

**Short Title:** Critical appraisal of *Rasayana Guna* of *Avaleha* ingredients

**Authors:** Siddhpura and Khatri

**Critical Appraisal of *Avaleha* Formulation in *Brihat-Trayi* w.s.r. to its Ingredients'  
*Rasayana Guna* (Antioxidant Property)**

Dr. Bhavisha Siddhpura<sup>1</sup>, Dr. Vinita Khatri<sup>2</sup>

<sup>1</sup> Assistant professor, Department of Rasashastra evam Bhaishajya Kalpana, Dr. Vasant Parikh Ayurvedic Medical College, Vadnagar-384355, Gujarat.

<sup>2</sup> Assistant professor, Department of Dravyaguna, Dr. Vasant Parikh Ayurvedic Medical College, Vadnagar-384355, Gujarat.

**Abstract**

Humans, due to their tremendous intellectual abilities are on way at par from and this is the most developed and sophisticated living creature on earth. They are step ahead, in true sense, desires not only to live, but to live a long & disease-free life as far as possible. The ancient revered Acharyas achieved the aims before thousands of years ago, in the means of *Rasayana* which not only helped to attain longer but healthier life & also prevent diseases. Out of all *Rasayana* formulations, most of them are *Avalehas*. In *Ayurveda* there is a special branch of pharmaceuticals called as Bhaishajya Kalpana dealing with formulations of mainly herbal medicines, which are basically two types i.e., primary and secondary formulations. *Avaleha* is the most popular secondary *Kalpana* (dosage form) which has been employed in various disorders and these products are gaining its importance due to its easy administration, palatability, longer shelf life and considering as *Ayurveda*'s nutraceutical. It is a semisolid preparation made from herbal drugs, prepared in decoction, expressed juices of different herbs other liquid etc. by adding sweetening agents like jaggery, sugar & added honey. Here an attempt is made to collect, analyze & discuss all different *Avaleha* formulations and its ingredients for *Rasayana Guna* (Antioxidant property) which is mentioned in *Brihat-trayi*.

**Keywords:** *Avaleha*, *Rasayana*, Anti-oxidant, Longevity

\*Author for Correspondence E-mail: [s.bhavisha242@gmail.com](mailto:s.bhavisha242@gmail.com), Contact No.: 9737966803

**INTRODUCTION**

Humans, the super most of all the species is always remaining in the search of one prime goal: the perfect health. The present condition of human health around the globe is far from satisfaction. As an answer to solve the problems of healthful longevity, and resistant against diseases the *Rasayana* is there. It prolongs the longevity, develops the positive health & also prevents diseases.

Out of all *Rasayana* formulations, mostly are *Avalehas*. *Avaleha* is a semisolid preparation of herbal drugs prepared in decoction or extracts of different herbs by adding sweetening agents like jaggery, sugar or sugar candy. *Avaleha Kalpana* is considered as an *Upakalpana* of *Kwatha Kalpana*. Different varieties of *Avaleha* are mentioned in various Ayurvedic classics and they are the most accepted variety of Ayurvedic dosage forms due to its easy administration, palatability and long shelf-life considering as *Ayurveda*'s nutraceutical.

*Rasayana* drugs act by preventing the old age and diseases in the healthy person. E.g., *Haritaki*<sup>1</sup>, *Guggulu*<sup>2</sup>, *Shilajitu*<sup>3</sup>. On scientific basis, *Rasayana Karma* can be analogous with Anti-oxidant, Anti-ageing, Adaptogenic, Nootropic and cognitive, Immunomodulatory activities. The anti-oxidant agent decreases the cell destruction activity of free radical and promotes cell longevity<sup>45</sup>. Considering this, a meticulous screening was done through *Brihat-trayi* to analyse all different *Avaleha* formulations, ingredients for their *Rasayana Guna* (Antioxidant property).

## MATERIALS AND METHOD

A review of *Brihat-trayi* i.e., Charaka Samhita, Sushruta Samhita, Ashtanga Samgraha and Ashtanga Hridaya has been made. The collected data is presented here in tabular form.

