

An Introduction of the Drugs of *Hridya Mahakashya* (Group of Cardio Tonics Drugs) and its Mode of Action

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Abstract

Ayurveda defines health as a state of physical, mental, intellectual and spiritual well-being. Nowadays, life has become so erratic that everybody is in hurry and is stressed. This life style has a direct impact on the health especially on the heart. Thus cardiovascular diseases pose an alarming threat to global health. Large number of herbs are mentioned in Ayurveda as *Hrida* i.e. beneficial for heart. In this study I have discussed about the herbs that are mentioned in *Hridya Mahakashya* (Group of cardio tonics drugs). *Acharya charaka* has mentioned the *Hridya Mahakashya* in his classification. This is a group of ten drugs i. e. beneficial for heart. All ten drugs are *Amla Rasa Pradhana* (sour in taste) and rich source of vitamin c. Vitamin c is proved to be a potent antioxidant as well as a good stress buster. The aim of this article is putting forward the brief accounts and probable mode of action of *these* drugs mentioned in *Hridya Mahakashya*.

Key words : Hridya, Mahakashya, Hridya mahakashya, Amla Rasa, Vata and Antioxidant

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Cardiovascular diseases pose an alarming threat to global health. Cardiovascular diseases (CVDs) have now become the leading cause of mortality in India. A quarter of all mortality is attributable to CVD. Ischemic heart disease and stroke are the predominant causes and are responsible for >80% of CVD deaths. The Global Burden of Disease study estimate of age-standardized CVD death rate of 272 per 100 000 population in India is higher than the global average of 235 per 100 000 population (Prabhakaran et al., 2016).

Ayurvedic aspect of *Hridya* (Heart)

The word *Hridaya* is composed of three syllables, i.e. hri+da+ya=*hridaya*. The first syllable denotes the suction activity of *Hridaya* (*Hridayam* i.e. venous return), second points out the pumping activity of *Hridaya* (*Samvardhanam* i.e. supply of oxygenated blood) and lastly the third syllable means control of these above two functions (*Yama*). According to Ayurveda, *Hridaya* is the best place of chetnayata (consciousness) and *oja*. *Charak* has stated that heart is the seat of

consciousness which is primarily a function of the brain (Charak Su. 30/7). *Hridaya* is the place of origin of two equally important *Srotasas* i.e. *Pranavaha srotas* and *Rasavaha srotas*. *Rasavaha srotas* is responsible for converting the *Aahar Rasa* to *Rasa Dhatu* and providing nourishment to all other body constituents and *Pranavaha srotas* is responsible for uninterrupted supply of the *Ambarapeeyush* (oxygen) through breathing. *Rasa Dhatu* is the first tissue emerging out of the nutritive fluid *Aahar Rasa*. *Rakta* circulates with *Rasa* all over the body and is responsible for *Jeevan Karma*, sustaining the life processes by supplying *Pran* to all body constituents. *Rasa-rakta* complex is essential for the continuation of life. The human body is nourished by *Shuddha rakta* circulated by *Hridaya* with the help of *Vyanavayu* (Arif et al., 2018).

In *Ayurvedic* text word "*Hridya*" is generally used for the drug which is beneficial for the heart "*Hridya Hitam Hridayam*". (Charak Su. 4/10). Thus *Hridya* means Cardiac tonic, the drugs which are helpful in maintaining the cardiac health

are called as *Hridya*. Acharya Charak classified the drugs based on their pharmacological action in fifty Mahakashya (class). One of them is *Hridya*

mahakashya the group of ten drugs which are beneficial for heart.

Hridya Mahakashya

Amra, Amratak, Lakucha, Karmarda, Virkshamla, Amlavetas, Kuval, Badar, Dadim, Matulunga (Charak Su. 4/10).

