

## **Anti Hypertensive Effect of Ayurvedic Medicinal Plants**

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## Abstract

The prevalence of hypertension and its related conditions are gradually rising in the developing countries for several decades. At present hypertension has been globally acknowledged as most prevalent cardiovascular diseases with potent complications. As an upshot the need to control hypertension becomes very crucial. The use of conventional antihypertensive drugs has been associated with various side effects. Hence in the last three decades, a lot of concerted efforts have been channelled into researching of medicinal plants with anti hypertensive therapeutic values. Although the term 'Hypertension' (persistent raised arterial pressure) is not pragmatic in Ayurvedic classics but review of previous theoretical and clinical works on this topic, point out certain mode of involvement of *dosha* and *dushya* in the genesis of this malady. The knowledge regarding drugs is a most important factor in victorious practice. Then it becomes easy to select the suitable drug for a particular patient in particular condition. So to review the existing data is important. In present study Ayurvedic medicinal plants with reported antihypertensive property, are reviewed with their *Rasapanchaka* (Ayurvedic pharmacological properties). This effort will make available information for Ayurvedic scholars to opt antihypertensive drugs based on *Rasapanchaka* (Ayurvedic pharmacological properties).

## Keywords

Antihypertensive, Ayurveda, Plants, *Rasapanchaka*

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## INTRODUCTION

Hypertension is a chronic medical condition in which the blood pressure in the arteries is elevated 140/90 mm Hg or above<sup>[1]</sup>. About 90–95% of cases of hypertension are regarded as "primary hypertension" which means high blood pressure with no apparent underlying medical cause. Remaining 5–10% of cases (secondary hypertension) are caused by other circumstances that affect the kidneys,

arteries, heart or endocrine system<sup>[2]</sup>. Recent reports indicate that nearly 1 billion adults (more than a quarter of the world's population) had hypertension in 2000 and this is predicted to be increased about 1.56 billion by 2025<sup>[3]</sup>. As regards 84% of hypertensive patients can't comprehend even this silent killer is present in their body<sup>[4,5]</sup>. Hence the need to control hypertension becomes very important at present. From a modern medical standpoint,

the use of anti-hypertensive drugs dominates the management of these conditions and little attention is often given to nutrition and lifestyle approaches. Conversely, many patients discontinue their drug regimen due to lot of side effects, like as fatigue, male impotency, elevated cholesterol levels, light-headedness, dizziness and skin eruptions<sup>[6]</sup>. Hence the World Health Organization has promoted lifestyle modification as an effective method of reducing high blood pressure and overall cardiovascular risk<sup>[7]</sup>. So here comes the scope of holistic approach of Ayurveda. Ayurveda is the antique medical system of India. It offers one of the safest trails to vigour. Though in Ayurvedic transcript, the versatile literature regarding hypertension is not pragmatic but review of previous theoretical and clinical works on this issue, point out certain mode of association of *dosha* and *dushya* in the genesis of this disease. Even though so many researches and studies on hypertension, both in Modern and Ayurvedic pasture are available till now it is one of the most offensive, challenging disease for patients as well as physicians. Hence it is become imperative to find out a safe and effective medicament in Ayurveda to maintain the blood pressure within normal ranges. Numbers of medicinal plants are reported as anti hypertensive agent; here

some common antihypertensive medicinal plants with their Ayurvedic pharmacological properties and mode of action are scientifically analysed. Several drugs are already proved experimentally in this facet, but many more are yet to be revealed. It is a confront before the Ayurvedic society to do supplementary widespread researches on this aspect.

**METHODOLOGY** Only textual resources have been used for this study, from which various references have been collected. Related modern texts and websites have also been searched for collection of data regarding the related knowledge. Some commonly used medicinal plants (reported as antihypertensive drug) are enlisted in this study. The Ayurvedic Pharmacological properties (*Rasapanchaka*) of each plant are tabulated (Table 1) and analysed for the corresponding action which may give light to the selection or identification of more drugs from the valuable treasure of indigenous system.

