A Review of herbal medicine on cardiovascular disease

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ABSTRACT Cardio vascular disease is a very dangerous disease it is related to heart. According to WHO guide for 17.9 million people die annually from Cardio vascular disease, an guesstimated 32% of the death in world, 85% were due to heart failure and embolic stroke. Heart related many disorder like hypotension, hypertension, arrhythmia, ischemia, heart failure, etc. It is more prevalence change the life style, hygiene, environmental problem. In these review article mention many herbal medication, these are the prevalence of CVD and many plant, family, chemical constituents, pharmacological action, mechanism of action discuss.

Keywords: Herbal medicine, Cardiovascular diseases, Stroke, Hypolipidemic, Haemostatic, Hypertension.

I. INTRODUCTIONS
Herbal medications have more prominent in cardio-vascular medicine. The effects of the most promising compound have undergone systematic evaluations, in some case becoming historic corner stone in the treatment of cardiovascular disease. The symptom both of these medicine have been decrease because of their small therapeutic range of their and harmful effect, despite by pivotal role instantly after their discovery. The aim of these review paper is to describe norm regulating the used of many herbal medications asses the concerns range by the used by such products and summarized the evidence available on the efficacy, potency and safety of herbal medicine generally used in cardiovascular medicine and many herbal medicine found in our RGSC BHU barkachhaMirzapur Campus like Arjuna, Aloe vera etc. We also discuss how best to approach consumer of herbal medication for the treatment of cardio-vascular disease.

TABLE 1 Medicinal Plant used in the treatment of Cardio-vascular Disease – A Review

<table>
<thead>
<tr>
<th>Plants Name</th>
<th>Family</th>
<th>Part Used</th>
<th>Chemical Constituents</th>
<th>Pharmacological Actions</th>
<th>Mechanism of Action</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Achilia Arabica</td>
<td>Asteraceae</td>
<td>Aerial Parts (Leave, Stalk, Stem)</td>
<td>Sesquiterpene, Lactone,</td>
<td>Hyperlipidemia, decrease in the level of serum cholesterol, triglycerides, and LDL. And also decreased hepatic total cholesterol and triglycerides.</td>
<td>Arjunolic acid bind to and stabilized the [1]</td>
<td></td>
</tr>
</tbody>
</table>