Sanskrit Name	Latin Name	Rasa	Guna	Virya	Vipaka
Amra	<i>Mangifera indica</i> Linn.	Kashaya,Amla	Laghu, Ruksha	Shita	Katu
Amratak	<i>Spondias mangifera</i> Willd	Amla, Kashaya	Guru	Ushana	Madhura
Lakoocha	<i>Atrocarpus lakoocha</i> Roxb	Madhur,Kashaya ,Amla	Guru, Ruksha	Ushana	Amla
Karamarda	<i>Carrisa carandas</i> Linn.	Amla , Tikta	Guru, Ushna	Ushana	Amla
Vrikshamla	<i>Garcinia indica</i> Chois	Madhura, Amla	Laghu, Ruksha	Ushana	Amla
Amlavetas	<i>Garcinia pedunculata</i> Roxb.	Amla	Laghu, Ruksha, Tikshna	Ushana	Amla
Kuval	<i>Ziziphus jujuba</i> Lam.	Madhura, Amla	Guru	Shita	Madhura
Badar	<i>Ziziphus sativa</i> Gaertn	Madhura, Amla	Guru	Ushana	Madhura
Dadim	<i>Punica granatum</i> Linn.	Madhur, Kashay,Amla	Laghu, Snigdha	Anushna	Madhura
Matulung	<i>Citrus medica</i> Linn.	Madhura, Amla	Laghu,Snigdha	Ushana	Madhura, Amla

Hridya Mahakashya enlists fruits which contain *Amla rasa* and are rich in vitamin C. These drugs work by the virtue of their *Amla rasa*. It is generally stated that —*Amlam Hridyanam* (Charak Su.25/40). *Amla* rasa is also claimed to nourish the *Hridya*—*Hridyam Tarpayati* (Charak Su. 26/42/2).

Objective of the study

To review the literature of *Hridya Mahakashya* and *Hridya Karma*.

MATERIALS AND METHODS

Systematic review has been made from possible texts of Ayurveda and other authenticated texts to gather information regarding *Hridya Mahakashya* and *Hridya Karma*.

DISCUSSION

Literary review of the drugs of *Hridya Mahakashaya*:

Amra (Mangifera indica Linn):

Mangifera indica is commonly known as mango belongs to anacardiaceae family. Normally height of the tree is about 20 m. It is native to tropical Asia and has been cultivated in the Indian subcontinent for over 4000 years. The seed and bark are mainly used in the *Ayurvedic* text. Sour fruits are considered to be *Hridya* and ripen fruits are *brimhana* (nourishing) in nature. Its leaves are mentioned under '*Pancha Pallavas*' (Sastry, 2012). Its Major chemical constituents are Mangiferin, Mangiferolic acid, indicenol (Sharma *et al.*, 2017).

Mangiferin, being a polyphenolic antioxidant and a glucosyl xanthone, it is a strong antioxidant, anti lipid peroxidator, immunomodulator, cardiogenic, hypotensive, wound healer, and antidiabetic. The fruit pulp contains vitamin A and C, β -carotene and xanthophylls. Thus Fruits of mangoes are good source of antioxidants in human diet and are beneficial for heart (Hasan *et al.*, 2014).

Aamratak (Spondias mangifera (Linn. F. Kurz.)

Spondias mangifera is also known as wild mango or *Ambara*. It belongs to Anacardiaceae family. It is an evergreen as well as deciduous tree which is distributed throughout India, Sri Lanka and South-East Asian countries. The tree has a strong, stout trunk having a smooth ash-coloured bark; having 27 meters of height. The Flowers are bisexual and fruits are yellow in colour; with fleshy pulp which is finely flavoured and edible. The seeds bear ridges and have hard and fibrous surface. *S. pinnata* is the species which grows well in light abundant areas. The fruits when unripe are often used for making pickles. Almost all parts of the

plant like young leaves, flowers and fruits are edible.

In *Ayurveda*, it has been used as a potent medicine in case of haemorrhagic diseases. The unripe fruits were used as an aphrodisiac. The fruit juice is useful antiscorbutic. The fruit pulp cures rheumatism and is used in bilious dyspepsia. The fruit is a valuable source of vitamin C, vitamin A and Iodine. The fruit contains sucrose, glucose, and fructose. The fruit is found to contain beta-amyrin, oleanolic acid and amino acids- glycine, cystine, serine, alanine leucine; and polysaccharides (Bora *et al.*, 2014).

In a study conducted on fifteen edible fruits found in Nepal; it was found that *S. pinnata* showed a more potent free radical scavenging activity than Vitamin C. The extracts of *S. pinnata* showed a 16% radical scavenging activity at 5 μ g/mL whereas Vitamin C only showed 5% radical scavenging activity at 5 μ g/mL (Chalise *et al.*, 2010; Hazara *et al.*, 2008). The exocarp of the fruit of *S. pinnata* also produced significant thrombolytic activity (Bora *et al.*, 2014).

