

**CONCEPT OF VYADHIKSHAMATVA (IMMUNITY) IN AYURVEDA – A CRITICAL REVIEW****Dr. Manjula<sup>\*1</sup>, Dr. Anubha Yadav<sup>2</sup> and Dr. Mita Kotecha<sup>3</sup>**<sup>1</sup>PG Scholar, Dept. of Dravyaguna, NIA, Jaipur.<sup>2</sup>PG Scholar, Dept. of Ras Shastra and Bhaishajya Kalpana, AIIA, Delhi.<sup>3</sup>Prof. and HOD, Dept. of Dravyaguna, NIA, Jaipur.**\*Corresponding Author: Dr. Manjula**

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**ABSTRACT**

Today, the mankind is facing an increase in the emergence of new diseases every now & then along with the challenge to cope up with the pollution & stress to compete for survival every moment. Inefficiency of the modern medicine to deal with such upcoming issues is making the world look upto Ayurveda with hope. To maintain the health is the prime objective of Ayurveda which focuses on the significance of a healthy body. It says if the body is strong & capable enough, external factors cannot make much harm to it. Here, is the concept of vyadhiikshamatva as put forward in Ayurveda classics along with some commonly used drugs & sanskaras for improving it as well as the scientific proof in their favor. It represents the concept of immunity of the modern science.

**KEYWORDS:** Vyadhiikshamatva, Immunity, Ayurveda, Drugs for vyadhiikshamatva.**INTRODUCTION**

There is continuous exposure to many infecting agents with the continuously changing environment.<sup>[1]</sup> The external environment also checks the adaptive power of humans.<sup>[2]</sup> Kala causes the caya, prakop and prasamana of dosa to affect the body and make one to suffer with diseases.<sup>[3]</sup> The nature has given us the power to adapt and overcome these variations which is known as vyadhiikshamatva.<sup>[4]</sup> described as immunity in medical science.

In Ayurveda, vyadhiikshamatva is illustrated as the power of resistance capable enough to check the progress, occurrence or recurrence of diseases.<sup>[5]</sup>

**MATERIAL AND METHODS**

All the classical texts of Ayurveda (Samhitas along with their commentaries) were referred for the conceptual study. The discussion was made on the basis of conceptual study, and conclusions were drawn considering the conceptual study and discussion. Different journals, research articles, magazines, health bulletin, text books on Vyadhiikshamatva (immunity) were also consulted. Different recent research updates in the contemporary science have also been revived for evidence based researches to scientifically justify the Ayurveda fundamental facts regarding health and immunity.

**Definition**

It is made up of two words- Vyadhi and Kshamatva. Vyadhi derived from “vyadh tadne”<sup>[6]</sup> is the condition which gives Kayika, Vachika, Manasika peeda to Shareeradhishtita Purusha.<sup>[7]</sup> It is the vitiation of basic elements i.e. dosa, dhatu and mala,<sup>[8]</sup> roga being a state of vitiation of dosa.<sup>[9]</sup> Kshamatva derived from ‘kshamus sahan’<sup>[10]</sup> means Shakti or Samarthya in general. Usage of Kshamatva word with vyadhi means energy to prevent diseases in a healthy body.

**Synonyms of Vyadhiikshamatva**

Its synonyms are not mentioned directly but the following may be taken as its synonyms according to symptoms:-

**1. Swastha:** Susruta defines Swastha as a person whose Vatadi Dosa, Rasadi Dhatu, Mootradi mala and agni are in Sama pramana and work properly and who possess Prasannatmendriyamanah.<sup>[11]</sup> These resemble with the symptoms of Vyadhisaha Shareera. Only a healthy person has the capability of fighting the diseases which is termed as Vyadhiikshamatva.

Chakrapani defines Swasthya as the state of Samyaktaya nirvikaritva which is due to Udvejaka Dhatuvaishamyaviheen Dhatusamya.<sup>[12]</sup>

Charak has directed for making constant efforts to maintain health.<sup>[13]</sup> Following all the rules in Swastha Chatushka promotes good health which results in

increased Vyadhipratirodhaka Shakti due to increased Swabhavika bala of the body.

**2. Bala:** Bala defies Rogaroopi Dosa and Vyadhi kshamatva is defying diseases. Hence, Bala is the synonym of Vyadhi kshamatva.<sup>[14]</sup> Susruta also directed to always preserve Bala as it destroys Vyadhibala.<sup>[15]</sup> In other words, preserving bala increases Vyadhi kshamatva.

**3. Ojas:** It is the capital essence of all seven dhatu. Ojas & Bala have Adhar- Adheya & Karana- Karya sambandha. But Ojas & Bala are used synonymously as Ojas is Sarvotkrishhta karana of Bala.

It is clear that Bala is a reflection of Vyadhi kshamatva & Ojas is the prime base of both. Hence, all three are similar.