### *Avalehas* mentioned in *Brihat-Trayi*:

The review revealed that mostly *Avaleha* formulations are indicated for *Rasayana*, *Dirghayu*, *Shwasa* and *Kasa Roga*. Total 41 *Avalehas* found from *Brihat-trayi* in which 24 *Avaleha* found in Charaka Samhita, while 9, 12 and 11 *Avalehas* found in Sushruta Samhita, Ashtanga Samgraha and Ashtanga Hridaya respectively (Table no. 1).

**Table 1: *Avaleha* formulations found in *Brihat-trayi* 6,7,8,9**

Sr.No.	Name of <i>Avaleha</i>	Name of Ingredients	Uses	References
1.	1 <sup>st</sup> <i>Brahma Rasayana</i>	<i>Haritaki, Amalaki, Pancha Panchamula</i>	<i>Rasayana, Dirghaayu</i>	Cha. Chi. 1, 1/41-47
				A.S. Utt. 49/21
2.	2 <sup>nd</sup> <i>Brahma Rasayana</i>	<i>Amalaki, Sthira, Punarnava, Suvarna, Rajata, Tamra Pravala</i>	<i>Rasayana, Dirghaayu</i>	Cha. Chi. 1, 1/58-61
3.	<i>Chyavanaprash a</i>	<i>Amalaki, Dashamula, Draksha, Jivanti, Abhaya, Amrita</i>	<i>Rasayana, Dirghaayu, Kasa-shwasahara</i>	Cha. Chi. 1, 1/62-74
				A.S. Utt. 49/29
4.	<i>Amalaka Rasayana</i>	<i>Amalaki, Bibhitaka, Haritaki, Palasha</i>	<i>Dirghaayu, Punaryuvatapra apti</i>	Cha. Chi. 1, 1/75
				A.S. Utt. 49/23-24
5.	<i>Amalaka Avaleha</i>	<i>Amalaki, Pippali</i>	100-Year Ayu, <i>Rasayana</i>	Cha. Chi. 1, 2/7
6.	<i>Vidanga Avavleha</i>	<i>Vidanga, Pippali, Sitopala</i>	<i>Rasayana</i>	Cha. Chi. 1, 2/9
				A.S. Utt. 49/37
7.	<i>Aparaamlaka Avaleha</i>	<i>1000 Amalaki, Pippali, Vidanga</i>	<i>Rasayana</i>	Cha. Chi. 1, 2/10
8.	<i>Nagabala Rasayana</i>	<i>Nagabala Mula</i>	<i>Rasayana</i>	Cha. Chi. 1, 2/11
9.	<i>Lohadi Rasayana</i>	<i>Triphala, Gomutra, Kshara, Lavana, Kinshukakshara</i>	<i>Rasayana, Dirghaayu</i>	Cha. Chi. 1, 3/15-23
				A.S. Utt. 49/31
10.	<i>Indrokt rasayana</i>	<i>Balya, Jivaniya, Brimhaniya, Vayasthapna Gana Aushadhi</i>	<i>Sarva Roga Prashamana</i>	Cha. Chi. 1, 4/13-26

