

A Review of herbal medicine on cardiovascular disease

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ABSTRACT Cardiovascular disease is a very dangerous disease it is related to heart. According to WHO guide for 17.9 million people die annually from Cardiovascular disease, an estimated 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 medicines 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 .

TABLE1 .Medicinal Plant used in the treatment of Cardio-vascular Disease – A Review

Plants Name	Family	Part Used	Chemical Constituents	Pharmacological Actions	Mechanism of Action	Reference
Achilia Arabica	Asteraceae	Aerial Parts (Leave, Stalk, Stem)	Sesquiterpene , Lactone,	Hyperlipidemia,	decrease in the level of serum cholesterol, triglycerides, and LDL. And also decreased hepatic total cholesterol and triglycerides.	[1]
					Arjunolic acid bind to and stabilized the	[2]

Termanalia arjuna	Combretaceae	Bark	Arjunolic Acid	Hypertrophy	ligand sre bind domain of peroxisome proliferator-activated receptor alpha	
Artemisia campestris	Asteraceae	Aerial Parts	3,5-dicaffeoylquinic (isochlorogenic A) Acid, vicenin-2	Anti-hypertensive	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]
Anthemisdeserti	Asteraceae	Whole Plants	1,3-di ethyl thiobarbituric acid	Anti-oxidants	inhibited antioxidant capacity 400micro gram/ml. All the concentration of extract tested possessed radical scavenging activity	[4-5]
Agastachemexicana	Lemiaceae	Aerial Parts (Leaf Stem Root)	Ursolic acid	Hypertension	Stretchy vasoconstriction induced by KCl and non adrenalinebitartrate(NA) in endothelium-denuded aortic rings, and also inhibited the concentration-response contraction of	[6]

					NA in a non parallel manner and depressed its maximum response. The chemical passed Ca^{2+} entry blocking activity.	
Astragalus membranaceus	Leguminosae	Aerial Parts Root	Astragaloside-IV	Congestive heart failure	Astragaloside-IV are involved in the improvement of myocardial contractions, regulation of neuro-endocrinal system, inhibition of left ventricular remodelling.	[7-11]
Allium sativum	Liliaceae	Bulb Oil	S-Allyl cysteine-sulfoxide diallyl thiosulfinate dial	Hypertension	Mediation of intracellular nitric oxide (NO) and hydrogen sulphide (H ₂ S) production as well as blockage of angiotensin-II production, which in turn promotes vasodilation and thus reduce the BP.	[12-14]
Baccharistri mera	Asteraceae	Whole plants (Aerial Parts)	Rutin Quercetine	Vasorelaxant	The Rutin Quercetine was capable of reducing deoxyribose damage at all concentrations by its ability to chelate Fe by greater than 50% at the	[15-16]

					chelate concentrations 100microgram/ml.	
Bidenspilosa	Asteraceae	Leaf	Methylene chloride	Ischemia arrhythmias.	Methylene chloride act primarily as a CNS depressant, as do other halogenated hydrocarbons. It metabolise chloride ions and CO, respectively cause acidity and reduce the oxygen carrying capacity in the blood.	[17-19]
Crataevanurvala	Capparidaeae	Bark	Nicotinamide Adenin Dinucleotide	Blood Purifiers Cancer	The enzyme PARP-I, which is inhibit by nicotinamide, is involved in cell weakness, oldage 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.	[20-21]
Commiphoramukul	Burseraceae	Stem(Resin)	Z-Guggulsterones Ethyle acetate	Hyperlipidemic	Z-Guggulsterones act on BAR antagonist is likely through their inability to	[22-24]

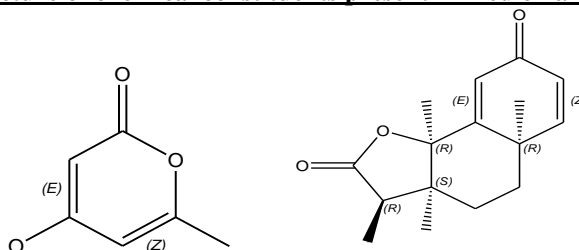
			Triglycerides Dehydroguggulosteron		circuit co-activator protein ,failure to release co-repressor protein from unliganded receptor, and ability to complete with BAR agonist to block co-activator requirement. Our data suggest these compound mediate at least some of their effect via the BAR.	
Cammeliastenis	Theaceae	Leaf seed	Catechine	Systolic Blood Pressure(SBP), Diastolic Blood Pressure(DBP)	Catechins interfere with vascular growth factor and thus inhibit vascular smooth muscles cell proliferation and also inhibit thrombogenesis by suppressing platelet adhesion. Additionally, catechins could protect vascular endothelial cell enhance vascular integrity and regulate blood pressur	[25-27]
Cynanchum wilfordii	Asclepiadaceae	Aerial part (Leaves Stalk Stem)	2,4-dihydroxyacetophene	Antihypertensive vasodilation	Inhibit VCAM-I and ET-I activity (aerotic endothelia)	[28]