### Variability of Vyadhi kshamatva in Different Individuals

It is observed that many people with appropriate daily and seasonal habits also develop disease and some, though indulged in improper things develop hardly any disease.<sup>[16]</sup> Hita- ahita and Sukha- dukha are different for different individuals. Even after similar conditions and similar Desh kala ahara vihar etc., one person remains healthy while other is diseased which points that all person are not capable of Vyadhi kshamatva.<sup>[4,17]</sup> It is Pravara, Madhya or Avara in different individuals. In epidemics also, certain individuals do not develop a disease even after coming in contact with the relevant etiological factors while others become victim of disease.<sup>[18]</sup> It is just like that seed sowed in non-fertile land gets destroyed and the fire thrown in fuel or airless space subsides by its own (Manusmriti).

Charak has further described two types of individuals – Vyadhisaha and Avyadhisaha which are similar to Vyadhi kshamatva and akshamatva.<sup>[5]</sup>

**Avyadhisaha:** Persons incapable of resisting diseases:

- Atisthoola – Excessively obese persons
- Atikrisha – Excessively emaciated persons
- Anivishta mansa – Persons having improper musculature
- Anivishta rakta - Persons having defective Rakta (Blood)
- Anivishta asthi - Persons having defective Asthi dhatu (bone tissues)
- Durbala – Very weak persons
- Asatmyaharopchit – Persons nourished with unwholesome food
- Alpahari – Persons taking diet in small quantity.
- Alpasatvayukta – Persons with feeble mind

Excessive obese or emaciated persons are very weak. Also, since the strength of the body depends primarily on the healthiness of dhatu i.e. mamsa dhatu, asthi dhatu & sonita; improper physiological functioning (anivista) of these dhatu renders the persons naturally very weak.

Special mention of mamsa, asthi & sonita by Caraka may be due to following reasons:

- Healthy state of these three dhatu can be obtained by equilibrium of three dosa which is also essential for resisting disease. This is due to relation of ashraya-ashrayee bhava between rakta & pitta, mamsa & kapha and asthi & vata.
- WBC of blood (rakta) fights against infection and prevent any foreign substance from entering the body.
- Red bone marrow in asthi (bone) manufactures red & white cells of blood.

Individuals taking alpa, ahita ahara and objectionable food are also very weak due to improper nourishment of dhatus. Those with feeble satva are also weak due to interdependency of sarira & sattva bala.<sup>[19]</sup>

**Vyadhisaha:** Persons capable of resisting diseases

They are just opposite to above. Proportionate musculature, compactness of the body and healthy indriyas prevent the onset of disease; help to withstand hunger, thirst and heat of the sun, cold weather and physical exertion; assist in digesting & assimilating the food properly.<sup>[20]</sup>

### Types of Vyadhi kshamatva

Cakrapani quoted two types of vyadhi kshamatva<sup>[5]</sup>

- Vyadhibalavirodhi kshamatva** – Destroys the disease which has occurred. May be correlated with Yuktikrita bala or Artificial immunity of acquired immunity.
- Vyadhyutpad pratibandhaka Kshamatva** – Doesn't let the Vyadhi to evolve. May be correlated with Sahaja bala or Innate immunity.

There is a reference of a sambhasha in Caraka Samhita on "Factors which provoke the diseases".<sup>[21]</sup> The conclusion "apathya ahara is the nimitta of vyadhi and pathya ahara is the cause of purusa" signified the role of hita- ahita ahara in the development & obstruction of a disease.<sup>[22]</sup>

### Main Reasons for Vyadhi kshamatva

Disease is the only factor responsible for disturbing the normal physiological state of the body. Disease originates from Paraspar anubandha of Nidan, Dosa, Dusya and absence of Vikarvighatkar bhava. Vyadhi kshamatva is a process which acts as a result of presence of Vikarvighatkar bhava even after Paraspar anubandha of Nidan, Dosa, Dusya. Hence, Vikarvighatkar bhava are the main reason for Vyadhi kshamatva.

### Vikarvighatkar bhava

Factors which prevent or destroy diseases are called Vikarvighatkar bhava which depend on Samdosadi hetu in healthy body and Hitaharviharadi yuktikrita hetu. These bhava are present naturally in the body due to

physiological state of Dosadi and generate Vyadhikshamata which doesn't let the disease happen and health is maintained.

### Vikarvighatabhava

Occurrence of disease is possible when Nidan is favorable to Dosa & Dusya. Nidan sewan leads to Dosa Dusya Sammurchhana which occurs only in the absence of Vikarvighatakara bhava. In short, factors favorable to disease lead to diseased state and factors against the diseases lead to promotion of health due to Vyadhikshamatva.