11.	<i>Danti Haritaki</i>	<i>Haritaki, Danti, Chitraka Mula</i>	<i>Gulma, Arsha, Pandu, Hridroga</i>	Cha. Chi. 5/154-160
				A.S. Chi. 16/40
12.	<i>Kamsa Haritaki</i>	<i>100 Haritaki, Dashamula</i>	<i>Shotha, Shwasa, Jwara, Arochaka, Meha, Gulma</i>	Cha. Chi. 12/50-52
				A.H. Chi. 17/14-16
13.	<i>Darvadileha</i>	<i>Daruharidra, Triphala, Vyosha, Vidanga</i>	<i>Kamala, Pandu</i>	Cha. Chi. 16/97
14.	<i>Dhatryavaleha</i>	<i>Dhatri, Munnaka, Tugakshiri, Yashtimadhu</i>	<i>Kamala, Pandu, Kasa, Halimaka</i>	Cha. Chi. 16/100-101
15.	<i>Duralabha Leha</i>	<i>Duralabha, Shati, Draksha, Sringavera</i>	<i>Kasa, Shwasa, Hikka</i>	Cha. Chi. 18/50
16.	<i>Durhsparshadi Leha</i>	<i>Durhsparsha, Pippali, Musta, Karkataki</i>	<i>Kasa, Shwasa, Hikka</i>	Cha. Chi. 18/51
17.	<i>Vidangadi Avaleha</i>	<i>Vidanga, Saindhava, Kushtha, Vyosha</i>	<i>Kasa, Shwasa, Hikka</i>	Cha. Chi. 18/52
18.	<i>Chitrakadi Avaleha</i>	<i>Chitraka, Pippalimula, Vyosha, Hingu</i>	<i>Kasa, Hridroga, Shwasa, Gulma</i>	Cha. Chi. 18/53-56
19.	<i>Agastya Haritaki</i>	<i>100 Haritaki, Dashmula, Bala, Shankhapushpi, Shati</i>	<i>Rasayana, Vali-Palitanashaka, Ayushyavardhna, Kasa, Shwasa</i>	Cha. Chi. 18/57-62
				Su. Utt. 52/43-47
				A.H. chi. 3/127-132
A.S. Chi. 5/82-87				
20.	<i>Pippalyadi Leha</i>	<i>Pippali, Yashtimadhu, Shitopala, Mridvika</i>	<i>Shwasa, Hridroga</i>	Cha. Chi. 18/135-137
21.	<i>Haritaki Leha</i>	<i>Haritaki, Guda, Pippali</i>	<i>Shwasa, Kasa</i>	Cha. Chi. 15/168-169
22.	<i>Drakshadi Leha</i>	<i>Draksha, Padmaka, Vartaka, Pippali</i>	<i>Shwasa</i>	Cha. Chi. 18/172-173
23.	<i>Padmakadi Avaleha</i>	<i>Padmaka, Triphala, Shunthi, Vyosha</i>	<i>Kasa</i>	Cha. Chi. 18/174-175
				A. S. Chi. 5/132-133
24.	<i>Jivantyadi Avaleha</i>	<i>Jivanti, Madhuka, Patha, Sariva, Pushkara</i>	<i>Kasa</i>	Cha. Chi. 18/176-179
25.	<i>Ayorajovyoshadyavaleha</i>	<i>Ayoraja, Vyosha, Vidanga, Triphala</i>	<i>Pandu</i>	Su. Utt. 11/19
26.	<i>Vidangadhyavaleha</i>	<i>Vidanga, Musta, Triphala, Ajamoda</i>	<i>Pandu, Shotha</i>	Su. Utt. 44/31-32
27.	<i>Kalyanka Guda</i>	<i>Amalaki, Pippali, Jiraka, Trikatu, Ajamoda, Saindhava</i>	<i>Swasa, Kasa, Swarbheda</i>	Su. Utt. 52/39-42
28.	<i>Khadiradhyavaleha</i>	<i>Khadira, Asana, Nimba, Rajvriksha</i>	<i>Kushtha</i>	Su. Chi. 10/9
29.	<i>Shalasaradhya Avaleha</i>	<i>Salasaradi Gana, Aushadha</i>	<i>Kushtha</i>	Su. Chi. 10/9