Digitalis purpurea	Plantaginaceae	Leaf	Digitoxin	Heart failure	Digitoxin act as a potent positive inotropic agent by directly inhibiting the membrane bound Na^+K^+ ATPase	[29]
Eclipta prostrata	Asteraceae	Stem	Polyacetylene	Hypolipidemic	Inhibition of Diacylglycerol acyltransferase (DGAT) biosynthesis enzyme of the final step of glycerol phosphate pathway.	[30]
Erigeron Canadensis	Asteraceae	Flowering parts	Polysaccharide Polyphenolic	Antithrombotic	inhibit thrombin and factor Xaamidolytic activity in the presence of antithrombin. The plant preparation inhibit plasma clot formation in aPTT as the low concentration 390microgm/ml of standerised human blood plasma and in PT test at concentration of 1.56microgm/ml .	[31]
Flaveriabidentis	Asteraceae	leaves	Quercetin 3-acetyl-7,3,4-trisulphate(ATS), Quercetin-3,7,3,4-tetrasulphate(Anticoagulants	QTS has higher activity than ATS in activating heparin Co-factor-II indicating that these flavonoid act as agonist of	[32]

			QTS), flavonoid		this inhibitor and also increase in PT with a concentration of 1mM of QTS.	
Ginkgo biloba	Ginkgoaceae	Leaves Seed	Ginkgolides Bilobetin	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.	[33-37]
Ganoderma lucidum	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.	[38-41]
Gynostemma pentaphyllum	Cucurbitaceae	Leaf Seed	Gypenoside	Cardioprotective	Gypenoside could protect cardiomyocytes Against hypoxia-reoxygenation injury by decreasing the	[42-50]

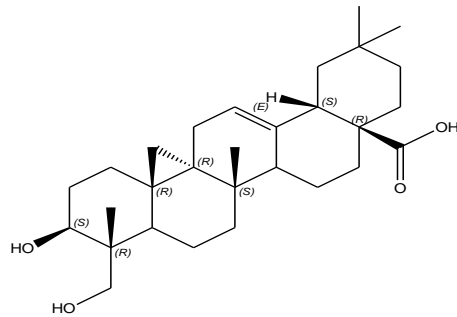
m					production of TNF-a and down regulating the protein of FAS gene related to inhibition of myocytes apoptosis.	
Pinax ginseng	Araliaceae	Root Berry leaves	Saponnin Rb1, Rg1,Rg3, Re, Rd	Anti-hypertensive Anti-hyperlipidemic	By inhibition on Acetylcholinest erase. By acting as an agonist Peroxisome proliferator activated receptor.	[51-53]
Thymus saturejoides	Combretaceae	Whole plant	Rosmarinic acid	Anti-coagulants	Reduction of Plasma total cholesterol was associated with decrease in the LDL fraction. It suppress the elevated Blood concentration of triglyceride.	[54-55]
Vitisvenifera	vitaceae	Seed	proanthocyanidine	Atherosclerosis	Proanthocyanidins can inhibit the binding of oxydised LDL to the lectin-like oxidized LDL receptor-I.	[56-57]

