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Ayurveda

VAYASTHAPAKA GANA AS AN ANTIOXIDANT IN NETRAGATA ROGAS:- REVIEW STUDY

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ABSTRACT The word *Vayasthapana* means slow down and maintain the ageing process i.e. degeneration which is main aim of treatment of degenerative disorders. All the herbal drugs in *Vayasthapaka Gana* possess properties of regeneration by maintaining normal level of *doshas*, additionally some of the drugs show *Rasayana* (Rejuvenating) Properties, which in turn improves quality of *dhatu* by enhancing the activity in the stratus all over the body. *Vayasthapak Gana* contains *Amruta, Abhaya, Dhatri ,Rasna, shweta, Jivanti, Shatavari, Mandukparni, Shaliparni, Punarnava.* Study done on *Vayasthapaka Ghana vati* in *Dwitiya tritiya patalagata dosh dushti* w.s. r. to myopic degeneration shows good result in subjective as well as objective parameter. This encourages me to study its effect in other degenerative disorder in *Netraroga*. So in the present study sincere effort is made to evaluate the antioxidant activity of *Vayasthapak Gana*.

KEYWORDS : *Vayasthapaka Gana*, Antioxidant Activity, *Rasayana, Netraroga.*

INTRODUCTION

The diseases of the eye are much more important than any other physical disability since the loss of vision completely disables the patient. The most disastrous result of ocular disease is blindness. Of all the ocular diseases, Refractive errors which can be correlate with *Timira* is considered to be the important one, causing difficulty in vision. A good deal of care is required in carrying out its proper diagnosis and treatment. Myopia of less than -6.00 D don't develop any problems and can be easily dealt with glasses or contact lenses. This is simple myopia. But people with myopia higher than -6.00 D may be at risk of certain eye condition that require treatment other than spectacle. This is known as degenerative or pathological myopia.

Myopic degeneration is the condition characterized by progressive stretching of eye that damage retina. Patients having high myopia are at higher risk of developing various eye condition and changes associated with lengthening of eye. If such changes are not treated timely, patient may get serious problems in the posterior segment or may become blind after certain age group & this degenerative changes are irreversible. Over 200 million people worldwide suffer from blindness or low vision[1] due to a variety of diseases, including retinal degenerative disease. The two most prevalent retinal diseases are[2] – age-related macular degeneration primarily affecting people above 60 years[3], and retinitis pigmentosa which is the most common inherited cause of blindness in people between the ages of 20 and 60 worldwide[4].Other degenerative disorders are Cataract, Diabetic retinopathy. Modern medicine have its limitation regarding degenerative disorders of eye. So here *Vayasthapaka Gana* is selected for the present study to evaluate its antioxidant activity.

AIM:-To evaluate the antioxidant activity of *Vayasthapak Gana.*

OBJECTIVE:-

1) To study the antioxidant activity of *Vayasthapaka Gana* in degenerative disorders of eye.
2) To study the properties and analyze the effect of drugs in *Vayasthapak Gana.*

MATERIAL AND METHOD

Vayasthapaka Gana[5]:-Includes following drugs.

Review of literature w. s. r. to chemical constituent of *Vayasthapaka Gana* in *Ayurvedic* and modern text is summarized in the given study.

Table No.1[6,7]: Drug Review

Sr. No.	NAME	LATIN NAME	FAMILY	PART USED	DOSHGHNATA	TYPES
1	Guduchi	Tinospora Cordifolia	Menispermacea	Kanda	Tridoshaghnata	1)Padma Guduchi 2) Kanda Guduchi
2	Haritaki	Terminalia Chebula	Combrataceae	Fruit	Tridoshaghna	7 Types
3	Amalaki	Emblica Officinalis	Euphorbiaceae	Fruit, Juice Of Leaves, AmalakiBeej	Tridoshaghna	1.Vanya 2.Gramya
4	Rasna	Pluchea Lanceolata	Asteraceae (Compositae)	Leaves	Kapha vatashamak	-
5	Aparajita	Clitoria Ternatea	Fabaceae (Papilionaceae)	Roots,Leaves,Flowers,Seeds	Tridoshaghna	1.Shwetpushpa Aparajita 2.Nilpushpa Aparajita
6	Jivanti	LeptadeniaReticulata	Asclepediaceae	Root,Fruit	Vata pittashamak, Tridoshhara	1.Jivanti 2.Swarnajivanti
7	Shatavari	AsperagusRacemosus	Liliacae	Kanda	Vatapittashamak	-
8	Mandukparni	Centella Asiatica	Umbelliferae	Whole Plant	Kapha pittashamak	1)Brahmi-Centella Asiatica 2)Mandukparni- Bacopa Monnieri
9	Shaliparni	DesmodiumGangeticum	Leguminosae (Papilionacae)	Roots, Whole Plant.	Tridoshshamak	-
10	Punarnava	Boerhavia Diffusa	Nyctaginaceae	Roots, Whole Plant, Seed	Tridoshhara	1.Rakta BoerhaaviaDiffusa 2.Shweta: TrianthemaSpecies