30.	<i>Nyagrodha Avaleha</i>	<i>Nyagrodha</i>	<i>Kushtha</i>	Su. Chi. 10/9
31.	<i>Aragvadha Avaleha</i>	<i>Aragvadha</i>	<i>Kushtha</i>	Su. Chi. 10/9
32.	<i>Shalasaradi Avaleha</i>	<i>Shalasaradi Gana Aushadha, Amalaki, Lodhra, Priyangu</i>	<i>Sarva Prameha Nashaka</i>	Su. Chi. 13/10
33.	<i>Vijaya Avaleha</i>	<i>Haritaki, Guda, Pippali</i>	<i>Shwasa, Kasa</i>	A. H. Chi.3/167
34.	<i>Kasanashska Avaleha</i>	<i>Draksha, Pippali, Sitopala</i>	<i>Kasa</i>	A.H. Chi.3/30
35.	<i>Kantakari Avaleha</i>	<i>Kantakari, Vyosha, Rasna, Guduchi, Chitraka</i>	<i>Gulma, Hridroga, Shwasa, Kasa</i>	A.H. Chi. 3/63-66 A.S. Chi. 4/84-87
36.	<i>Kushmandaka Rasayana</i>	<i>Kushmanda, Pippali, Shunthi, Maricha, Jiraka</i>	<i>Kasa, Hikka, Shwasa, Hridya, Medha-smriti-bala Prada</i>	A.H. Chi. 3/115-117 A.S. Chi. 5/64-68
37.	<i>Vashishtha Haritaki Rasayana</i>	<i>Dashamula, Haritaki, Bala, Haridra, Pippali, Patha</i>	<i>Rasayana, without any regimen healthy person can use it</i>	A.H. Chi. 3/133-140 A.S. Chi. 5/88-96
38.	<i>Eladi Sarpi Guda</i>	<i>Ela, Ajamoda, Triphala, Vyosha, Chitraka</i>	<i>Rasayana, Ayushyavardhaka, Gulma, without any regimen healthy person can use it</i>	A. H. Chi. 5/28-32
39.	<i>Kutajadi Avaleha</i>	<i>Kutaja, Manjishtha, Priyangu, Mocharasa</i>	<i>Rakta Atisara, Raktapitta, Raktaarsha</i>	A.H. Chi. 8/104-107 A.S. Chi. 7/53-56
40.	<i>Chitrakavaleha</i>	<i>Chitrakamula, Trikatu, Haritaki, Nagarmotha</i>	<i>Arsha, Kushtha, Gulma, Udararoga</i>	A.H. Chi. 8/153-154
41.	<i>Sitadi Avaleha</i>	<i>Shita, Taila, Vidanga, Amalaka</i>	<i>Sarvakushtha</i>	A.H.Chi.19/79

Table no. 2 shows, list of drugs with their pharmacological activity i.e., Anti-oxidant activity, which are maximum times used in *Avaleha* formulation and all of them possess anti-oxidant activity (*Rasayana Guna*).

**Table 2: Avaleha ingredients' Rasayana property (Anti-oxidant activity)**

Sr. No.	Drug having Rasayana property	Botanical Source	Part Used	Research Study done on Anti-Oxidant Activity of mentioned drug in Avalehas
1	<i>Pippali</i>	<i>Piper longum</i> Linn.	Extract of fruit	Total phenolic content, Radical scavenging by DPPH, ABTS <sup>10</sup> .

2	<i>Haritaki</i>	<i>Terminalia chebula</i> Ritz.	Extract	Reducing power, total Antioxidant capacity, DPH radical concentration, nitric oxide radical concentration and hydrogen peroxide scavenging activity <sup>11</sup> .
3	<i>Amalaki</i>	<i>Emblica officinalis</i> Gaertn.	Extract of Fruit	Anti-oxidant activity by DPPH radical, hydroxyl radical, Superoxide anion radical, Reducing power, inhibition capability of Fe.
			Seed	Free radical scavenging activity by DPPH and reducing power method <sup>12</sup> .
4	<i>Bibhitaka</i>	<i>Terminalia bellirica</i> Gaertn.	Extract of fruit	Radical scavenging by DPPH <sup>13</sup> .
5	<i>Daruharidra</i>	<i>Berberis aristata</i>	Extract of plant	Superoxide dismutase (SOD), catalase (CAT), glutathione peroxidase (GPx), activities and the level of lipid peroxidation decreased oxidative stress. <sup>14</sup>
6	<i>Varahi</i>	<i>Dioscorea bulbifera</i> Linn	Extract of bulb	Scavenging activity by DPPH, ABTS, total phenolic content <sup>15</sup> .
7	<i>Vidari</i>	<i>Pueraria tuberosa</i>	Tuber	ABTS assay, lipid peroxidation, superoxide, hydroxyl radical scavenging activity <sup>16</sup> .
8	<i>Guduchi</i>	<i>Tinospora cordifolia</i>	Five different Extracts of leaves	Total reducing sugar, lipid peroxidation, DPPH & superoxide radical scavenging method <sup>17</sup> .
9	<i>Kshiravidari</i>	<i>Ipomoea digitata</i> Linn.	Extract of root	Nitric oxide, Total anti-oxidant activity <sup>18</sup> .
10	<i>Shatavari</i>	<i>Asparagus racemosus</i> Willd	Root extract	Free radical by DPPH method <sup>19</sup>