Arjunolic acid bind to and stabilized the [2]
<table>
<thead>
<tr>
<th><strong>Termalnia arjuna</strong></th>
<th>Combretaceae</th>
<th>Bark</th>
<th>Arjunolic Acid</th>
<th>Hypertrophy</th>
<th>ligand sre bind domain of peroxisome proliferator-activated receptor alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Artemisia campestris</strong></td>
<td>Asteraceae</td>
<td>Aerial Parts</td>
<td>3,5-dicaffeoylquinic (isochlorogenic A) Acid, vicenin-2</td>
<td>Anti-hypertensive</td>
<td>isochlorogenic A prevented hypertension on hypertensive human and decrease Systolic BP from 172mmHg to 144mmHg.at the dose of extract reduced SBD,MAP and DBP without affecting the heart beat. The extract contracted aorta. [3]</td>
</tr>
<tr>
<td><strong>Anthemis de serti</strong></td>
<td>Asteraceae</td>
<td>Whole Plants</td>
<td>1,3-di ethyl thiobarbituric acid</td>
<td>Antioxidants</td>
<td>inhibited antioxidant capacity 400microgram/ml. All the concentration of extract tested possessed radical scavenging activity [4-5]</td>
</tr>
<tr>
<td><strong>Agastachexicana</strong></td>
<td>Lemiaceae</td>
<td>Aerial Parts (Leaf Stem Root)</td>
<td>Ursolic acid</td>
<td>Hypertension</td>
<td>Stretchy vasoconstriction induced by KCl and non adrenalinebitartrate(NA) in endothelium-denuded aerobic rings, and also inhibited the concentration-response contraction of [6]</td>
</tr>
<tr>
<td>Plant Species</td>
<td>Genus and Family</td>
<td>Part</td>
<td>Chemicals</td>
<td>Activity</td>
<td>Reference(s)</td>
</tr>
<tr>
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<td>--------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>Astragalus membranaceus</td>
<td>Leguminaceae</td>
<td>Aerial Parts, Root</td>
<td>Astragaloside-IV</td>
<td>Congestive heart failure, improvement of myocardial contractions, regulation of neuro-endocrinal system, inhibition of left ventricular remodelling.</td>
<td>[7-11]</td>
</tr>
<tr>
<td>Allium sativum</td>
<td>Liliaceae</td>
<td>Bulb Oil</td>
<td>S-Allyl cysteine-sulfoxide</td>
<td>Hypertension Mediation of intracellular nitric oxide (NO) and hydrogen sulphide(H2S) production as well as blockage of angiotensin-II production, which in turn promotes vasodilation and thus reduce the BP.</td>
<td>[12-14]</td>
</tr>
<tr>
<td>Baccharis trimera</td>
<td>Asteraceae</td>
<td>Whole plants (Aerial Parts)</td>
<td>Rutin Quercetine</td>
<td>Vasorelaxation, The Rutin Quercetine was capable of reducing deoxyribose damage at all concentrations by its ability to chelate Fe by greater than 50% at the</td>
<td>[15-16]</td>
</tr>
<tr>
<td><strong>Bidens pilosa</strong></td>
<td>Asteraceae</td>
<td>Leaf</td>
<td>Methylene chloride</td>
<td>Ischemia arrhythmias.</td>
<td>chelate concentrations 100 microgram/ml.</td>
</tr>
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</tr>
<tr>
<td><strong>Crataeva nervala</strong></td>
<td>Capparidaceae</td>
<td>Bark</td>
<td>Nicotinamide Adenin Dinucleotide</td>
<td>Blood Purifiers Cancer</td>
<td>The enzyme PARP-I, which is inhibit by nicotinamide, is involved in cell weakness, old age and cancer. The excessive activation of PARP-I by Ultraviolet rays result in depletion of cellular NAD, which further cause glycolytic failure leading to cell death.</td>
</tr>
<tr>
<td><strong>Commiphora amukul</strong></td>
<td>Burseraceae</td>
<td>Stem(Resin)</td>
<td>Z-Guggulsterones Ethyle acetate</td>
<td>Hyperlipidemic</td>
<td>Z-Guggulsterones act on BAR antagonist is likely through their inability to</td>
</tr>
<tr>
<td>Triglycerides Dehydroguggulosteron</td>
<td>circuit co-activator protein, failure to release co-repressor protein from unliganded receptor, and ability to complete with BAR agonist to block co-activator requirement. Our data suggest these compound mediate at least some of their effect via the BAR.</td>
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</tbody>
</table>

| Cammeliasia nensis | Theaceae | Leaf seed | Catechine | Systolic Blood Pressure(SBP), Diastolic Blood Pressure(DBP) |

<p>| Cynanchum wilfordii | Asclepiadaceae | Aerial part (Leaves Stalk Stem) | 2,4-dihydroxyacetophene | Antihypertensive vasodialation | Inhibit VCAM-I and ET-I activity (aerotic endothelia) | [25-27] | [28] |</p>
<table>
<thead>
<tr>
<th><strong>Digitalis purpurea</strong></th>
<th>Plantaginaceae</th>
<th>Leaf</th>
<th>Digitoxin</th>
<th>Heart failure</th>
<th>Digitoxin act as a potent positive inotropic agent by directly inhibiting the membrane bound $\text{Na}^+\text{K}^+$ ATPase</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ecliptaprost rata</strong></td>
<td>Asteraceae</td>
<td>Stem</td>
<td>Polyacetylene</td>
<td>Hypolipidemic</td>
<td>Inhibition of Diacylglycerol acyltransferase (DGAT) biosynthesis enzyme of the final step of glycerol phosphate pathway.</td>
</tr>
<tr>
<td><strong>Erigeron Canadensis</strong></td>
<td>Asteracea</td>
<td>Flowering parts</td>
<td>Polysaccharide Polyphenolic</td>
<td>Antithrombotic</td>
<td>inhibit thrombin and factor Xaamidolytic activity in the presence of antithrombin. The plant preparation inhibit plasma clot formation in aPTT as the low concentration 390micromg/ml of standerised human blood plasma and in PT test at concentration of 1.56micromg/ml.</td>
</tr>
<tr>
<td><strong>Flaveriabide ntis</strong></td>
<td>Asteraceae</td>
<td>leaves</td>
<td>Quercetin 3-acetyl-7,3,4-trisulphate(ATS), Quercetin 3,7,3,4-tetrasulphate</td>
<td>Anticoagulants</td>
<td>QTS has higher activity than ATS in activating heparin Co-factor-II indicating that these flavonoid act as agonist of</td>
</tr>
</tbody>
</table>

[29]

[30]

[31]