Chemical Structure of chemical constituents present in medicinal plant

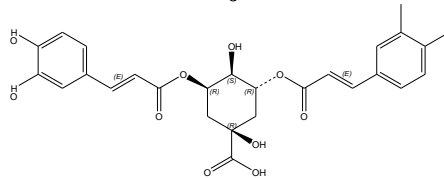


Lactones

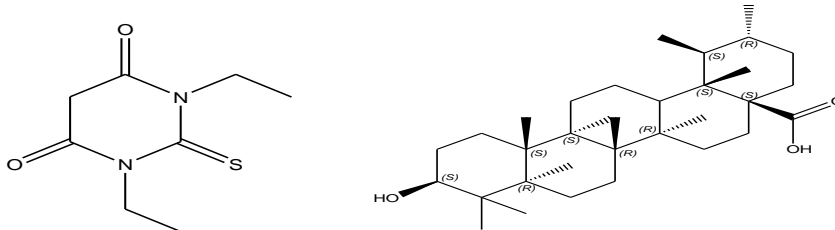
Sesquiterpenes



Arjunolic Acid

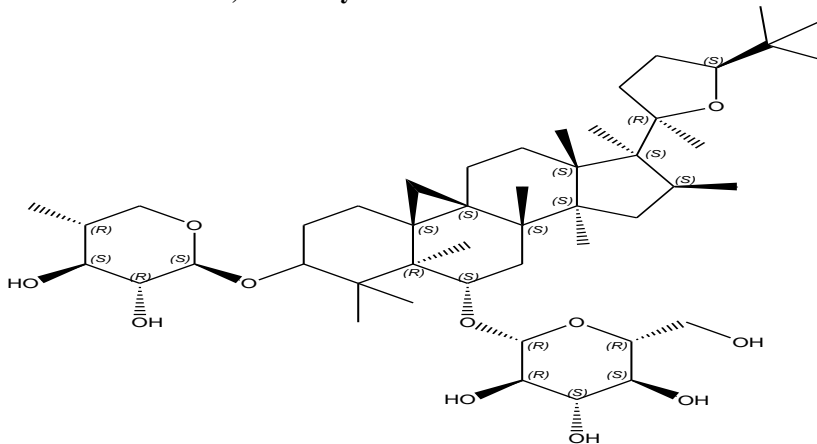


3,5 – Dicafeoylquinic Acid

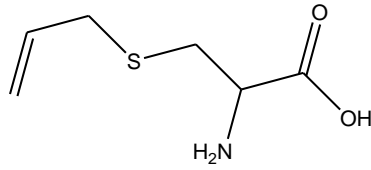


1,3 – Diethyl-2-thiobarbituric Acid

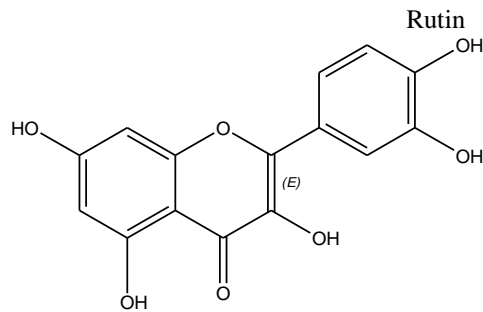
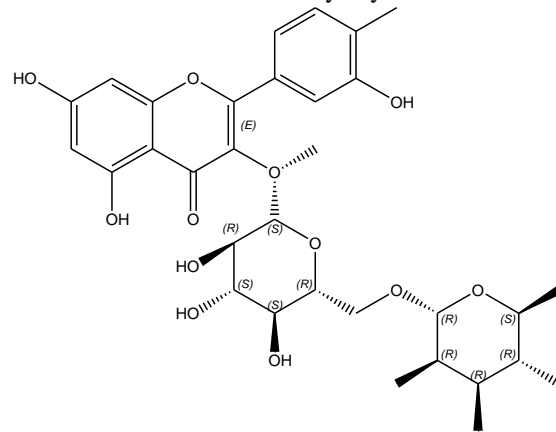
Ursolic Acid