**Table 3: Repetition of drugs in Avaleha Kalpana**

Sr. No.	Name of the drug	Botanical source	Part used	No. of times repeated in Avaleha formulations
1	<i>Pippali</i>	<i>Piper longum</i> Linn.	Fruit	20 times
2	<i>Haritaki</i>	<i>Terminalia chebula</i> Ritz	Fruit	17 times
3	<i>Amalaki</i>	<i>Embalica officinalis</i> Gaertn	Fruit	16 times
4	<i>Bibhitaki</i>	<i>Terminalia bellirica</i> Gaertn	Fruit	8 times
5	<i>Daruharidra</i>	<i>Berberis aristata</i>	Stem bark	6 times
6	<i>Varahi</i>	<i>Dioscorea bulbifera</i> Linn	Bulb	6 times
7	<i>Vidari</i>	<i>Pueraria tuberosa</i>	Tuber	6 times
8	<i>Guduchi</i>	<i>Tinospora cordifolia</i>	Stem	5 times
9	<i>Kshiravidari</i>	<i>Ipomoea digitate</i> Linn.	Root	4 times

10	<i>Shatavari</i>	<i>Asparagus racemosus</i> Willd	Root	4 times
----	------------------	-------------------------------------	------	---------

## DISCUSSION

Health is a state of a complete physical, mental and social well-being and not merely the absence of disease or infirmity. The enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, religion, political belief, economic or social condition.

Ayurveda describes various rejuvenating therapies with the help of special class of medicinal preparations called *Rasayana*, those are believed to rebuild the body, mind, prevent degeneration and postpone aging or rather reverse the aging process.

In Ayurveda, there is a special branch of pharmaceuticals called as Bhaishajya Kalpana dealing with formulation of medicines. In this branch there are basically two types of formulations i.e., Primary formulations and Secondary formulations. *Avaleha* is the most popular secondary *Kalpna* (dosage form) which has been employed in various disorders and these products are gaining its importance due to its easy administration, palatability, longer shelf life and considering as *Ayurveda*'s nutraceutical. It is defined as "A semisolid preparation which is prepared by reboiling of decoction etc., till it solidifies and attains signs of proper cooking. Out of all *Rasayana* formulations, mostly are *Avalehas*.

During the screening throughout in *Brihat-trayi*, the *Avalehas* can be classified into two categories:

- 1) As a *Rasayana*,
- 2) As a therapeutic indication.

Out of them mostly *Avaleha* are indicated as a *Rasayana*. This shows that *Avaleha* has property of *Rasayana Karma* (for longevity) because of its ingredient's *Rasayana* properties, E.g., *Chyavanaprashavaleha*. The main ingredient of *Chyavanaprasha Avaleha*<sup>20</sup> is *Amalaki*, which has properties like *Rasayana*, *Vayasthapana* as well as antioxidant properties. The chief ingredients of *Avalehas* in *Brihat-Trayi* are *Amalaki*<sup>21</sup>, *Haritaki*<sup>22</sup>, *Pippali*<sup>23</sup>, *Shatavari*<sup>24</sup>, etc. which have properties like *Rasayana*, *Vayasthapana* (for longevity), etc.

Table no. 2 shows, correlation with Ayurvedic pharmacology i.e. *Rasayana Guna* with antioxidant properties. The part of activity of *Rasayana Guna* may be interpreted with antioxidant activity or free radical scavenging activity. Antioxidants are reducing agents, and limit oxidative damage to biological structures by passivating them from free radicals. Free radicals accumulate in the cell as the age progresses. They are highly unstable and reactive in nature and cause oxidative chain reaction<sup>25</sup>. As per Ayurvedic mode of action for *Rasayana Dravyas*, ingredients of *Rasayana Avaleha* are working on proper formation and functioning of all seven *Dhatus*. This can be assumed after observing their action and indication regarding various disease conditions of individual *Dhatu*. Among them 10 drugs are mostly repeated, and they are already reported for their antioxidant activity. (Table 2). Table no. 3 shows, the number of times drug repeated in *Avaleha Kaplana* having a *Rasayana* property. The maximum repeated drug used in *Avaleha* formulation is *Pippali* i.e., 20 times. Then after *Haritaki*, *Amalaki*, *Bibhitaka*, *Daruharidra*, *Varahi*, *Vidari*, *Guduchi*, *Kshiravidari* and *Shatavari* being repeated for 17, 16, 8, 6, 6, 6, 5, 4, 4 times respectively.