### Factors Affecting the Status of Vyadhikshamatva

- Ojas:** Ojas which is the supreme essence of all dhatu<sup>[23]</sup> is the vital power of the body rendering the capability of being unaffected in case of severe infections.<sup>[24]</sup>
- Bala:** Bala is responsible for all the physical & psychological actions. Proper psychosomatic state ensures sufficient agnibala, dehabala which presents itself as healthy immune system.<sup>[25]</sup>
- Season:** One year is divided into aadana kala (Uttarayana) & visarga kala (Dakshinayana) on the basis of movement of sun. The former exhibits the predominance of sun & winds and is the debilitating period while the latter has predominance of moon and is the strengthening period.<sup>[26,27,28,29]</sup>
- Diet & regimen:** Appropriate quality & quantity of food following proper rules & regulations bring strength, complexion, happiness and longevity.<sup>[30]</sup>
- Anupana:** It promotes longevity & strength by facilitating easy digestion through assistance in breakdown, softening, digestion, proper assimilation and instant diffusion of food.<sup>[31]</sup>
- Rasa:** Utilizing all the six rasa in ahar is ideal for maintenance of health. Intake of Madhura & Amla rasa produces more strength.<sup>[32]</sup> One should follow the seasonal regimens by consumption of rasa opposite to kalakrita caya, prakop of dosas in order to avoid their adverse effects.<sup>[33]</sup>

S. No.	Ritu (Season)	Rasas (Taste)
1.	Varsha (Rainy)	Madhur, Amla, Lavana
2.	Sarad (Autumn)	Madhur, Tikta, Kasaya
3.	Vasanta (Spring)	Katu, Tikta, Kasaya
4.	Grisma (Summer)	Madhur
5.	Seeta (Winter)	Madhur, Amla, Lavana

**Jatakarma:** A sanskara conducted just after birth by giving madhu & ghrita in unequal quantity or gold to the baby for licking. It activates the neonatal digestive system by making external nutrition palatable to them. In addition to this, gold enhances the immune system.<sup>[34,35,36]</sup>

**Karnavedhana:** A sanskara done at 6<sup>th</sup> or 7<sup>th</sup> month of age by puncturing the pinna of the ear for raksha & bhushana<sup>[37]</sup> where raksha means protection from

disease as well as improvement of mental status whereas bhushana refers to cosmetic value. The puncturing injury leads to development of factors responsible for fighting against external stimuli, stimulation of immune system and good psychology against fear in future.

**Lehana karma:** Similar to the vaccination to prevent bacterial & viral diseases in the present day world, Kashyapa indicated lehana karma in children for homeostasis of dosas and to improve the immunity of the child.<sup>[38]</sup> Some of the lehas are as follows:

- Brahmi, Mandukaparni, Triphala, Chitraka, Vacha, Saunf, Satavari, Danti, Nagabala, Nisotha, use single above drugs with madhu & ghrita.
- Manjishtha, Triphala, Brahmi, Bala, Chitraka equal parts with honey & ghrita.
- Kalyanaka ghrita<sup>[39]</sup>
- Pancagavya ghrita
- Brahmi ghrita
- Samvardhana ghrita
- Abhaya ghrita<sup>[38]</sup>
- Astamangala ghrita
- Astanga ghrita<sup>[40]</sup>
- Saraswat ghrita<sup>[41]</sup>
- Vachadi ghrita<sup>[42]</sup>

**Suvarna prashana.**<sup>[43]</sup> Done by rubbing the gold on a clean stone & then mixing it with honey & ghrita (in asymmetrical quantity) and make the child lick it. It increases the intellect, strength, digestion & longevity of the child. It makes the child intellectual within one month and he does not get the disease. Further, he becomes shrutadhara within 6 months.

### Some herbal recipes with gold are<sup>[44]</sup>

- Swarna, sweta vacha & kushtha with madhu & ghrita
- Swarna, Arkapushpi with madhu & ghrita
- Swarna, matsyaksha & shankhabhasma with madhu & ghrita
- Kayaphala, swarna, balvacha with madhu & ghrita
- Swarna, vacha, bilva churna with ghrita

**Dhoopana karma:** To destroy various toxins present in the atmosphere Ayurveda directs for Dhoopana karma. For example Guggulu (Commiphora wightii), Jatamansi (Nardostachys jatamansi), Dhoopana is for destroying micro-organisms and thus protecting the health.

**Dravya:** There are many dravya which enhance immunity viz.

- Taila pradhan ahara for female & ghrita pradhan ahara for male is prescribed before gramya dharma (copulation).<sup>[45]</sup>
- Specific drugs are prescribed in different months of pregnancy for better foetal growth.
- Different ahar kalpana is prescribed according to age for enhancing the bala (strength) of children.
- Stanya is quoted as Arogyakara.<sup>[46]</sup> Harita samhita says that breast milk purifies strotas, keeps dosas in

balanced state, increase & improve digestion and keeps a person free from various ailments.<sup>[47]</sup> Kashyap samhita described about breast milk in detail & said that it provides nourishment, growth, increase strength, produces ojas and carries quality of life.<sup>[48]</sup> It is also therapeutically indicated for diarrhea, fever, malnutrition anaemia, loss of appetite, influenza, worm infestation and specially for eye diseases. Breast feeding to child acts as a health promoter for the mother too.<sup>[49]</sup>

- (e) Rasayana drugs which fortify dhatus are described in all texts for enhancing bala and preventing old age & disease.<sup>[50]</sup>