Lakucha (Artocarpus lakoocha)

It belongs to Moraceae family and commonly known as *barhala*. It is called Monkey Jack in English and in *Ayurveda* it is called *Lakuch*, *Kshudra Panas*, *Granthiphala* and *Pitanaasha*. It is a medium to large deciduous tree dropping its leaves for a short time at the beginning of the dry season. Fruit is a syncarp (the entire female inflorescence forms a fruit), irregularly rounded, green when young, turning yellow at the time of maturity, later brown. The size of fruits differ with the diameter of 5-10 cm and their weight varies between 200-350 g. The number of seeds per fruit varies between 10-30. In most places Ripe fruits are collected at the end of June to early August. It is found on the western coast of Konkan Kerala and Tamil Nadu.

The unripe fruit is *ushna virya (hot)*, *amla ras pradhan (sour)*, *madhur (sweet)*, causes *tridosha* impotency, loss of appetite. The riped fruit is sour and sweet, aphrodisiac, alleviate the *vata* and *pitta dosha*, and improves taste and appetite. The seeds are good purgative for children (Pandey, 2012,p.30-32). It has many pharmacological activities such as anti-inflammatory, antiviral, anticancer and anti-HIV (Gautam & Patel, 2014). The study has revealed the presence of Alkaloids, flavonoids, phenols, tannins, lignins, glycosides (Krishnamurthy & Sarla, 2013).

Karamarda (*Carissa carandas* Linn.)

It is a common herb of Apocynaceae family found throughout India mainly in the semi-arid regions. It is commonly used as a condiment or additive in Indian pickles and spices. Traditionally the plant has been used in the treatment of scabies, intermittent fever, anemia etc. In *Ayurveda* text it is described as *pita-samirjit* (allivate *vata* and *pitta dosha*) and it is used in the treatment of toxicity and liver disorders children (Pandey, 2012,p.81-82). Recently many other biological activities are reported such as analgesic, anti inflammatory, anti pyretic, cardiogenic and histamine releasing. Additionally it has shown wide range of evidences for its, hepato-protective, free radical scavenging, anti-rheumatic, antibacterial, antiviral and anticonvulsant activity. The results of many studies suggest that *C. carandas* fruit extract was the most potent antioxidant as it exhibit exceptional reducing power, scavenging activity against nitric oxide, DPPH and peroxide radicals (Arif et.al. 2016).

Vrikshamla (*Garcinia indica*)

It is commonly known as kokum and it belongs to guttifereae family. It is a beautiful evergreen tree mainly found along the western coast of the Konkan, Goa, and Kerla. It is cultivated commercially. The tree blooms between November to February and the fruits ripe in April-

May. The berries are usually deep purple to pink in colour and occasionally whitish. These are of lemon size. The fleshy rind of the fruit is juicy and acidic. It contains the important chemical constituents viz, Garcinol, Hydroxycitric acid and Anthocyanin pigment. Anthocyanins are well known for their antioxidant, anti-inflammatory, and anti-carcinogenic activities (Shrikant *et al.*, 2014). In *Ayurveda*, it is used for treating piles, sprue, abdominal disorders, and cardiac disease, etc. According to *Acharya charak* it is beneficial for *vata-shleshmic* disorders (Sharma, 2003). Deore.et al. reported the antioxidant and hepato-protective effect of aqueous and ethanolic extract of *G. indica* fruit rind (Elumalai & Eswaraiha, 2011).

Amlavetas (*Garcinia pedunculata* Roxb.)

Garcinia pedunculata is a plant found in north-east region of India and belongs to Guttiferae family. It is considered to have versatile therapeutic properties. It is used by the people of this region as a medicinal plant for healing different gastrointestinal disease. *G. pedunculata* is a rich source of Flavonoids, Xanthones, Benzophenones and phenolic acids. It has been revealed that *G. pedunculata* have beneficial antioxidant properties (Sharma *et al.*, 2016).

It is mentioned under *Phala varga* by *Charaka*. According to him it is mild purgative, and alleviates *vata* and *kapha dosha*. It is indicated in colic, stone, indigestion (Sastry, 2012, p.657)

Kola *Ziziphus jujuba*

Kola consists of dried fruit pulp (devoid of seed) of *Zizyphus mauritiana* Lam. Syn. *Z. jujuba* Lam. (Fam. Rhamnaceae); is a small, evergreen sub-deciduous tree, wild and also extensively cultivated throughout the country and is found in Himalayan region upto about 1370 m. The plant *Ziziphus jujuba* is also known as *Desi Ber*. Fruits of kola contain vitamin C, sugar and minerals. It is sweet, sour and astringent in taste. It is a good

appetizer and digestive. It alleviates *Vata dosha*. (API, 2006, Part-1, Vol.3, p.94-95)