## CONCLUSION

Total 41 *Avalehas* are enumerated from four important Samhita having *Rasayana Guna*. A critical analysis on data regarding *Avaleha* formulations clearly indicates that maximum number of drugs are attributed with *Rasayana Guna*. Among them, repeated ten major drugs viz., *Amalaki*, *Haritaki*, *Pippali* etc. exhibit antioxidant activity, which is preferred as one of the pharmacological expressions of *Rasayana Guna*. Degenerative changes in different organs due to oxidative stress may be controlled by *Rasayana* drugs which are mentioned in *Avaleha* formulation with proven antioxidant activities. So that *Avaleha* might play major role in *Ayurveda* for longevity of human being.

## REFERENCES

- <sup>1</sup> Bhavamishra, Bhavaprakasha Nighantu, commentary by; Prof. K.C. Chunekar, edited by Dr. G.S. Pandey, Reprint:2020, Chaukhambha Bharti Academy; Varanasi, Haritkyadi Varga/19, Pg.5.
- <sup>2</sup> Bhavamishra, Bhavaprakasha Nighantu, commentary by; Prof. K.C. Chunekar, edited by Dr. G.S. Pandey, Reprint:2020, Chaukhambha Bharti Academy; Varanasi, Karpuradi Varga/39, Pg.195.
- <sup>3</sup> Bhavamishra, Bhavaprakasha Nighantu, commentary by; Prof. K.C. Chunekar, edited by Dr. G.S. Pandey, Reprint: 2020, Chaukhambha Bharti Academy; Varanasi, Dhatvadi Varga/80, Pg.600.
- <sup>4</sup> Sushama B Bhuvad, K Nishteswar, Anti-Oxidant Activity perspectives in Rasayana Karma, Joinsysmed vol 3(2), Pg. 69-81.
- <sup>5</sup> Jian-Ming Lü et al. Chemical and molecular mechanisms of antioxidants: experimental approaches and model systems J Cell Mol Med. 2010 Apr; 14(4): 840–860. Published online 2009 Sep 14. doi: 10.1111/j.1582-4934.2009.00897.x
- <sup>6</sup> Agnivesha, Charaka Samhita of Acharya Charaka, Dridhabala, edited by Prof. Rajeshwara Datta Shastri, Prof. Yadunandana Upadhyaya, Prof. Ganga Sahaya Pandey, with Vidyotini Hindi commentary by Pandit Kashinatha Shastri and Dr. Gorakhanatha Chaturvedi. Reprint, Varanasi: Chaukhambha Bharti Academy; 2016.
- <sup>7</sup> Sushruta Vriddha Sushruta, Sushruta Samhita of Acharya Sushruta, Nagarjuna, edited with Ayurveda Tattava Sandipika Hindi commentary by Kaviraj Ambikadatta Shastri, forwarded by Dr. Pranajivana Mehta. Reprint, Varanasi: Chaukhambha Surbharti Sansthan; 2014.
- <sup>8</sup> Vriddha Vagbhata, Astanga Samgraha, with Hindi commentary by Kaviraj Atrideva Gupta, forwarded by Rajvaidya Nandakishor Sharma. Reprint, Varanasi: Chowkhamba Krishnadas Academy; 2011.
- <sup>9</sup> Vagbhata, Astanga Hradaya, edited by Dr. Brahmanand Tripathi with Nirmala Hindi commentary. Reprint, Delhi: Chaukhambha Sanskrit Pratishtan; 2015.
- <sup>10</sup> Beena J, Sandhya CP, Remitha KR. Comparison and Bio evaluation of fruit extracts. Journal of Chemical and Pharmaceutical Research. 2010; Vol 2 (4):612-622.
- <sup>11</sup> Prakash G. Biological and pharmacological properties of Terminalia chebula Retz. (Haritaki) – An overview. International Journal of Pharmacy and Pharmaceutical Sciences. 2012; 4. 62-68.
- <sup>12</sup> Gupta P, Parminder N, Jaspreet S. Antimicrobial and anti-oxidant activity on Emblica officinalis seed extract. IJRAP. 2012; 3(4):591-596.