**DISCUSSION** The majority of the drugs performing antihypertensive action are predominant in *tikta rasa* (bitter taste); *katu vipaka* (pungent metabolism); *laghu ruksha guna* (light and rough property) and *ushna*

*veerya* (tepid active potency). Such kinds of properties of the drugs are responsible for *srota shodhana* (purification of channel) & *srotovivarana* (dilatation of channel) action which in turn reduce hypertension. *Kaphaharathwa* and associated *dosha samakatwa* properties are having a vital role in controlling the blood pressure<sup>[42]</sup>. Table1 shows almost all drugs are having predominantly *Kaphaharatwa* property and associated with other *dosa samakatwa* assets. In addition these drugs embraced negative inotropic and chronotropic effect on experimental heart<sup>[43]</sup>; they are responsible for reducing blood cholesterol level (eg-*Vacha*<sup>[9]</sup>, *Lasuna*<sup>[10]</sup>, *Sadapuspī*<sup>[17]</sup>, *Shigru*<sup>[31]</sup> etc). These drugs are also conscientious for increase tone of hypo dynamic heart and force of contraction of the papillary muscle<sup>[44]</sup>, along with depression of heart and dilatation of the blood vessels<sup>[45]</sup>. By this line of attack such group of drugs control the high blood pressure and perform as a anti hypertensive agent. In contrast a few numbers of drugs contain *madhura rasa* and *madhura vipaka* and also principally *Vata Pitta samakatwa* property (Table1, serial no.11, 16, 24, 30, 34, 49). These kind of drugs are having inhibitory effect on heart<sup>[46]</sup>. These are proved as effective in mild to moderate hypertension<sup>[47]</sup>. Hence drugs with *tikta*,

*katu, kasaya rasa; laghu, Ruksha, tikshna guna; katu vipaka; ushna veerya ; kaphavata hara* properties are performing as a potent antihypertensive agent. On the other hand drugs with *madhura rasa, guru snigdha guna, madhura vipaka, sheeta veerya* are mostly effective in mild to moderate hypertension.

## CONCLUSION

Ayurvedic drugs act as antihypertensive agents based on *Rasapanchaka* not by any single property. Physician should choose drug strictly based on *roga pareeksha* and *rogi pareekhsa* (proper examination of the patient and diseases). Such thorough examination will help the physician to select suitable drug according to the *dosha dooshya* etc (Pathogenesis of the disease).The knowledge about drugs is a prime factor in successful practice. Then it becomes easy to select the appropriate drug for that patient and that condition. So to review the available data is important. Some drugs are already proved experimentally in this aspect, but numerous more are yet to be revealed. It is a challenge before the Ayurvedic community to do further extensive researches on simple & safe remedies for common ailments, from our antique treasure house.