### Some Single Drugs Used To Enhance Vyadhikshamatva

In the classics, no direct reference of drugs increasing vyadhikshamatva was found. But, practically many drugs are utilized for the purpose which are otherwise termed as Jivaniya, Balya, Vayahsthapana, Brimhaniya or Rasayana in the classics. Some of them are:-

Vidarikanda (*Pueraria tuberosa* DC.),<sup>[51]</sup> Satavari (*Asparagus racemosus* Willd.),<sup>[52]</sup> Ashwagandha (*Withania somnifera* Dunal),<sup>[53]</sup> Varahikanda (*Dioscorea bulbifera* Linn.),<sup>[54]</sup> Mudgaparni (*Phaseolus trilobus* sensu),<sup>[55]</sup> Mashparni (*Teramnus labialis* Spreng.),<sup>[56]</sup> Jeevanti (*Leptadenia reticulata* W. & A.),<sup>[57]</sup> Guduchi (*Tinospora cordifolia* Willd. Miers ex Hook. f. & Thoms.),<sup>[58]</sup> Karkat shringi (*Pistacia integerrima* Stewart ex Brandis), Vanshalochana (*Bambusa arundinacea* Willd.),<sup>[59]</sup> Sweta kamala (*Nelumbo nucifera* Gaertn.),<sup>[60]</sup> Draksha (*Vitis vinifera* Linn.),<sup>[61]</sup> Yashtimadhu (*Glycyrrhiza glabra* Linn.),<sup>[62]</sup> Vidhara (*Argyrea speciosa* Sweet),<sup>[63]</sup> Ksheeravidari (*Ipomea digitata* Linn.), Bala (*Sida cordifolia* Linn.), Atibala (*Abutilon indicum*),<sup>[64]</sup> Mahabala (*Sida rhombifolia* Linn.), Amalaki (*Embolia officinalis* Gaertn.),<sup>[65]</sup> Rishabhi (*Mucuna pruriata* Hook.), Endri (*Baccopa monnieri* Linn.),<sup>[66]</sup> Punarnava (*Boerhavia diffusa* Linn.),<sup>[67]</sup> Haritaki (*Terminalia chebula* Retz.),<sup>[68]</sup> Pippali (*Piper longum* Linn.),<sup>[69]</sup> Gokshura (*Tribulus terrestris* Linn.),<sup>[70]</sup> Kantakari (*Solanum surattense* Burm f.),<sup>[71]</sup> Bhallataka (*Semecarpus anacardium* Linn. f.),<sup>[72]</sup> Kharjura (*Phoenix sylvestris* Roxb.).<sup>[73]</sup>

### DISCUSSION

Every Ahita Ahar is not equally harmful, all dosas are not equally powerful, and all persons are not capable of resisting diseases. Over obese individual; over emaciated person; whose muscles and blood are diminished markedly; debilitated person; one who consumes unwholesome food; one who consumes less amount of food; who is mentally weak are incapable to resist diseases & vice versa. Factors which contribute for resistance to diseases are equilibrium of dosa, dhatu, agni; patency of srotas etc.

Ayurveda presents with the concept of vyadhikshamatva (resistance against any disease) equivalent to the immunity of modern medicine which refers to the ability

of the body to defend itself against specific invading agents such as bacteria, toxins, viruses and foreign tissues.<sup>[74]</sup> It is of two types, innate and adaptive. The innate immunity is the first line of defence without antigenic specificity. The innate immunity can be compared with the Sahaja Bala of a person which is gained by birth. The second type of immunity is the adaptive immunity, which is characterised by antigenic specificity. The adaptive immunity can be compared with the Kalaja Bala and Yuktikrita Bala.

It is possible to increase Vyadhikshamatva at the time of conception, during gestational period and even after birth. Among all factors responsible for increasing the strength of body, Desha and Kula are such factors which cannot be changed. The Kala & Kshetra are changeable, the age & time of conception being plannable and the health of Kshetra (Uterus) improvable. But these factors are internal factors, the external factors used after conception for healthy progeny being the good quality of food, adaptability of food and environment, mental relaxation. After birth, daily & seasonal regimes play a major role.

The vitiated Doshas during particular season should be removed through Shodhana as a preventive measure for occurrence of disease. In Vasanta Ritu Kapha is expelled through Vamana while Pitta is expelled through Virechana in Sarad Ritu.

### CONCLUSION

Vyadhikshamatva which is synonymous to Swastha, Bala & Ojas is a matter of substance in the present world where every day new sort of diseases are evolving. Different individuals present with different levels of vyadhikshamatva which depends on various factors viz. Ojas, Bala, Season, Diet & regimen, Anupana, Rasa, Jatakarma sanskara, Karnavedhana sanskara, Lehana karma, Suvarna prashana; various dravya including Jivaniya, Balya, Vayahsthapana, Brimhaniya or Rasayana Dravya. One should wisely adopt these into his lifestyle so as to make his body & mind strong enough to deal with all the physical & mental stresses of the modern era.