- 
- <sup>13</sup> Gupta A, Kumar R, Pandey S, et al. *Molecular Biology and Pharmacognosy of Beneficial Plants. Pharmacological Aspects of Terminalia belerica*. Publisher: Lenin Media Private Limited. 2017; Delhi, India.
- <sup>14</sup> Brijesh K. Evaluation of the Hepatoprotective and antioxidant effect of *Berberis asiatica* against experimentally induced liver injury in rats. *International Journal of Pharmacy and Pharmaceutical Sciences*. 2010; 2(1).
- <sup>15</sup> Ghosh K, Derle A, Ahire M, et al. Phytochemical analysis and free radical scavenging activity of medicinal plants *Gnidia glauca* and *Dioscorea bulbifera*. 2013; *PLoS One*; Vol. 8 (12): e82529.
- <sup>16</sup> Pandey N, Chaurasia JK, Tiwari OP, et al. Antioxidant properties of different fractions of tubers from *Pueraria tuberosa* Linn. *Food chemistry*. 2007; 05(1): 219- 222.
- <sup>17</sup> Premanath R, Lakshmidivi N. Studies on Anti-oxidant activity of *Tinospora cordifolia* (Miers.) Leaves using in vitro models. *Journal of American Science*. 2010; 6(10): 736-743.
- <sup>18</sup> Alagumani G, Muthu K, Manavalan R. Anti-oxidant potential of methanolic extract of tuberous root of *Ipomoea digitata* (Linn.). *Asian Journal of Chemistry*. 2011; Vol 23 (3):1393-1394.
- <sup>19</sup> Lalana K. Anti-oxidant activity and anti-apoptotic effect of root extracts in human ling epithelial H460 cells. 2011; *Exp. Ther Med*, 2(1):143-148.
- <sup>20</sup> Agnivesha, *Charaka Samhita of Acharya Charaka, Dridhabala*, edited by Prof. Rajeshwara Datta Shastri, Prof. Yadunandana Upadhyaya, Prof. Ganga Sahaya Pandey, with Vidyotini Hindi commentary by Pandit Kashinatha Shastri and Dr. Gorakhanatha Chaturvedi. Reprint, Varanasi: Chaukhambha Bharti Academy; 2016, Chikitshasthan 1/1/62-74.
- <sup>21</sup> Bhavamishra, *Bhavaprakasha Nighantu*, commentary by; Prof. K.C. Chunekar, edited by Dr. G.S. Pandey, Reprint:2020, Chaukhambha Bharti Academy; Varanasi, Haritkyadi Varga/39, Pg.10.
- <sup>22</sup> Bhavamishra, *Bhavaprakasha Nighantu*, commentary by; Prof. K.C. Chunekar, edited by Dr. G.S. Pandey, Reprint:2020, Chaukhambha Bharti Academy; Varanasi, Haritkyadi Varga/19, Pg.5.
- <sup>23</sup> Bhavamishra, *Bhavaprakasha Nighantu*, commentary by; Prof. K.C. Chunekar, edited by Dr. G.S. Pandey, Reprint:2020, Chaukhambha Bharti Academy; Varanasi, Haritkyadi Varga/54, Pg.15.
- <sup>24</sup> Bhavamishra, *Bhavaprakasha Nighantu*, commentary by; Prof. K.C. Chunekar, edited by Dr. G.S. Pandey, Reprint:2020, Chaukhambha Bharti Academy; Varanasi, Guduchyadi Varga/186, Pg.378.
- <sup>25</sup> Sushama B Bhuvad, K Nishteswar, *Anti-Oxidant Activity perspectives in Rasayana Karma*, *Joinsysmed* vol 3(2), Pg. 69-81.