**Table 1** Antihypertensive medicinal plants with their Ayurvedic pharmacological properties

SL NO	Botanical name		Ayurvedic name and useful part	Dosa Shamak Karma	Ayurvedic Pharmacological properties			
					Rasa	Guna	Veerya	Vipaka
1.	<i>Abies webbiana</i> Lindl. <sup>[7]</sup>	<i>Talispatram</i> Leaves	<i>KV</i>	<i>M,Ti</i>	<i>L,Ru</i>	<i>Ushna</i>	<i>Katu</i>	
2.	<i>Acacia nilotica</i> .Linn <sup>[8]</sup>	<i>Babbula</i> Bark	<i>KP</i>	<i>Ks</i>	<i>G,Ru</i>	<i>Sheeta</i>	<i>Katu</i>	
3.	<i>Achyranthus aspera</i> Linn <sup>[8]</sup>	<i>Apamarga</i> Whole plant	<i>KV</i>	<i>Kt,Ti</i>	<i>L,Ru,Tik</i>	<i>Ushna</i>	<i>Katu</i>	
4.	<i>Acorus calamus</i> Linn <sup>[9]</sup>	<i>Vacha</i> Rhizome	<i>KV</i>	<i>Kt,Ti</i>	<i>L,Tik,Sa</i>	<i>Ushna</i>	<i>Katu</i>	
5.	<i>Adhatoda zeylanica</i> Medic. <sup>[8]</sup>	<i>Vasa veda</i> Leaves, Roots	<i>KP</i>	<i>Ti,Ks</i>	<i>Ru,L</i>	<i>Sheeta</i>	<i>Katu</i>	
6.	<i>Allium sativum</i> Linn. <sup>[10]</sup>	<i>Lasuna</i> Tuber	<i>KV</i>	<i>M,La</i>	<i>Sni,G,Tik</i>	<i>Ushna</i>	<i>Katu</i>	
7.	<i>Aloe barbadensis</i> Mill. <sup>[8]</sup>	<i>Kumari</i> Leaves	<i>KP</i>	<i>Ti,M</i>	<i>G,Sni,Pi</i>	<i>Sheeta</i>	<i>Katu</i>	
8.	<i>Alstonia scholaris</i> R.Br <sup>[8]</sup>	<i>Saptaparni</i> Bark, Leaves	<i>KP</i>	<i>Ti,Ks</i>	<i>L,Sni</i>	<i>Ushna</i>	<i>Katu</i>	
9.	<i>Albizia lebbek</i> Linn. <sup>[11]</sup>	<i>Shirisha</i> Bark	<i>VPK</i>	<i>Ti,M,Ks</i>	<i>L,Ru,Tik</i>	<i>Sheeta</i>	<i>Katu</i>	
10.	<i>Averrhoa carambola</i> Linn. <sup>[12]</sup>	<i>Karmaranga</i> Leaves	<i>KV</i>	<i>Amla,Ks</i>	<i>L,Ru</i>	<i>Ushna</i>	<i>Katu</i>	
11.	<i>Asperagus recemosus</i> Willd. <sup>[13]</sup>	<i>Shatavari</i> Roots	<i>VP</i>	<i>M,Ti</i>	<i>G,Sni</i>	<i>Sheeta</i>	<i>Madhura</i>	
12.	<i>Azadirachta indica</i> A.Juss. <sup>[13]</sup>	<i>Nimba</i> Leaves, Bark	<i>KP</i>	<i>Ti,Ks</i>	<i>L</i>	<i>Sheeta</i>	<i>Katu</i>	
13.	<i>Baliospermum montanum</i> (Willd.) Muell. <sup>[13]</sup>	<i>Danti</i> Roots, Leaves	<i>KP</i>	<i>Kt</i>	<i>Tik,G</i>	<i>Ushna</i>	<i>Katu</i>	
14.	<i>Barleria prionitis</i> Linn. <sup>[13]</sup>	<i>Sahachara</i> Leaves, Bark	<i>KV</i>	<i>Ti,M</i>	<i>Sni,L</i>	<i>Ushna</i>	<i>Katu</i>	