### REFERENCES

1. Susruta, Susruta samhita, with Nibandhasangraha commentary of Dalhana, Ed. Yadavji Trikamji Acharya, Chaukhambha Sanskrit Sansthan, Varanasi, Reprint, Sutrasthan, 2014; 6/3: 23.
2. Agnivesha, Charaka Samhita with Ayurved Deepika commentary of Chakrapanidatta, Ed. Yadavji Trikamji Acharya, Chaukhambha Sanskrit Sansthan, Varanasi, Reprint, Sutrasthan, 2014; 6/8: 45.
3. Susruta, Susruta samhita, with Nibandhasangraha commentary of Dalhana, Ed. Yadavji Trikamji Acharya, Chaukhambha Sanskrit Sansthan, Varanasi, Reprint, Sutrasthan, 2014; 6/11: 26.
4. Agnivesha, Charaka Samhita with Ayurved Deepika commentary of Chakrapanidatta, Ed. Yadavji



- Trikamji Acharya, Chaukhambha Sanskrit Sansthan, Varanasi, Reprint, Sutrasthana, 2014; 28/7: 178.
5. Agnivesha, Charaka Samhita with Ayurved Deepika commentary of Chakrapanidatta, Ed. Yadavji Trikamji Acharya, Chaukhambha Sanskrit Sansthan, Varanasi, Reprint, Sutrasthana, Chakrapani commentary, 2014; 28/7: 178.
6. Sri Taranatha Tarkavachaspati, Vachaspatyam (A comprehensive Sanskrit Dictionary), Chaukhambha Sanskrit Series, Varanasi-1, 1962: VI: 4987.
7. Susruta, Susruta samhita, with Nibandhasangraha commentary of Dalhana, Ed. Yadavji Trikamji Acharya, Chaukhambha Sanskrit Sansthan, Varanasi, Reprint, Sutrasthan, Dalhana commentary, 2014; 1/23: 6.
8. Agnivesha, Charaka Samhita with Ayurved Deepika commentary of Chakrapanidatta, Ed. Yadavji Trikamji Acharya, Chaukhambha Sanskrit Sansthan, Varanasi, Reprint, Sutrasthana, 2014; 9/4: 62.
9. A. H. Su., 1/20.
10. Sri Taranatha Tarkavachaspati, Vachaspatyam (A comprehensive Sanskrit Dictionary), Chaukhambha Sanskrit Series, Varanasi-1, 1962: III: 2362.
11. Susruta, Susruta samhita, with Nibandhasangraha commentary of Dalhana, Ed. Yadavji Trikamji Acharya, Chaukhambha Sanskrit Sansthan, Varanasi, Reprint, Sutrasthan, 2014; 15/41: 75.
12. Agnivesha, Charaka Samhita with Ayurved Deepika commentary of Chakrapanidatta, Ed. Yadavji Trikamji Acharya, Chaukhambha Sanskrit Sansthan, Varanasi, Reprint, Sutrasthana, Chakrapani commentary, 2014; 5/13: 38.
13. Agnivesha, Charaka Samhita with Ayurved Deepika commentary of Chakrapanidatta, Ed. Yadavji Trikamji Acharya, Chaukhambha Sanskrit Sansthan, Varanasi, Reprint, Sutrasthana, 2014; 5/13: 38.
14. Agnivesha, Charaka Samhita with Ayurved Deepika commentary of Chakrapanidatta, Ed. Yadavji Trikamji Acharya, Chaukhambha Sanskrit Sansthan, Varanasi, Reprint, Chikitsasthana, 2014; 3/167: 413.
15. Susruta, Susruta samhita, with Nibandhasangraha commentary of Dalhana, Ed. Yadavji Trikamji Acharya, Chaukhambha Sanskrit Sansthan, Varanasi, Reprint, Chikitsasthan, 2014; 18/3: 470.
16. Agnivesha, Charaka Samhita with Ayurved Deepika commentary of Chakrapanidatta, Ed. Yadavji Trikamji Acharya, Chaukhambha Sanskrit Sansthan, Varanasi, Reprint, Sutrasthana, 2014; 10/4: 65.
17. Agnivesha, Charaka Samhita with Ayurved Deepika commentary of Chakrapanidatta, Ed. Yadavji Trikamji Acharya, Chaukhambha Sanskrit Sansthan, Varanasi, Reprint, Chikitsasthana, 2014; 3/68: 404.