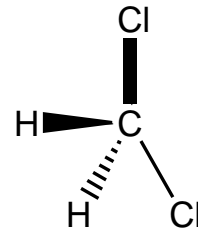
Astragaloside IV



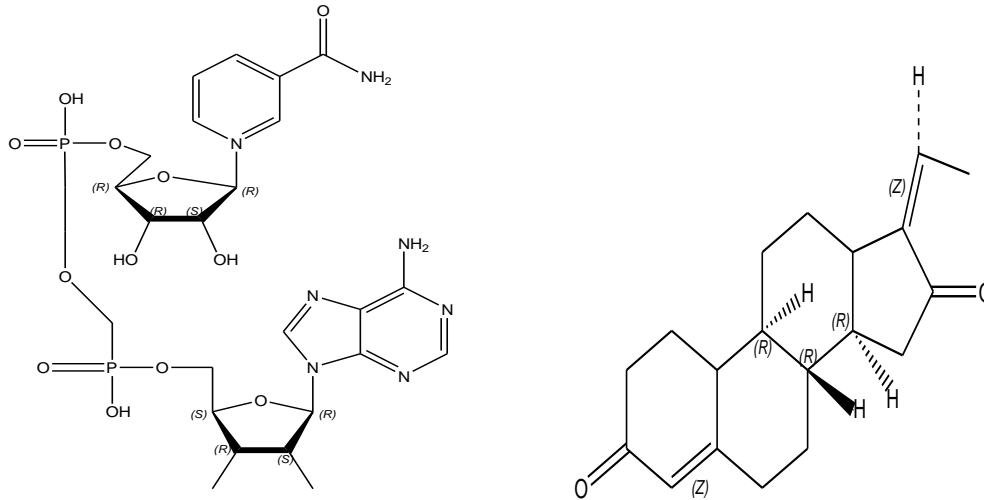
S-Allyl Cysteine



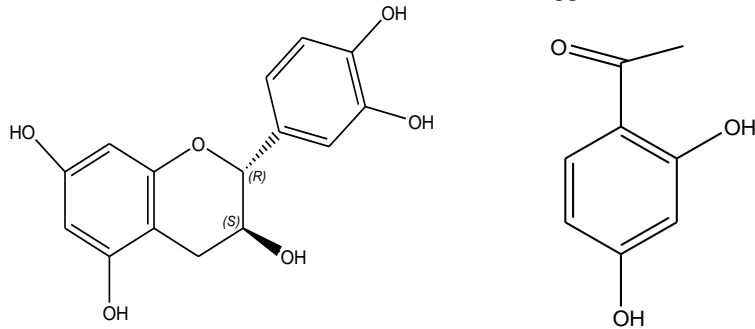
Quercetine



Methylene Chloride

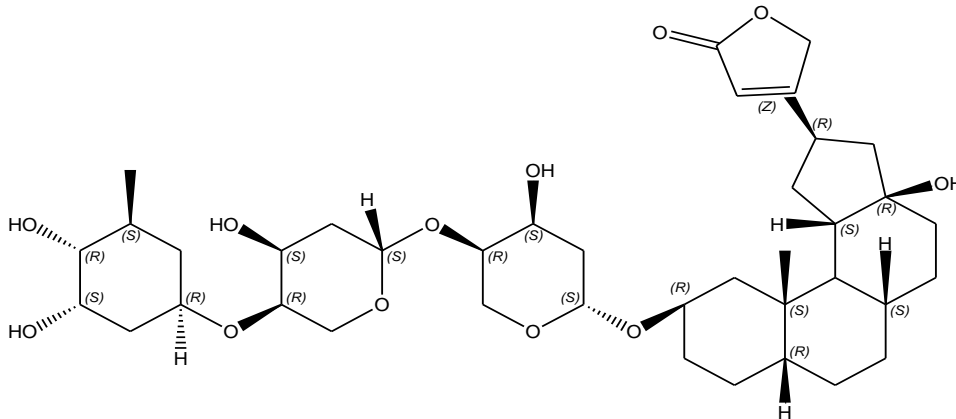


Nicotinamide adenine dinucleotide Guggulsterone

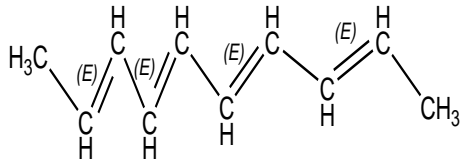


Catechin

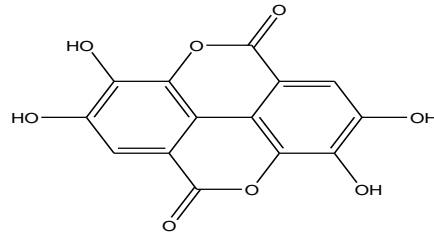
2,4-dihydroxyacetophenone



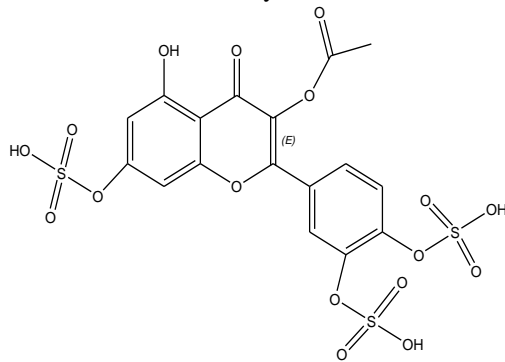
Digitoxin



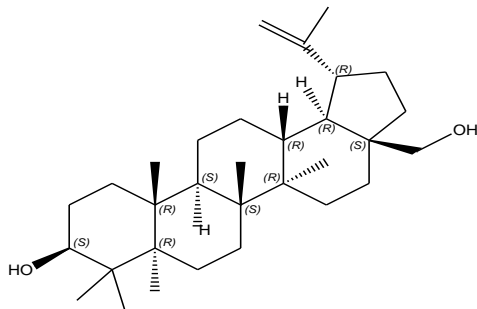
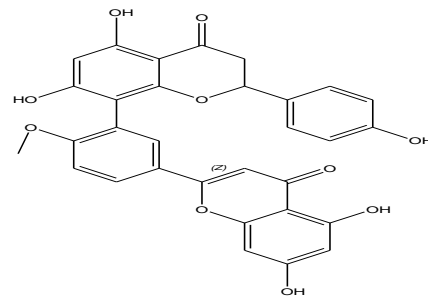
Polyacetylene