15.	<i>Berberis</i> DC. <sup>[13]</sup>	<i>aristata</i>	<i>Daruharidra</i> Wood	<i>KP</i>	<i>Ti, Ks</i>	<i>L, Ru</i>	<i>Ushna</i>	<i>Katu</i>
16.	<i>Boerhavia</i> Linn. <sup>[14]</sup>	<i>diffusa</i>	<i>Punarnava</i> Whole, plant	<i>VPK</i>	<i>M, Ti, Ks</i>	<i>L, Ru</i>	<i>Ushna</i>	<i>Madhura</i>
17.	<i>Boswellia</i> Roxb. <sup>[13]</sup>	<i>serrata</i>	<i>Shallaki</i> Bark, Resin	<i>KP</i>	<i>Ks, Ti, M</i>	<i>L, Ru</i>	<i>Ushna</i>	<i>Katu</i>
18.	<i>Cissus quadrangularis</i> Linn. <sup>[13]</sup>		<i>Asthisamhara</i> Whole, plant	<i>KV</i>	<i>M</i>	<i>L, Ru, Tik</i>	<i>Ushna</i>	<i>Madhura</i>
19.	<i>Carum</i> Benth. & Hook <sup>[15]</sup>	<i>copticum</i>	<i>Ajavan</i> Leaves, Fruits	<i>KV</i>	<i>Kt</i>	<i>L, Ru, Tik</i>	<i>Ushna</i>	<i>Katu</i>
20.	<i>Cassia</i> Linn. <sup>[16]</sup>	<i>occidentalis</i>	<i>Kasamarda</i> Leaves	<i>KV</i>	<i>Ti, M</i>	<i>L, Ru</i>	<i>Ushna</i>	<i>Katu</i>
21.	<i>Catharanthus</i> Reichb. <sup>[17]</sup>	<i>rosea</i>	<i>Sadapuspi</i> Leaves	<i>KV</i>	<i>Ti</i>	<i>G</i>	<i>Ushna</i>	<i>Katu</i>
22.	<i>Centella asiatica</i> (L.) Urban. <sup>[18]</sup>		<i>Mandookparni</i> Whole plant	<i>KP</i>	<i>Ti, Ks, M</i>	<i>L, Sa</i>	<i>Sheeta</i>	<i>Madhura</i>
23.	<i>Clerodendrum</i> <i>serratum</i> L. <sup>[13]</sup>		<i>Bharangi</i> Roots	<i>KV</i>	<i>Ti, Kt, Ks</i>	<i>Ru, L</i>	<i>Ushna</i>	<i>Katu</i>
24.	<i>Cocos</i> Linn. <sup>[19]</sup>	<i>nucifera</i>	<i>Narikela</i> Fruit kernel	<i>VP</i>	<i>M</i>	<i>G, Sni</i>	<i>Sheeta</i>	<i>Madhura</i>
25.	<i>Coriandrum</i> Linn. <sup>[20]</sup>	<i>sativum</i>	<i>Dhanyaka</i> Fruits	<i>VPK</i>	<i>Ks, Ti</i>	<i>L, Sni</i>	<i>Ushna</i>	<i>Madhura</i>
26.	<i>Coscinium fenestratum</i> Linn. <sup>[21]</sup>		<i>Daruharidra</i> Leaves	<i>KP</i>	<i>Ti, Ks</i>	<i>L, Ru</i>	<i>Ushna</i>	<i>Katu</i>
27.	<i>Crocus</i> Linn. <sup>[22]</sup>	<i>sativus</i>	<i>Keshara</i> Stigma	<i>VPK</i>	<i>Kt, Ti</i>	<i>Sni</i>	<i>Ushna</i>	<i>Katu</i>
28.	<i>Citrus</i> Risso. <sup>[23]</sup>	<i>limetta</i>	<i>Nimbuka veda</i> Fruits	<i>KV</i>	<i>M, Amla</i>	<i>L, Tik</i>	<i>Ushna</i>	<i>Amla</i>
29.	<i>Elettaria</i> <i>cardamomum</i> Maton. <sup>[24]</sup>		<i>Ela</i> Seeds	<i>VPK</i>	<i>Kt, M</i>	<i>L, Ru</i>	<i>Sheeta</i>	<i>Madhura</i>
30.	<i>Hemidesmus</i>	<i>indicus</i>	<i>Sariba</i>	<i>VPK</i>	<i>Ti, M</i>	<i>G, Sni</i>	<i>Sheeta</i>	<i>Madhura</i>