It is used in traditional medicines as laxative and blood purifier. Several research papers have shown various activities of fruit *Ziziphus jujube* such as antioxidant, antimicrobial, anti-inflammatory, and anticancer. Chemically, *Ziziphus jujube* contains Flavonoids, Saponins, tannins, Vitamin A, Vitamin B, sugars, mucilage, calcium, phosphate & iron. *Ziziphus jujube* fruits are very rich in vitamins C, B1 and B2. It is also known to have high vitamin P content, which enhances the action of vitamin C. Presence of Pectin-A in *Ziziphus jujube* fruit is also reported (Hasan *et al.*, 2014).

Badar (*Ziziphus sativa* Gaertn)

Ziziphus sativa known as *Unnab* in *Unani* medicine belongs to the family Rhamnaceae and is widely used in traditional system of medicine as fresh and dried riped fruit. It is a shrub or small deciduous tree, up to 12m in height, sometimes a large bush, found both cultivated and wild. *Unnab* or *Ber* is used as edible fruit and also used medicinally in *Ayurvedic* system. Medicinally, it is used as an expectorant, stomachic, digestive, laxative, blood purifier and anti pruritus. Its phytochemical constituents are Vitamin C, alkaloids, glycosides, flavonoids, terpenoids, phenolics and polysaccharides. Research studies showed its pharmacological activities like antioxidant, immunomodulatory, anti-inflammatory, antiulcer, antiallergic, antifungal, antidiarrhoeal, antidiabetic and wound healing etc. The fruit is cooling, digestible, tonic, aphrodisiac, laxative and removes biliousness, burning sensations, thirst, vomiting etc. and is also good in treating tuberculosis and blood diseases. The fruit is employed as an antidote to aconite poisoning (Talib *et al.*, 2017).

Dadim (*Punica granatum* Linn.)

It is commonly known as Pomegranate belonging to the family Lytheraceae. It is native from the Himalayas in northern India to Iran nowadays it has been cultivated all over India. The Pomegranate tree typically grows 12 to 16 feet high, and has many spiny branches. According to *Ayurveda* it is *Balya* (providing strength), *Medhya* (brain tonic), *Shukralam* (having aphrodisiac effect), and *Hridya* (cardiac tonic) and it is indicated in *Atisara* (diarrhea), *jwar*(fever), *Aamvat* (arthritis), *Kasa* (cough), *Raktipitta* (bleeding disorder) etc (API, Part-1, Vol.4).

The fruit contains many seeds separated by white, membranous pericarp and each surrounded by small amounts of tart, red juice. Fruits are believed to be a potential source of natural phenolics that has been associated with reducing the risk of cardiovascular diseases. Phytochemical analysis of *Punica granatum* indicated the presence of alkaloids, flavonoids, cardiac glycosides, phenolic compounds, tannins, lignins, etc. Pomegranate juice is rich in Vitamin C, flavonoids like Punicalgin, tannins, possesses anti-atherosclerotic action, and has an anti-aging effects and potent anti-oxidant properties. These compounds are responsible for antioxidant and free radical scavenging effect of plant material (Arif *et al.*, 2018).

Matulunga (*Citrus medica* Linn.)

It is commonly known as Citron and Bara nimbu, belongs to family Rutaceae. It is an evergreen shrub/small tree about 3.6 m high with short, thick and thorny branches cultivated throughout warm moist regions in India. It contains secondary metabolites including the ascorbic acid, flavonoids, phenolics and pectin etc. The fruits and seeds are cardiac tonic. Fruit extracts have

also shown good umbelliferone, while seeds contain limonin, limonol and antioxidant activity (Nagaraju *et al.*, 2012). In ancient medicine, it is very commonly used in the management of *Agnimandy* (Poor digestion), *Raktapitta* (Bleeding disorder), *Vibandha* (constipation), *Shawas* (Asthma), *Kasa* (cough), *Aruchi* (anorexia) (API, 2006, Part-1, Vol.3, p.).

Hridya karma (cardio tonic action)

We have observed that all plants mentioned in Hridya mahakashya are amla rasa pradhan (mainly sour in taste) as well as contain a large amount of vitamin C and Flavonoids.