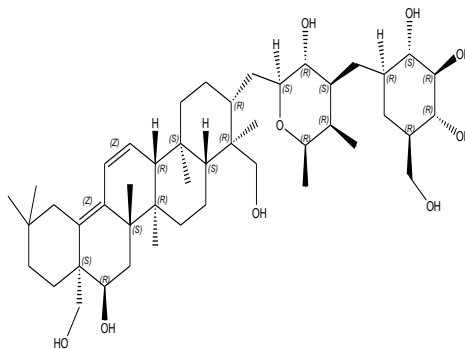
Polyphenolic

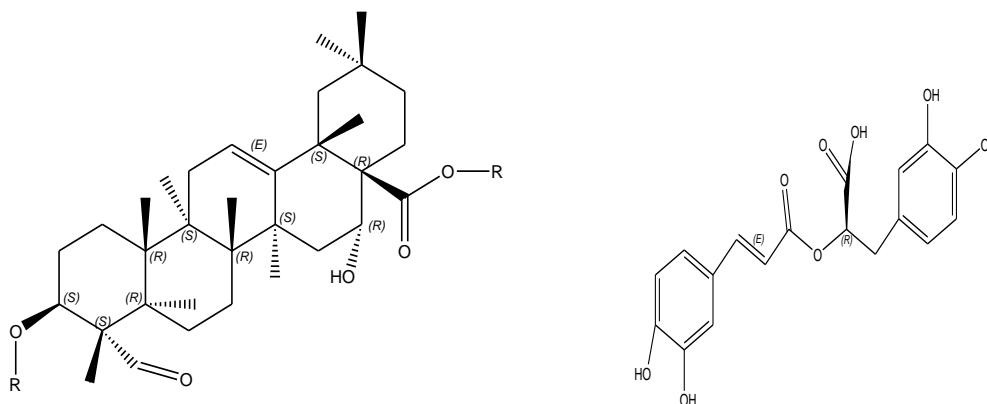


Quercetin 3-acetyl-7,3,4-trisulfate

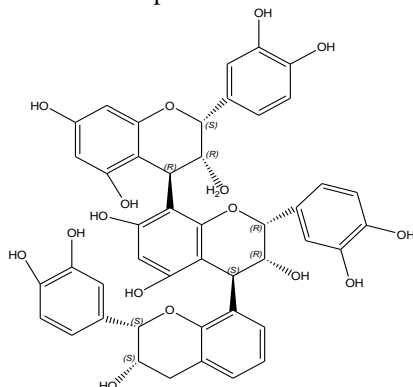


Triterpene Gypenoside





SaponinsRosmarinic acid



Proanthocyanidins

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 topicalamiaceae morphology: opposite, petioles 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 a annual and perennial herb, subshrubs 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.

Bachharistrimera^[69]

Bachharistrimera 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 pistillated or only staminate. 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.

Crataevanurvala^[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 foliate, 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 glabrous 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, Karnataka and Assam. Commiphoramukul is a tree grows up to 4m tall, densely branched having simple and trifoliate leaves with serrate margins. The plant has separate 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.

Cammeliasinensis^[74]

It is home-grown from mainland China, south and southeast Asia, according to Indian scenario it is roughly production of green tea in India, in the year 2013 11million kg. West Bengal production rate is 8 millions kg. Assam 2 million kgs. And remaining 1million kgs produced by South India. 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 retained 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 place 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 are 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. purpurea 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.

Eclipta prostrata^[77-78]

Eclipta prostrata 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 september 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 penicel. 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, India. The plant of *G. biloba* is saprophytic in nature, height of the plant is upto 30m. the branches are diamorphic 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 normally 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.

Ganoderma lucidum^[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 towny to russet 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.

Vitis venifera^[83]

V. venifera 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.

Gynostemma pentaphyllum^[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.

Pinax ginseng^[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 dia 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

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 importants^[86]. Along with the increased used of herbal medications, usefull information about the interaction of these supplements and medications given to the patients to prevents complecations 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^[87-88]. The plant may also have a positive impact have a performance of the heart and blood vessels, including the devloperment of arrhythmia, BP similar effect on the sympahthetic nervous current that cause interference activity of heart.

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