	R.Br <sup>[13]</sup>		Roots, Leaves					
31.	<i>Hibiscus sabdarifa</i> Linn. <sup>[25]</sup>	<i>Pulivenda</i>	<i>KP</i>	<i>Ti, Kt</i>	<i>L, Ru, Tik</i>	<i>Sheeta</i>	<i>Katu</i>	
			Leaves					
32.	<i>Jatropha gossypifolia</i> Willd. <sup>[26]</sup>	<i>Dravanti veda</i>	<i>KP</i>	<i>Kt</i>	<i>G, Tik</i>	<i>Ushna</i>	<i>Katu</i>	
			Leaves					
33.	<i>Lepidium sativum</i> Linn. <sup>[27]</sup>	<i>Chandrasura</i>	<i>KV</i>	<i>Kt, Ti</i>	<i>L, Ru, Tik</i>	<i>Ushna</i>	<i>Katu</i>	
			Leaves, Seeds					
34.	<i>Linium usitatissimum</i> Linn. <sup>[28]</sup>	<i>Atasi</i>	<i>V</i>	<i>M, Ti</i>	<i>G, Sni, Pi</i>	<i>Ushna</i>	<i>Katu</i>	
			Seeds					
35.	<i>Madhuka longifolia</i> Roxb. <sup>[29]</sup>	<i>Madhuka</i>	<i>KP</i>	<i>M, Ks</i>	<i>G, Sni</i>	<i>Sheeta</i>	<i>Madhura</i>	
			Stem, bark					
36.	<i>Mesua ferrea</i> Linn. <sup>[13]</sup>	<i>Nagakeshara</i>	<i>KP</i>	<i>Ks, Ti</i>	<i>L, Ru</i>	<i>Ushna</i>	<i>Katu</i>	
			Bark, Leaves					
37.	<i>Mimosops elingi</i> Linn. <sup>[13]</sup>	<i>Bakula</i>	<i>Bark</i>	<i>PK</i>	<i>Ks, Kt, M</i>	<i>G, Sni, V</i>	<i>Sheeta</i>	<i>Katu</i>
38.	<i>Momordica charantia</i> Linn. <sup>[30]</sup>	<i>Karabellaka</i>	<i>KP</i>	<i>Ti, Kt</i>	<i>L, Ru</i>	<i>Sheeta</i>	<i>Katu</i>	
			Whole plant					
39.	<i>Morinda oleifera</i> Lamk. <sup>[31]</sup>	<i>Shigru</i>	<i>Fruits</i>	<i>KV</i>	<i>Kt, Ti</i>	<i>L, Ru, Tik</i>	<i>Ushna</i>	<i>Katu</i>
40.	<i>Mucuna pruriens</i> (L.) DC. <sup>[13]</sup>	<i>Kapikacchu</i>	<i>KP</i>	<i>M, Ti</i>	<i>G, Sni</i>	<i>Ushna</i>	<i>Madhura</i>	
			Seeds					
41.	<i>Nigella sativa</i> Linn. <sup>[32]</sup>	<i>Krishnajiraka</i>	<i>KV</i>	<i>Kt, Ti</i>	<i>La, Ru, Ti</i>	<i>Ushna</i>	<i>Katu</i>	
			Seeds					
42.	<i>Oleo europaea</i> Linn. <sup>[33]</sup>	<i>Jaituna</i>	<i>Leaves</i>	<i>KV</i>	<i>Amla, Ks</i>	<i>L, Sni</i>	<i>Ushna</i>	<i>Amla</i>
43.	<i>Phyllanthus amarus</i> Schum.& Thonb <sup>[34]</sup>	<i>Bhumiamalaki</i>	<i>KP</i>	<i>Ti, Ks, M</i>	<i>L, Ru</i>	<i>Sheeta</i>	<i>Madhura</i>	
			Leaves					
44.	<i>Polyalthia longifolia</i> Benth.R.H.f. <sup>[35]</sup>	<i>Kasthadaru</i>	<i>KP</i>	<i>Ks, Ti</i>	<i>L, Ru</i>	<i>Ushna</i>	<i>Katu</i>	
			Bark, Roots					
45.	<i>Raphnus sativus</i> Linn. <sup>[36]</sup>	<i>Mulaka</i>	<i>VK</i>	<i>Kt, Ti</i>	<i>L</i>	<i>Ushna</i>	<i>Katu</i>	
			Leaves					
46.	<i>Rauwalfia serpentina</i> Benth ex. Kutz <sup>[37]</sup>	<i>Sarpagandha</i>	<i>KV</i>	<i>Ti</i>	<i>Ru</i>	<i>Ushna</i>	<i>Katu</i>	
			Roots					

47.	<i>Solanum torvum</i> Linn. <sup>[38]</sup>	<i>Brihati</i> Fruits	<i>veda</i> KV	<i>Kt, Ti</i>	<i>L, Ru</i>	<i>Ushna</i>	<i>Katu</i>
48.	<i>Terminalia arjuna</i> Roxb. <sup>[39]</sup>	<i>Arjuna</i> Bark	KP	Ks	Ru, L	Sheeta	Katu
49.	<i>Tribulus terrestris</i> Linn. <sup>[40]</sup>	<i>Gokshura</i> Leaves	VP	M	G, Sni	Sheeta	Madhura
50.	<i>Valeriana wallichii</i> DC. <sup>[41]</sup>	<i>Tagara</i> Rhizome	KV	Ti, Kt, Ks	L, Sni	Ushna	Katu

