial Infarction	Male Wistar Rats	11	15 Days	Significant	200mg/Kg Orally
30.	*Vyadhighata*[45]	Bark	Methanolic	Doxorubicin 10 Mg/Kg i p	Cardiotoxicity	Male Wistar Rats	5	15 Days	Significant	400mg/Kg Orally
31.	*Bahurasa*[46]	Peel		High Fat Diet	Obesity And Atherosclerosis	Adult Male Albino Rats	4	28 Days	Significant	200mg Orally
32.	*Jivanti*[47]		Methanolic	Adriamycin 10mg/Kg i p	Cardiotoxicity	Wistar Rats		28 Days	Significant	250/500 mg/Kg Orally

Discussion

The above said experimentally proven cardioprotective effect of drugs evaluated by using different parts of the plant (leaf, fruit rind, seed, fruit, root, bark, whole plant, peels) with different doses, conducted on various types of animal models (rats, rabbits, mice,) which were divided into various groups at different time duration, with different induction methods of different doses, shown there protective effect of different extense against different cardiac condition.

Along with this, the product of plant origin showed the presence of various activities like - anti inflammatory, antioxidant, anti-coagulant, vasodilation, cardiac stimulant, free radical scavenging activity, calcineurin

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activities and also showed presence of various bio-chemicals like flavonoides, glycosides, tannins, quercetin, kaempferol, boeravinone, caffeic acid, tri-terpenoids.

Due to presence of such bio-chemicals showed the different actions for example, in mangifera indica, presence of mangiferin, isomangiferin, galloyl, hydroxy- benzoyl esters, epicatechin, tannins, gallic acid which are flavonoid and phenolic origin components exerts antioxidant activity, protective effect may be due to the collective free radical scavenging effect of extracted product.

The protective effect is evaluated by using different parameters such as heart rate, pressure rate index, electrocardiograph, morphological, histo-pathological changes, Cardiac rhythm, blood pressure. Levels of Superonide dismutare, catalase, low density lipoprotein, Lactate dehydrogenage, creatine kinase, Alanine aminotransferase, aspartate aminotransferase, malondialdehyde, non protein sulfhydryl group, total protein, Lipid peroxidation, triglycerides, total cholesterol, High density lipo-proteins, hematological parameters are evaluated.

Different repeated studies was done on cardioprotective activity of Moringa oleifera in different cardiac conditions. Among all these experimentally proven cardioprotective drugs, the drugs such has *Vrukshamla, Matulunga, Amalaki, Vibhitaki, Vira, Gokshura, Gopasuta, Bahala, Karamarda, Kantakari, Badara, Bruhati, Jivanti* showed significant effect over various cardiac condition.

The drugs such has *Amra, Dadima, Draksha, Haritaki, Patha, Vruschiva, Shalaparni, Chinnaruha, Amlavetasa, Madhuka, Abhiru, Gavakshi, Bastantri, Vyadhighata, Bahurasa, Kandukari* showed moderate cardioprotective effect on given conditions.

Karanja showed comparatively less protective against the given condition.

Conclusion

The experimental studies have values only when they become useful to human, which is by means of clinical trials on human, utilization of drugs done based on the efficacy of drugs against protective effect i.e., most efficient drugs are trialed first. All the experimentally proven drug are not practicing in clinical base on humans. Only few are in practicing, for example A*rjuna, Guduchi, Amalaki*, still more drugs are there which have to be used in practice and which have to be explored experimentally for their protective effects.

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How to cite this article: Bharati S. Muddannavar, Anand Katti. Cardioprotective activity of various Herbs - Research Update. J Ayurveda Integr Med Sci 2022;1:165-177.

Source of Support: Nil, **Conflict of Interest:** None declared.

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