Table No.2[6,7]:Properties and effect of drugs in *Vayasthapaka Gana*

1)Guduchi	Rogaghnata	Trushna, Daha, Mehaghna, Kasa, Pandu, Kamala, Kushtha, Vatarakta, Jwara, Krumi, Chardi, Aamvata, Agnimandya, Shoola.
	Karma	Dahaprashamana, Trushnashamana, Medoghna, Vrushya, Rasayana, Yakrut- Uttejaka.
	Strotogamitwa	Rasavha, Raktavaha, Medovha, Astivha, Majjavha, Shukravaha
2)Haritaki	Rogaghnata	Netravikara, Plihavruddhi, Shoola, Anaha, Gulma, Vibandha, Udara, Grahani, Shwasa, Ashmari, Shukrameha, Shwetpradara, Jwar, Mutrakruccha, Mutraghata.

	Karma	Dahashamana, Chakshushya, Rasayana, Krumighna, Vedanasthapana, Balya, Vranashodhana, Vranaropana, Medhya, Dipana, Pachana, Yakruta-Uttejaka.
	Strotogamitwa	Rasavaha, Majjavaha, Raktavaha, Medovaha.
3)Amalaki	Rogaghnata	Sarvadoshaghna, Chakshushya, Raktapitta, Prameha, Adhman, Vibandh,
	Karma	Dahashamaka, Rochana, Dipana, Pachana, Amlatanashaka, Stambhana In Small Quantity And Sarana In Large Quantity, Shonitsthapana, Gharbhasthapaka, Rasayana, Shaithilyanashaka.
	Strotogamitwa	Raktavaha, Medovaha, Shukravaha, Action On Specific Organ – Chakshu, Pliha, Yakruta, Phuphusa.
4)Rasna	Rogaghnata	Vatvyadhi, Vatrakta, Kasa, Sarvangvata, Aamvata, Grudhrasi
	Karma	Vedanasthapan, Shothhara, Rechak, Raktashodhak, Aampachan, Shulprashaman, Rasayan.
	Strotogamitwa	Pranavha, Annavha, Raktavha, Majjavha
5)Aparajita	Rogaghnata	Netra, Kanthrog, Jwaradaha, Chardi, Atisara- Amdosha, Udarrog,Parinamshula, Raktdosha, Pittavikara, Shotha, Sleepad, Valmika, Shukradosh, Klaibya, Kushtha-Switra, Smruti-Buddhi-MedhaVikara, Balroga
	Karma	Vishghna, Kushthghna, Vednasthapan, Chakshushya, Medhya, Kanthya, Dahashamak, Pittashamak, Raktdoshshmak, Aampachak, Vranropan, Jwaraghna, Sarak, Mutrala
	Strotogamitwa	Pranvha, Udakvha, Rasavha, Raktavha, Mansvha
6)Jivanti	Rogaghnata	Paittikshoth, Vistambha, Grahani Kosthgata Roukshya, Dourbalya, Raktapitta, Kasa, Puyameha, Sukrameha, Mutrakruccha, Mutradaha, Jwara, Drushtimandya, Hruddourbalya.
	Karma	Jivaniy, Balya, Rasayan, Vrushya, Kaphanissarak, Mutrala, Chakshushya
	Strotogamitwa	Pranavha, Annavha, Raktavha, Mutravha, Shukravha
7)Shatavari	Rogaghnata	Shukrakshaya, Garbhasrava, Pradar-Rakta, Shweta, Dourbalya-Dhatukshaya, Vatvyadhi, Drushtimandya, Amlapitta-Shula, Grahani, Shirorog.
	Karma	Shukrajanan, Rasayan, Vednasthapan, Garbhaposhak, Styanyajanan, Raktabharshamak, Mutrala, Medhya-Nadibalya, Vrushya.
	Strotogamitwa	Pranavha, Annavha, Raktavha, Majjavha, Mutravha, Shukravha
8)Mandukparni	Rogaghnata	Budhimandatva-Smritirhasa, Mastishkadourbalya, Unmad-Apasmara, Agnimandya-Ghrahani, Hrudvikara-Hruddourbalya, Kasa-Shwas-Swarbheda, Vayuvikar.
	Karma	Medhya-Rasayana, Rasayan-Vayasthapan-Balya, Aampachan
	Strotogamitwa	Pranvaha, Annavaha, Raktavha, Mutravha, Shukravha.
9)Shaliparni	Rogaghnata	Nadidourbalya, Vatvyadhi-Vatrakta, Dourbalya- Angmarda,
	Karma	Angaamardaprashaman, Nadibalya, Deepan, Anuloman, Stambhan, Krimighna, Hrudya, Shothhara, Shonitsthapan, Kaphanissarak, Vrushya, Rasayana
	Strotogamitwa	Pranavha,Annavha, Raktavha, Mutravha, Shukravha
10) Punarnava	Rogaghnata	Shotha-Mutrakruccha-Mutraghata, Pandu-Kamla-Yakrtplihavikara, Hrudroga-Sarvangsotha, Agnimandya-Udararoga-Vibandha-Plihodara, Kasa-Swasa-Urahkshta- Raktanishthivan, Raktapradar, Kushtha, Chaturthik Jwara, Dourbalya, Visha-Sarpvisha-Mushikavisha, Vrushchikvisa-Alarkvisha, Netraroga
	Karma	Mutrala, Lekhana-Shothahara, Deepan–Anuloman-Rechana-Vamaka, Hrudya-Raktavardhak-Shothhara- Kasa, Mutrajanan, Kusthaghna, Jwaraghna, Rasayan, Vishaghna, Arshoghna.
	Strotogamitwa	Pranavha, Annavha, Raktavha, Mutravha