**Abbreviations:** *M-Madhura* (Sweet); *Kt-Katu* (Pungent); *Ti-Tikta* (Bitter); *Ks-Kasaya* (Astringent); *L-Laghu* (Light); *G-Guru* (Heavy); *Sni-Snigdha* (Unctuous); *Ru-Ruksha* (Not unctuous); *Tik-Tikshna* (Sharp); *Sa-Sara* (Not stable); *Pi-Picchila* (Slimy); *V-Vata, P-Pitta, K-Kapha*.



**REFERENCES**

- [1] [1] KV Krishna Das. Text Book of Medicine. 5th edition. New Delhi, India: Jaypee Brothers Medical Publication (P) LTD, 2008.p.829.
- [2] Carretero OA., Oparil S. "Essential hypertension. Part I: definition and aetiology". *Circulation* 2000; 101 (3):329-335.
- [3] Murray CJLM, *et al.* Evidence-based health policy - lessons from the global burden of disease study. *Science* 1996; 274:740-743.
- [4] Joffres MR, *et al.* Awareness, treatment, and control of hypertension in Canada. *Am J Hypertens* 1997; 10(Pt-1):1097-1102.
- [5] Griffith HW. Complete Guide to Prescription and Non-Prescription Drugs 2nd edition. New York, USA: The Body Press publisher, 1999.p.168-169,194-195, 54-55.
- [6] Yamagami T *et al.* Bioenergetics in clinical medicine, VIII. Administration of Coenzyme Q10 to patients with essential hypertension. *Research Comm. in Chem. Path and Pharmacol* 1976;144:721-727.
- [7] Singh R.K., Nath G.R.K., Bhattacharya S.K. Pharmacological action of *Abies pindrow* Royle Leaves. *Indian J Exp Bio* 1998; 36:187-191.
- [8] Database on Medicinal plants used in Ayurveda, Vol-1. New Delhi, India: Central Council for Research in Ayurveda and Siddha publisher, 2000.p.58, 13, 497,225,385
- [9] Baxter R.M., Dandiya P.C., Kandel S.I., Okany A., Walker G.C. separation of hypotonic potentiating principles from essential oil of *Acorus calamus* Linn. of Indian origin by liquid gas chromatography. *Nature (London)* 1960; 185:466-467
- [10] Hosseini M., Shafiee SM., Baluchnejadmojarad T. Garlic extract reduces serum angiotensin converting enzyme activity in non diabetic and streptozotocin- diabetic rats. *Pathophysiology*, 2007; 14:109-112
- [11] Tripathi RM., Das PK. Effect of *Albizia lebbek* on perfused blood vessels. *Ind.Jour. Pharmacology* 1976;7:105 .
- [12] Soncini R., Santiago MB., Orlando L., Moraes GOI., Peloso ALM., Dos Santos MH *et al.* Hypotensive effect of aqueous extract of *Averrhoa carambola* Linn.(Oxalidaceae) in rats: An in vivo and in vitro approach. *Journal of Ethnopharmacology* 2011; 133:353-357.