18. Agnivesha, Charaka Samhita with Ayurved Deepika commentary of Chakrapanidatta, Ed. Yadavji Trikamji Acharya, Chaukhambha Sanskrit Sansthan, Varanasi, Reprint, Vimanasthana, 2014; 3/6: 241.
19. Agnivesha, Charaka Samhita with Ayurved Deepika commentary of Chakrapanidatta, Ed. Yadavji Trikamji Acharya, Chaukhambha Sanskrit Sansthan, Varanasi, Reprint, Sarirasthana, 2014; 4/36: 323.
20. Agnivesha, Charaka Samhita with Ayurved Deepika commentary of Chakrapanidatta, Ed. Yadavji Trikamji Acharya, Chaukhambha Sanskrit Sansthan, Varanasi, Reprint, Sutrasthana, 2014; 21/18(19): 117.
21. Agnivesha, Charaka Samhita with Ayurved Deepika commentary of Chakrapanidatta, Ed. Yadavji Trikamji Acharya, Chaukhambha Sanskrit Sansthan, Varanasi, Reprint, Sutrasthana, 2014; 25/30: 129.
22. Agnivesha, Charaka Samhita with Ayurved Deepika commentary of Chakrapanidatta, Ed. Yadavji Trikamji Acharya, Chaukhambha Sanskrit Sansthan, Varanasi, Reprint, Sutrasthana, 2014; 25/31: 129.
23. Susruta, Susruta samhita, with Nibandhasangraha commentary of Dalhana, Ed. Yadavji Trikamji Acharya, Chaukhambha Sanskrit Sansthan, Varanasi, Reprint, Sutrasthan, 2014; 15/19: 71.
24. Susruta, Susruta samhita, with Nibandhasangraha commentary of Dalhana, Ed. Yadavji Trikamji Acharya, Chaukhambha Sanskrit Sansthan, Varanasi, Reprint, Sutrasthan, 2014; 15/21(22): 71.
25. Susruta, Susruta samhita, with Nibandhasangraha commentary of Dalhana, Ed. Yadavji Trikamji Acharya, Chaukhambha Sanskrit Sansthan, Varanasi, Reprint, Sutrasthan, 2014; 15/20: 71.
26. Susruta, Susruta samhita, with Nibandhasangraha commentary of Dalhana, Ed. Yadavji Trikamji Acharya, Chaukhambha Sanskrit Sansthan, Varanasi, Reprint, Sutrasthan, 2014; 6/7: 25.
27. Agnivesha, Charaka Samhita with Ayurved Deepika commentary of Chakrapanidatta, Ed. Yadavji Trikamji Acharya, Chaukhambha Sanskrit Sansthan, Varanasi, Reprint, Sutrasthana, 2014; 6/5: 44.
28. Vriddha Vagbhata; Ashtanga Sangraha; with the commentaries of Vaidya Shree Govardhan Sharma Changani; Ed. Yadavji Trikamji Acharya, Chaukhambha Sanskrit Series, Varanasi, Sutrasthana, 1954; 4/5(6): 35.
29. Vagbhata; Ashtanga Hridaya; with the commentaries of Sarvangasundara of Arunadatta & Ayurveda Rasayana of Hemadri; Pandita Hari Sadasiva Sastri Paradkara (Ed.); Chaukhambha Sanskrit Sansthan, Varanasi; Reprint; Sutra Sthana, 2012; 3/7: 39.
30. Agnivesha, Charaka Samhita with Ayurved Deepika commentary of Chakrapanidatta, Ed. Yadavji Trikamji Acharya, Chaukhambha Sanskrit Sansthan, Varanasi, Reprint, Sutrasthana, 2014; 6/3: 44.
31. Susruta, Susruta samhita, with Nibandhasangraha commentary of Dalhana, Ed. Yadavji Trikamji Acharya, Chaukhambha Sanskrit Sansthan, Varanasi, Reprint, Sutrasthan, 2014; 46/419- 445: 244- 247.
32. Agnivesha, Charaka Samhita with Ayurved Deepika commentary of Chakrapanidatta, Ed. Yadavji Trikamji Acharya, Chaukhambha Sanskrit Sansthan, Varanasi, Reprint, Sutrasthana, 2014; 26/42-1(2): 144.
33. Vriddha Vagbhata; Ashtanga Sangraha; with the commentaries of Vaidya Shree Govardhan Sharma