Table 3[8,9,10,11,12,13,14,15,16,17]**:Phytochemical constituent of *Vayasthapaka Gana***

Sr. No.	NAME	Phytochemical Constituent
1	Guduchi	Tannins, Alkaloids, Saponins, Phenols, Flavonoids, Cardiac Glycosides, Carbohydrates, Proteins, Steroids
2	Amalaki	Alkaloid , Coumarin, Flavanoid, Carbohydrate/Glycoside, Steroid, Phenol , Carboxylic Acid, Tannin, Terpenoid, Resins, Saponins, Aminoacids
3	Haritaki	Alkaloid, PhenolicCompound, Flavonoid, Tannin, Steroid, Glycoside, Saponin, Carboxylic Acid And Quinine.
4	Rasna	Carbohydrate, AlkaloidSaponins, Flavonoid, Tanin Phenolic Compound, Glycoside,Steroids, Fats And Oils,Amino Acids Proteins Volatile Oils , AntraquinineCynogenetic, Coumarin Glycosides
5	Aparajita	Flavonoids, Tannins ,Steroids , Glycosides , Saponin, Terpenoids, Proteins , Carbohydrates, Phenols
6	Jivanti	Lupanol 3-O Diglucoside, Leptidine , Saponins, Flavonoid, Luteolin, Diosmtin And Tanin
7	Shatavari	Alkaloid, Amino Acids, Flavonoids, Tannins ,Steroids , Glycosides/Sugar , Saponin, Triterpenoids , Phenols, Furanoid, Lignan, Carboxylic Acid, Quinine, Coumarin
8	Mandukparni	Alkaloids, Flavonides , Phenols, Saponins , Reducing Sugars, Steroids , Tannins , Terpenoid , Anthraquinone , Cardiac Glycosides
9	Shaliparni	Alkaloid, Amino Acids, Anthraquinone, Carbohydrates,Cardiac Glycosides, Flavonoides, Glycosides, Phenols, Saponins,Steroids,Tannins,Terpenoids Volatile Compounds
10	Punarnava	Alkaloid, Rotenoids, Glycosides, Acids, Lignans,Lipids, Phenoic Compound

DISCUSSION

The oxidation process which continuously goes on in the human body, result in ageing i.e.nothing but degeneration of the cells including retinal cells also. *Rasayan* or Rejuvenative regime is must in all degenerative disorders. The antioxidant (*Rasayan*) properties in *Vayasthapaka Gana* inhibit the oxidation process, limiting the emission of free radicals.