[32]
<p>| <strong>Ginkgo biloba</strong> | Ginkgoaceae | Leaves | Ginkgolides | Atherosclerotic Antihypertensive | Work on several neurotransmitter pathway and brain structures. Bilobetin inhibit lipid peroxidation; inhibit the uptake of serotonin, dopamine and nor-epinephrine; and inhibit platelet aggregation. |
| <strong>Ganodermal lucidum</strong> | Ganodermataceae | Fruits Mycelia Spore | Triterpene | Antihypertensive | Left femoral vein and artery were intubation for the quantification for the artery pressure and subsequent delivery of drug and a branch of renal nerve was used to integrate renal afferent or efferent nerve activity. And the extract decrease BP accompanied by an inhibition of kidney efferent sympathetic activities. |
| <strong>Gynostemma pentaphyllum</strong> | Cucurbitaceae | Leaf | Gypenoside | Cardioprotective | Gypenoside could protect cardiomyocytes Against hepoxia-reoxygenation injury by decreasing the |</p>
<table>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Pinax ginseng</strong></td>
<td>Araliaceae</td>
<td>Root Berry leaves</td>
<td>By inhibition on Acetylcholinesterase. By acting as an agonist Peroxisome proliferator activated receptor. [51-53]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Saponnin Rb1, Rg1, Rg3, Re, Rd</td>
<td>Anti-hypertensive Anti-hyperlipidemic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Anti-</td>
<td>Reduction of Plasma total cholesterol was associated with decrease in the LDL fraction. It suppress the elevated Blood concentration of triglyceride. [54-55]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>hypoxicacid</td>
<td>Anti-coagulants</td>
</tr>
<tr>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>Thymus saturejoides</strong></td>
<td>Combretaceae</td>
<td>Whole plant</td>
<td>Proanthocyanidins can inhibit the binding of oxydised LDL to the lectin-like oxidized LDL receptor-I. [56-57]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rosmarinic acid</td>
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<td></td>
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<tr>
<td><strong>Vitisvenifer a</strong></td>
<td>vitaceae</td>
<td>Seed</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>proanthocyanidine</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Atherosclerosis</td>
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</tr>
</tbody>
</table>

**Chemical Structure of chemical constituents present in medicinal plant**

![Chemical Structure Diagram](image-url)
Lactones

Sesquiterpenes

Arjunolic Acid

3,5 – Dicaffeoylquinic Acid

1,3 – Diethyl-2-thiobarbituric Acid

Ursolic Acid

Astragaloside IV
Nicotinamide adenine dinucleotide, Guggulsterone, Catechin, 2,4-dihydroxyacetophene, Digitoxin
Polyacetylene

Polyphenolic

Quercetin 3-acetyl-7,3,4-trisulfateBilobetin

Triterpene Gypenoside
Short Information of all mentions medicinal plant use in Cardio-Vascular Disorder

Terminalia arjuna[58-61]

Terminalia arjuna is a deciduous and evergreen tree, height is 20-30m above the ground level. Arjuna medicinal plant are found in abundance. Throughout indo-sub-Himalayas region and the tract of Uttar Pradesh, Bihar, South, Madhya Pradesh and Deccan region near pond and River. And it is also found in Forest of Sri lanka. The bark, fruit, and leave have been used indigenous system of medicine. The bark is said to be sweet, acrid, heating and cooling, expectorant, tonic, purgative, laxative. The used of bark powder as an astringent and diuretic, cardio protective, find mention in the literature.

Artemisia campestris[62-63]

It was found in Asia and north America. This plant is a biennial /short-lived perennial during the one year a rosette of basal leave is produced the leaves are pinnatifid / bipinnatifid with narrow linear lobes. The central stem and ascending lateral stem are light green to dark red in color.

Anthemisdeserti[64]

This plant including approximately 210 species. It is found in all over india like Europe, south west asia, north east Africa is medically important genus as evident from the several pharmacological studies.

AgastacheMexicana[65-66]

Agastache Mexicana plant are distributed in the all over the worldwide are found in the
country like Mexico, Tlaxcala as well as in the Mexico city. It is a perennial herb. Plant both subspecies have a toplcally large morphology: opposite, petiolas leaf, a four angle stem, and numerous trichomes. The plant height reach between 50-150cm, the stem of Mexicana sp. Erect, branched and four angled. The leaves are ovate and lanceolate, measuring 4.6 -6.2cm long and 1.7-3cm wide. And petiole is 1cm long.