- Changani; Ed. Yadavji Trikamji Acharya, Chaukhambha Sanskrit Series, Varanasi, Sutrasthana, 1954; 1/24: 7.
34. Agnivesha, Charaka Samhita with Ayurved Deepika commentary of Chakrapanidatta, Ed. Yadavji Trikamji Acharya, Chaukhambha Sanskrit Sansthan, Varanasi, Reprint, Sarirasthana, 2014; 8/46: 349.
  35. Susruta, Susruta samhita, with Nibandhasangraha commentary of Dalhana, Ed. Yadavji Trikamji Acharya, Chaukhambha Sanskrit Sansthan, Varanasi, Reprint, Sarirasthan, 2014; 10/12: 388.
  36. Vagbhata; Ashtanga Hridaya; with the commentaries of Sarvangasundara of Arunadatta & Ayurveda Rasayana of Hemadri; Pandita Hari Sadasiva Sastri Paradkara (Ed.); Chaukhambha Sanskrit Sansthan, Varanasi; Reprint; Uttara Tantra, 2012; 1/12-13: 778.
  37. Susruta, Susruta samhita, with Nibandhasangraha commentary of Dalhana, Ed. Yadavji Trikamji Acharya, Chaukhambha Sanskrit Sansthan, Varanasi, Reprint, Sutrasthan, 2014; 16/3: 76.
  38. Vriddha Jivaka; Kashyapa Samhita; Revised by Vatsya, with Vidyotini Hindi commentary and hindi translation of Sanskrit introduction by Sri Satyapala Bhishakacharya; Chaukhambha Sanskrit Sansthan, Varanasi, Reprint, Sutrasthan, 2013; 1/4: 1.
  39. Vriddha Jivaka; Kashyapa Samhita; Revised by Vatsya, with Vidyotini Hindi commentary and hindi translation of Sanskrit introduction by Sri Satyapala Bhishakacharya; Chaukhambha Sanskrit Sansthan, Varanasi, Reprint, Sutrasthan, 2013 1/33(34): 5.
  40. Vagbhata; Ashtanga Hridaya; with the commentaries of Sarvangasundara of Arunadatta & Ayurveda Rasayana of Hemadri; Pandita Hari Sadasiva Sastri Paradkara (Ed.); Chaukhambha Sanskrit Sansthan, Varanasi; Reprint; Uttara Tantra, 2012; 1/43-44: 780.
  41. Vagbhata; Ashtanga Hridaya; with the commentaries of Sarvangasundara of Arunadatta & Ayurveda Rasayana of Hemadri; Pandita Hari Sadasiva Sastri Paradkara (Ed.); Chaukhambha Sanskrit Sansthan, Varanasi; Reprint 2012; Uttara Tantra 1/45, p- 780.
  42. Vagbhata; Ashtanga Hridaya; with the commentaries of Sarvangasundara of Arunadatta & Ayurveda Rasayana of Hemadri; Pandita Hari Sadasiva Sastri Paradkara (Ed.); Chaukhambha Sanskrit Sansthan, Varanasi; Reprint; Uttara Tantra, 2012; 1/43-46: 780.
  43. Vriddha Jivaka; Kashyapa Samhita; Revised by Vatsya, with Vidyotini Hindi commentary and hindi translation of Sanskrit introduction by Sri Satyapala Bhishakacharya; Chaukhambha Sanskrit Sansthan, Varanasi, Reprint, Sutrasthan, 2013; 1/26(27): 4-5.
  44. Vagbhata; Ashtanga Hridaya; with the commentaries of Sarvangasundara of Arunadatta & Ayurveda Rasayana of Hemadri; Pandita Hari Sadasiva Sastri Paradkara (Ed.); Chaukhambha Sanskrit Sansthan, Varanasi; Reprint; Uttara Tantra, 2012; 1/48-49: 781.
  45. Agnivesha, Charaka Samhita with Ayurved Deepika commentary of Chakrapanidatta, Ed. Yadavji Trikamji Acharya, Chaukhambha Sanskrit Sansthan, Varanasi, Reprint, Sarirasthana, 2014; 8/4: 340.
  46. Agnivesha, Charaka Samhita with Ayurved Deepika commentary of Chakrapanidatta, Ed. Yadavji Trikamji Acharya, Chaukhambha Sanskrit Sansthan, Varanasi, Reprint, Sarirasthana, 2014; 8/54: 351.
  47. Harita Samhita, Ed. & Commentator Pandit Hari Prasad Tripathi, I edition, 2005; 8/13: 60.
  48. Vriddha Jivaka; Kashyapa Samhita; Revised by Vatsya, with Vidyotini Hindi commentary and hindi translation of Sanskrit introduction by Sri Satyapala Bhishakacharya; Chaukhambha Sanskrit Sansthan, Varanasi, Reprint, Khilasthan, 2013; 22/7-9: 355.
  49. Vriddha Jivaka; Kashyapa Samhita; Revised by Vatsya, with Vidyotini Hindi commentary and hindi translation of Sanskrit introduction by Sri Satyapala Bhishakacharya; Chaukhambha Sanskrit Sansthan, Varanasi, Reprint, Khilasthan, 2013; 22/8-11: 355.
  50. Agnivesha, Charaka Samhita with Ayurved Deepika commentary of Chakrapanidatta, Ed. Yadavji Trikamji Acharya, Chaukhambha Sanskrit Sansthan, Varanasi, Reprint, Chikitsasthana, 2014; 1/1/7(8): 376.
  51. Patel J., Doshi N., Bhalerao A., Bonagiri R.; Immunomodulatory activity of ethanolic extract of Pueraria Tuberosa D.C; International Journal of Scientific & Engineering Research, 2016; 7(11).
  52. Gautam M, Saha S., Bani S., Kaul A., Mishra S., Patil D., Satti N.K., Suri K.A., Gairola S., Suresh K., Jadhav S., Qazi G.N., Patwardhan B.; Immunomodulatory activity of Asparagus racemosus on systemic Th1/Th2 immunity: implications for immunoadjuvant potential, 2009; 121(2): 241-7.
  53. Davis L<sup>1</sup>, Kuttan G.; Effect of Withania somnifera on cell mediated immune responses in mice; J Exp Clin Cancer Res., 2002; 21(4): 585-90.
  54. Zhang H.M., Yuan J. Y., Wei F.R., Liu L.F.; Effects of Hubei Dioscorea bulbifera L. on immune function in mice; Chinese Pharmaceutical Journal, 44: 1309-1311.
  55. Sony Jayaraman, Sumesh Kumar T.M., E. Jayadevi Variyar; Evaluation of immunomodulation by Leptidaguthis cuspidate and Phaseolus trilobus; International Journal of Innovative Pharmaceutical Sciences and Research, 2015; 3(7): 829- 838.
  56. Alagumanivasagam G., Muthu A. K., Manavalan R.; In vivo Antioxidant and Lipid Peroxidation Effect of Methanolic Extract of whole plant of Teramnus labialis (Linn.) in Rat fed with high Fat Diet; International Journal of Pharm Tech Research, 2012; 4(3): 1233-1237.
  57. Pravansha S<sup>1</sup>, Thippeswamy BS, Veerapur VP; Immunomodulatory and antioxidant effect of Leptadenia reticulata leaf extract in rodents: possible modulation of cell and humoral immune response; Immunopharmacol Immunotoxicol, 2012; 34(6): 1010-9.