- [13] Database on Medicinal plants used in Ayurveda, Vol-1. New Delhi, India: Central Council for Research in Ayurveda and Siddha publisher, 2000.p.418, 292, 116, 379, 121,406, 45, 75, 396, 280, 67,202.
- [14] Bhide N.K., Aletekar W.W., Trivedi J.C., Sheth UK. Potassium diuretics in Ayurvedic system of medicine. J.Postgrad.Med 1958;4:22-27.
- [15] Gilani AH., Jabeen Q., Ghayur MN., Janbaz KH., Akhtar MS. Studies on the antihypertensive, Antispasmodic, Bronchodilator and Hepatoprotective activities of the *Carum copticum* seed extract. Journal of Ethnopharmacology, 2005; 98:127-135.
- [16] Oliver B. Medicinal Plants in Nigeria. Ibadan, Nigeria: Nigerian College of Arts and Science and Technology publisher, 1960.p.16-42.
- [17] Ara N., Rashid M., Amran MS. Comparison of Hypotensive and Hypolipidemic effect of *Catharanthus roseus* leaves extract with atenolol in adrenaline induced hypertensive rats. Pak J Pharm Sci 2009; 22: 267-271.
- [18] Hansen k *et al.* In vitro screening of Indian Medicinal Plants for anti hypertensive effect based on inhibition of angiotensin converting enzymes (ACE). Glimpses of Indian Ethno pharmacology 1995; pp:263-273.
- [19] Bankar GR., Nayak PG., Bansal P., Paul P., Pai KSR., Singla RK *et al.* Vasorelaxant and Antihypertensive effect of *Cocos nucifera* Linn. Endocarp on isolated rat thoracic aorta and doxa Salt induced hypertensive rats. Journal of ethnopharmacology 2011;134:50-54.
- [20] Jabeen Q., Bashira S., Lyoussi B., Gilani AH. Coriander fruit exhibits gut modulatory, blood pressure lowering and diuretic activities. Journal of Ethnopharmacology 2009; 122: 123-130.
- [21] Wongcome T, Panthong A, Jesadnont S, Kanjanapothi D, Taesotikul T, Lertprasertsuke N: Hypotensive effect and toxicology of the extract from *Coscinium fenestratum* (Gaertn.) colebr. Journal of Ethno pharmacology 2007; 111:468-475.
- [22] Imenshadi M., Hosseinzadeh H., Javadpour Y. Hypotensive effect of aqueous saffron extract (*Crocus sativus* Linn.) and its constituents, safranal and crocin, in normotensive and hypotensive rats. Phytother Res 2010;24: 990-994.
- [23] Perez YY., Jimenez- Ferrer E., Alonson D., Botello-Amaro CA., Zamilpa A. *Citrus limetta* leaves extract antagonizes the hypertensive effect of angiotensin ii. Journal of Ethnopharmacology 2010; 128: 611-614.

- [24] Gilani AH.,Jabeen Q.,Khan A-u.,Shah AJ.Gut modulatory Blood pressure lowering, Diuretic and Sedative activities of Cardamom.Journal of Ethnopharmacology 2008;115:463-472.
- [25] Ojeda D.,Jimenez-Ferrer E., Zamilpa A.,Herrera-Arellano A., Tortoriello J.,Alvarez L: Inhibition of angiotensin convertin enzyme (ace) activity by the anthocyanins delphinidin- and cyaniding-3-o-sambubiosides from *Hibiscus sabdariffa*. Journal of Ethnopharmacology 2010; 127: 7-10.
- [26] Abreu IC., Marinho AS., Paes AM., Freire SM., Olea RS., Borges MO *et al.*Hypotensive and Vasorelaxant effects of ethanolic extract from *Jatropha gossypifolia* (Linn.) In rats. Fitoterapia 2003; 74:650-657.
- [27] Maghrani M., Zeggwagh N-A., Michel J-B.,Eddouks M: Antihypertensive effect of *Lepidium sativum* Linn. In spontaneously hypertensive rats. Journal of Ethnopharmacology, 2005; 100: 193-197.
- [28] Nurudeen Oyewale Raji *et al.* Ethno botanical Survey Of Antihypertensive Agents In Sokoto, Northwest Nigeria. International Journal of Innovative Research and Development 2013; 2(5):1820-1835.
- [29] Samaresh Pal Roy *et al.* A review on some indigenous medicinal plants with Hepatoprotective activity. Journal of Chemical and Pharmaceutical Sciences 2013; 6(2): 85-92.
- [30] Ojewole JA., Adewole SO., Olayiwola G. Hypoglycaemic and Hypotensive effect of *Momordica charantia* Linn.(Cucurbitaceae) whole plant aqueous extract in rats, Cardiovasc J S Afr 2006; 17: 227-232.
- [31] Faizi S.S., Siddiqui B.S., Saleem R., Siddiqui S., Aftab k., Gilani A.N. Isolation and structure elucidation of a new nitrile and mustered oil glycoside from *Moringa oleifera* and their effect on blood pressure. J of Natural Products 1994; 5-7(9):957-963.
- [32] Dehkordi F R.,Kamakhah AF. Antihypertensive effect of *Nigella sativa* seed extract in patients with mild hypertension. Fundam Clin Pharmacol 2008; 22:447-452.
- [33] Somova L.I., Shode F.O., Ramnanan P., Nadar P., Antihypertensive, Antiatherosclerotic and Antioxidant activity of triterpenoids isolated from *Olea europaea*, subspecies *Africana* leaves.Journal of Ethnopharmacology 2003; 84:299-305.