**Astragalus membranaceus**[67]

Astragalus medicinal plant is one of the largest genus of flowering plant in the leguminous family. It is an annual and perennial herb, shrubs and shrub. This plant are widely distributed throughout the temperate region and arid regions. The genus of the plant are found 2000-3000 species or more than 250 taxonomical section in the world.

**Allium sativum**[68]

Garlic is a perennial bulbs, thought to be indigenous to central Asia, Siberia and west of the Himalayas and has been grow in England. Allium sativum are cultivated all over the worldwide. Allium sp. is a common food of spices, flavour and this herb used in the modern folkloric medicine. And it is closely related to the onions. It has a tall, erect and flowering stem that reached at 23 feet in height. Flower color is pink to purple flower that bloom is mild to the late summer.

**Bachharistrimer**[69]

Bachharistrimeras plant widely distributed in south America and traditional use in the populations. It is a shrub in nature, present cylindrical and branches, up to 1m in length papillose or with rare sessile leaves and reduced in the node. Glabrous to naked in the eyes membranous 0.5cm-1.5cm wide. When flowering branches are present, they are most be only pistillate or only stamine. The inflorescence, when present, they are chapter type, yellowish white, numerous, sessile, arrange along the upper branches.

**Bidens pilosa**[70]

Bidens pilosa L. is a herbaceous plant widely distributed in worldwide like America, Africa, China, Japan. It is originated native to south America, it is also found in tropical and subtropical region. It is a annual herb or 60-90cm height, stem are quadrangular, groove, branches, opposite. leaves pinnate compound usually 2.5-13.5cm long including petiole, leaflet 3-5cm, head 21-42 in compound cymes terminating main stem and lateral branches and 0.7-1cm in diameter including ray florets, peduncles 1-9cm long.

**Craetevanurvala**[71]

This herbal medicine are distributed in all over india and Burma, wild or cultivated. Often found along stream, and also found in sub himalayas regions. Leaves are deciduous, 3 foliata, petiole 3.8-7.6cm long. Leaflet 5-15 by 3.8-6.3cm. ovate, entire lanceolate or acute, obovate, acute or acuminate alternate at the base, entire gloverous at the both surface, lateral leaflet at the base. Flower are greenish white in color. Pedicel 2.4-4.4 cm. long stout, glabrous, sepal petaloid, small distant, ovate, acute.stamen is longer than petals spreading gynophores nearly 5cm. long terete, smooth. Ovary ellipsoid. Fruit are ovoid woody, smooth, or scurfy, berry, on the thickened gynophores. Seed imbedded in pulp, nearly smooth brown.

**Commiphoramukul**[72-73]

It is found in all over India like Rajasthan, Andhra Pradesh, Madhya Pradesh, karnatak and assam. Commiphoramukul is a tree grows up to 4m tall, densely branched having simple and trifoliate leaves with serrate margins. The plant has seprate male and female flowers so, that it reproduced sexually. The flower colour vary from pink to red, stamen is alternative long and short with ovoid ovary, fruit are small rounded red in colour at the ripening time. Gummy resin obtained from the stamen of the commiphoramukul tree.

**Cammeliasinensi**[74]

It is home-grown from mainland China, south and southeast Asia, according to Indian scenario it is roughy production of green tea in India, in the year 2013 11 million kg. westbangal production rate is 8 millions kg. assam 2 millionkg. And remaining 1 million kgs produced by southindia. Green tea are grow variety of way, depending on the type of green tea. Result of maximum amount of polyphenol and volatile organic compound are retailed with affecting aroma and taste. Green tea can be grow in row and harvesting in annually three times. First gathering take place april to may. Second harvesting take place june-july. And third harvesting take planted july to august.

**Cynanchum wilfordii**[75]

The root of Cynanchum wilfordii appear tuberous and cylindrical with a brownish yellow
surface. Appearing 10cm long and 2cm diameter. Its stem is long slender with soft hair to cover and leaves are oval in shape and 5-6 cm long and 2-4 cm wide. Flowering period of the plant 6-9 month and fruit period is 7-11 months. In one plant have 15-20 flower with soft hair outside of the calyx, and corolla is yellowish in colour, and oblong in shape. The shape of the seed is egg shape with a dark brown surface. Flowering period 5-9 month and fruiting period is 7-10 month.

**Digitalis purpurea**[76]

*D.pupurea* is located in all over world i.e Europe, Africa, new Zealand, Canada. Leaf Microscopic view of *D. purpurea* is show a epidermal cell with stomata, non glandular trichomes with bicellular and unicellular head, upper epidermis with numerous segmented trichomes, fragment of articulated hair with rounded end and twisted glandular trichomes. The T.S of leaf composed of upper epidermis.