58. More P, Pai K; Immunomodulatory effects of *Tinospora cordifolia* (Guduchi) on macrophage activation; *Biology and Medicine, Special Issue*, 2011; 3(2): 134-140.
59. Muniappan M. Immunosuppressant effect of *Bambusa arundinacea*. *Journal of pharmaceutical and biomedical sciences (J Pharm Biomed Sci.)*, 2013; 26(26): 393-396.
60. Sivagurunathan A., Xavier Innocent B., Muthu Lakshmi S. Immunomodulatory effect of dietary *Nelumbo nucifera* (Lotus) in growth and haematology of *Cirrhinus mrigala* challenged with *pseudomonas aeruginosa*, *Journal of Applied Pharmaceutical Science*, 2012; 2: 191-195. 10.7324/JAPS.2012.2730.
61. Rabie M., Asri Y., Ahmadi K., Effect of Milk thistle plant, *Vitis vinifera* extract on immune system of rainbow trout (*Oncorhynchus mykiss*) challenge by diazinon, *International Journal of Aquatic Biology*, 2016; 4: 208-214.
62. Hong YK, Wu HT, Ma T, Liu WJ, He XJ.; Effects of *Glycyrrhiza glabra* polysaccharides on immune and antioxidant activities in high-fat mice; *Int J Biol Macromol.*, 2009; 45(1): 61-4.
63. Gokhale AB, Damre AS, Saraf MN.; Investigations into the immunomodulatory activity of *Argyrea speciosa*; *J Ethnopharmacol*, 2003; 84(1): 109-14.
64. Dashputre N. L. , Naikwade N. S.; Immunomodulatory Activity of *Abutilon Indicum* Linn on Albino Mice; *International Journal of Pharma Sciences and Research (IJPSR)*, 2010; 1(3): 178-184.
65. Sharma M., Pandey G., Verma K. S.; Antioxidant, immunomodulatory and anticancer activities of *Emblia officinalis*: An overview, *International Research Journal of Pharmacy*, 2014; 2: 38-42.
66. Saraphanchotiwitthaya A., Ingkaninan K., Sripal P.; Effect of *Bacopa monniera* Linn extract on murine immune response in vitro; *Physiotherapy Research*, 2008; 22(10): 1330-1335.
67. Manu KA, Kuttan G.; *Boerhavia diffusa* stimulates cell-mediated immune response by upregulating IL-2 and downregulating the pro-inflammatory cytokines and GM-CSF in B16F-10 metastatic melanoma bearing mice; *J Exp Ther Oncol.*, 2008; 7(1): 17-29.
68. Aher V., Wahi A.; Immunomodulatory Activity of Alcohol Extract of *Terminalia chebula* Retz *Combretaceae*; *Tropical Journal of Pharmaceutical Research*, 2011; 10(5).
69. Tripathi D. M., Gupta N., Lakshmi V., Saxena K. C., Agrawal A. K.; Antigiardial and immunostimulatory effect of *Piper longum* on giardiasis due to *Giardia lamblia*; *Phytotherapy Research*, 1999; 13(7): 561-565.
70. Mallaiaha G.K., Rajub P. K. , Thirupathib K., Mohan G.K.; Evaluation of Immunomodulatory Activity of *Tribulus Terrestris* in Animal Model; *International Journal of Pharmacy and Biological Sciences*, 2016; 6(2): 171-177.
71. Sultana R., Khanam S., Devi K.; Immunomodulatory effect of methanol extract of *Solanum xanthocarpum* fruits; *International Journal of Pharma Sciences and Research (IJPSR)*, 2011; 2(2): 93-97.
72. Singh D., Aggarwal A., Mathias A., Naik S.; Immunomodulatory activity of *Semecarpus anacardium* extract in mononuclear cells of normal individuals and rheumatoid arthritis patients; *Journal of Ethnopharmacology*, 2006; 108(3): 398-406.
73. Eddine K.H., Zerizer S., Kabouche Z.; Immunostimulatory Activity of *Phoenix Dactylifera*, *International Journal of Pharmacy and Pharmaceutical Sciences*, 2014; 6(3).
74. Tortora G. J.; *Principles of Anatomy and Physiology*, Ninth Edition, 752.