Hridya action (cardio tonic action) of Amla rasa

According to Acharya Charak renowned physician of Ayurveda, *Amla rasa* nourishes the *heart* (Charak su. 26/42-2) *as well as* as it is the best among *Hridya*. (Charak su. 25/) This view is further sustained with the description of group of ten plants which are good for heart i.e. '*Hridya Mahakashaya*' Under this group, only the plants possessing sour taste fruits are quoted.

Drugs of Hridya Mahakashaya' breakdown the *Samprapti* (pathophysiology) of *Hridroga* by means of its virtues as described above. As *Amla rasa* is composed of *Agni* and *Prithvi Mahabhutas*, it is *Agneya* in origin (Ashtang Sangrah, Su.18/4) allied with *Snigdha* (unctuous), *Laghu* (light) *Gunas* (Ashtang Sangrah, Su.18/9) and *Ushna virya* (hot potency) (Ashtang Sangrah, Su.17/9) By virtue of above mentioned properties *Amla rasa* performs the function of *Agni deepan* (stimulating *Agni*) and *Anuloman* and thus *Amla rasa* makes the channels potent to carry on the nutrients to subsequent *Dhatus* as per the chronological order mentioned in *Ayurveda*. In this way it encourages the organic metabolism and improves structural & functional form of *tissues*. *Amla Rasa* and *Rakta dhutu* (blood) comes under the similar category

i.e., both have the domination of *Agni Mahabhuta*. So *Amla Rasa* aggravates blood and it is useful in *Rakta Kshaya* (anaemia). In Ayurveda, *Amla Preeti* (desire for sour taste) is described as a specific symptom of *Rakta Kshaya* (anemia).

In *Hridyaroga* the predisposing factors causes generation of *Aam*, contamination of *Rasa* and vitiation in *Doshas* creating obstruction in *Rasavaha srotasa* leading to provocation of *Vata*. This also results in diminished supply of *Pranvayu* and nutrition to *Hriday*. *Amla ras*, brings *Vata* in its normal state and proper channel due to its specific *Karma* (action) i.e. *Vatanulomana* as well as *Amla rasa* helps in the opening of channels by its *ushna veerya* (hot potency).

The clear channels facilitate *Dhatu Poshana* (Tissue nourishment) as well as production of *Ojas* (a factor which increase immunity). *Amla rasa* works as oxidative as it helps to bring the vitiated *Vayu* in its healthy states and pacifies *Ama* and thus *Drugs of Hridya Mahakashay* being *amla ras pradhan*, play a major role in maintaining healthy heart.

Modern Aspect of Hridya karma (cardio tonic action)

Most of the degenerative diseases are caused by free radicals. Antioxidants are the agents responsible for scavenging free radicals. Antioxidants are specific phytochemicals, vitamins and other nutrients that protect our cells from damage caused by free radicals. The evidence of vitamin C's beneficial effects on the heart proved an association between high blood levels of vitamin and a healthy cholesterol profile. Vitamin C is found to increase HDL and decrease LDL to considerable level (Sharma, 2003). Vitamin C has potent antioxidant property. It reduces free radicals by directly binding to oxidizing chemicals and converting them to less harmful molecules. Vitamin C is proved to be a potent antioxidant in addition it is also a good stress buster. Role of vitamin C in improving the

cardiac structure and functions is very clear from various studies (Akolkar *et al.*, 2017). Drugs of *Hridya Mahakashaya* are *Amla Rasa Pradhana* (dominating) and rich source of vitamin C. Therefore the drugs of *Hridya mahakashaya* act as *Hridya* (cardiotonic).

CONCLUSION

Today the mortality and morbidity rate due to cardiovascular diseases is a worldwide issue. *Ayurveda* offers satisfactory management strategies for CVD through preventive and curative approaches. Researches on organ targeting and low toxic effects drugs are the need of time. All drugs of *Hridya mahakashya* are the cheapest and easily available dietary fruits which contain rich Vitamin C and flavonoids and have potent anti-oxidant properties. By means of *Amla rasa* all these ten drugs perform the function of *Agneesandhukshana* and *Dhatwagnideepana* (improves digestion and metabolism). It brings the vitiated *Vayu* in its healthy state and pacifies *Ama* and thus helps in breakdown of the pathophysiology of *Hridyarog*. From this exhaustive literature review it is concluded that drugs mentioned in *Hridya Mahakashaya* are all *Amla rasa* predominant and rich in vitamin C and flavanoids and thus these are beneficial for heart.

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