**Ecliptaprostrata**[77-78]

Ecliptaprostrata is found in all over world like tropical and subtropical country like Asia, America, Africa. It is a herbaceous plant with white flower head, leave are 4-10cm long 0.8-2cm wide and upto 90cm tall, stiff hair and reddish stem and root at the lower end. Flowering period is most probably found in throughout the year. And fruiting period is septmber to October.

**Erigeron Canadensis**[79]

The plant distributed in Northern America, and southern America, Africa, Asia, Europe. It is a herb and found in winter and summer season. E Canadensis is erect one to several stem reached at 30-150cm in height. Stem are typically unbranched at the base unless damage has occurred to the growing point. And leaves are linear to oblanceolate, 2-8cm long and 2-8mm wide. Leaf is ciliate and serrate. The inflorescence is loose penicile. The numerous flower head on very small 2-4mm long 2-8mm in wide.

**Ginkgo biloba**[80-81]

The medicinal plant are distributed in all over world like china, japan, Korea, Australia, France, Germany, Italy, Japan. The plant of *G. biloba* is saprophytic in nature, height of the plant is upto 30m. the branches are dихomorphic in nature. Colour of the leave is pale yellow or dark green. The leave have hypostomatic, they are fan shape leathery and smooth. Height of the tree 30-40m in height and spread of 8m. and diameter is 3-4 m. fruit are female ginkgo tree bear oval to round fleshy fruit, fruit is normaly green in colour and after the mature pale yellow in colour. In flower abundant in ovule on pair on stalk. Each containing on egg cell, and colour of the flower is greenish yellow.

**Ganodermalucidum**[82]

*G. lucidum* seen throughout the world in temperate and sub-tropical region including north and south America, Europe, and Asia. It grow decaying hardwood trees. The fruiting body almost always has a stipe present, which is toen yellow colour and 1.5 times of diameter of the caps. The hymenium display 4-5 pores per millimetre. Chlamydospore are absent, basidiospore are 8-12micrometre long and 4-8 micrometre wide.

**Vitisvinifera**[83]

*V. vinifera* are distributed in China, India, Iron, Turkey, Brazil, Central and Southern Europe, Western Asia. It is a fast growing, that can reached up to 12-15m in height. Leaves are alternating, palmately lobed, deciduous with 3-5 pointed lobed, coarsely pricklytoothed leaf margins and heart shape foot and 5-20cm long and broad with a flaky bark. They have glossy dark green top and a light green bottom And normally hairless. Tendril bind the vine to support.

**Gynostemmapentaphyllum**[84]

*G.pentaphyllum* is distributed in tropical and sub tropical of Asia(China, India, Nepal, Bangladesh, Sri-Lanka, Japan, Malaysia) and naturally distributed in mountain forest. *G.pentaphyllum* consist of long slender stem, leaves are arranged like fingers on the hand, bear 3-8 leave. Male and female flower on separate plant. And male flower are upto 10-15cm and petal is pale yellow in colour. Female flower are similar to male but smaller than male. The 2-3 cavity ovary is globe- shaped. The three style and stigma are short and cleft into two part. The leaflet are long and pliable, they are aough to touch on both side are colour. Fruit consist of a smooth, globular , small berry type black when ripe. Fruiting period are April to December and flowering Period are March to November.

**Pinaxginseng**[85]

*P. ginseng* are found in Himalayas region of Russian far East, Northern China, and the Korean Peninsula. It is a perennial herbs with study
taproots. The plant generally die back in the fall and reemerge from the root system in the spring seasons. And the leaves are palmately compound with 3-5 leaflets, the margins of which may be entire, toothed, or lobed, depending on the species. Inflorescence is a solitary umbel with both bisexual and male flowers. The fruit is a drupe.

II. CONCLUSIONS

The herbal medicine can be beneficial for heart disease. Rigorous training of patients to take precaution a drug interaction in to accounts and to avoid the arbitrary used of medicinal plant is very important. Along with the increased used of herbal medications, usefulfull information about the interaction of these supplements and medications given to the patients to prevents complacations resulting from their intractions that are sometime very critical. There are many plant have therapeutic effects, may prevent CVD, and effect BP, heart failure through anti-oxidant, anti-clotting, hypotensive, anti-atherosclerosis, heart rate regulating, vaso-dialating properties. The plant may also have a positive impact have a performance of the heart and blood vessels, including the developement of arrhythmia, BP similar effect on the sympathetic nervous current that cause interference activity of heart.

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