- [34] Amaechina F.C., Omogbai E.K.I. Hypotensive effect of the aqueous leaves extract of *Phyllanthus amarus* in rabbits. Proceedings of Annual Regional Conference of West African Society for Pharmacology. 2004.
- [35] Saleem R., Ahmed M., Ahmed S.I., Azeem M., Khan R.A., Rasool N *et al.* Hypotensive activity and Toxicology of constituents from bark of *Polyalthia longifolia* var. Pendula. *Phytother Res* 2005;19:881-884.
- [36] Ghayur MN., Gilani AH. Radish seed extract mediates its cardiovascular inhibitory effects via muscarinic receptor activation. *Fundam Clin Pharmacol* 2006; 20:57-63.
- [37] Gawade B.V., Fegade S.A., Rauwolfia (Reserpine) As a Potential Antihypertensive Agent- A Review. *International Journal of Pharmaceutical and Phytopharmacological Research* 2012; 2(1): 46-49.
- [38] Ashok D., Agrawal., Puja S., Bajpei., Ashwini A., Patil., Sunil R., Bavaskar. *Solanum torvum* Sw. - A Phytopharmacological review. *Scholars Research Library Der Pharmacia Lettre* 2010; 2(4): 403-407.
- [39] Subir K. Maulik., Kewal K. Talwar., Therapeutic Potential of *Terminalia Arjuna* in Cardiovascular Disorders. *American Journal of Cardiovascular Drugs* 2012; 12( 3):157-163.
- [40] Sharifi AM., Darabi R., Akbarloo N. Study of Antihypertensive mechanism of *Tribulus terrestris* in 2k1chypertensive rats. Role of tissue ace activity. *Life Science* 2003; 73: 2963-2971.
- [41] Gilani AH., Khan A-u., Jabeen Q., Subhan F., Ghafar R. Antispasmodic and blood pressure lowering effects of *Valeriana wallichii* are mediated through K<sup>+</sup> channel activation. *Journal of Ethnopharmacology* 2005;100:347-352.
- [42] Ramesh Bhayal et al. the role of *Virechana* and *Shamana Chikitsa* in the management of *Uccharaktachapa* (EHT). MD(Ayu) in KC Thesis, Submitted to IPGT&R, Jamnagar, Gujarat, 2003.
- [43] VD Mukund Sabins, Chemistry & Pharmacognosy of Ayurvedic Medicinal Plants, 1<sup>st</sup> ed, Vol-12, Varanasi: Chaukhamba Amarbharati Prakashan; 2006.p.70,154.
- [44] VD Mukund Sabins, Chemistry & Pharmacognosy of Ayurvedic Medicinal Plants, 1<sup>st</sup> ed, Vol-12, Varanasi: Chaukhamba Amarbharati Prakashan; 2006.p.64.
- [45] VD Mukund Sabins, Chemistry & Pharmacognosy of Ayurvedic Medicinal Plants, 1<sup>st</sup> ed, Vol-12, Varanasi: Chaukhamba Amarbharati Prakashan; 2006.p.92.

[46] VD Mukund Sabins, Chemistry & Pharmacognosy of Ayurvedic Medicinal Plants, 1<sup>st</sup> ed, Vol-12, Varanasi: Chaukhamba Amarbharati Prakashan; 2006.p.186.

[47] VD Mukund Sabins, Chemistry & Pharmacognosy of Ayurvedic Medicinal Plants, 1<sup>st</sup> ed, Vol-12, Varanasi: Chaukhamba Amarbharati Prakashan; 2006.p.160-210.

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