What Are Free Radicals[18]

Before explaining how to stop free radical damage it is important to understand exactly what free radicals are. Free radicals are molecules or atoms having extra electron. That unpaired electron makes the atom or molecule unstable. These unstable molecules then go around looking for electrons to steal in order to become stable again. Free radicals are byproduct of the metabolism process that occurs naturally in our body and has to happen in order for our body to function properly. When free radicals run a muck they can cause damage to cell DNA which in the worse case scenario cause cancer.

How Antioxidants Stop Free Radicals

Antioxidants stop free radicals by supplying the unstable molecule with the electron they are looking for. This means that antioxidants can stop free radical damage before it gets worse[19]. Free radicals or reactive oxygen species (ROS) are formed in our body as a result of biological oxidation. The over production of free radicals such as hydroxyl radical, super oxide anion radical, hydrogen peroxide can cause damage to the body and contribute to oxidative stress (Diplock, 1994; Thomson, 1995). Oxidative damage of proteins, DNA and lipid is associated with chronic degenerative diseases including cancer, coronary artery disease, hypertension, diabetes etc (Lee et al., 2000) Most of the reactive oxygen species are scavenged by endogenous defense systems such as catalase, superoxide dismutase and peroxidase-glutathione system (Rice-Evans and Bourdan, 1993). But these systems may not be completely efficient requiring them to depend on exogenous anti-oxidants from natural sources

The protective effect of plant products are due to the presence of

several components such as enzymes, proteins, vitamins (Halliwell, 1996), carotenoids (Edge et al., 1997), flavonoids (Zhang and Wang, 2002) and other phenolic compounds (Argolo et al., 2004). Different plant extracts were prepared which are useful in preventing the deleterious consequences of oxidative stress. There is increasing interest in the protective biochemical functions of natural antioxidants contained in spices, herbs and medicinal plants and reducing the risk of degenerative diseases associated with aging[19].Keeping this in mind *Vayasthapaka Gana* is selected to evaluate its antioxidant activity.

VARIOUS ACTION OF DRUGS IN VAYASTHAPAK GANA AS FOLLOWS

Acharya Vagbhata noted close relationship between *Netra* and *Majjadhatu*[20]. So the drugs *Aamalaki* & *Guduchi* from *Asthimajjapachak kashay* will definitely give best result in *Netragata* Vyadhi, also the drugs *Rasna* and *Shatavari* acts on *Majjavha strotasa*[21,22]

Ttiktaswadupradhan Vyasthapaka Gana reduces vitiation of *Majjavaha Strotasa.* Degenerative disorder occurs due to *Dhatu Kshaya,* so the drug *Shatavari*, with its effects like *Mansapushtikar* i.e. nourishment of the *'Mansa dhatu*' and '*Rasayan effect* serve the best result in degenerative disorder of eye[23,24]. Many drugs are directly denoted as *Chakshushya* like *Aamalaki, Haritki, Aparajita*. Drugs like *Guduchi and Haritaki* act as *YakrutUttejaka,* maintain equilibrium of *Pachak Pitta* which ultimately act on Alochaka*Pitta*[25] Drug like *Mandukparni* is described as *Medhyarasayna*[26]which help to reduce stress in the individuals.

Table 4: Various research paper published on the drugs in *Vayasthapak Gana* which proves their antioxidant activity are as follows:-

Drugs	Research Work done	Reference
1)Guduchi	1.Free Radical Scavenging Activity Of TinosporaCordifolia - Journal Of ... 2.StudiesOn Anti-Oxidant Activity Of TinosporaCordifolia (Miers 3.Antioxidant Activity Of TinosporaCordifolia Leaf ... - Academic Journals	27,28,29
2)Haritaki	1.Antioxidant Activity Of Polyphenolic Extract Of TerminaliaChebula ... 2.Antioxidant Activity Of Ethanolic Extract Of TerminaliaChebula Fruit ... 3.The Vayasthapan Karma (Age Sustaining Action) Of Haritaki...	30,31,32
3)Amalaki	1.Evaluation Of Antioxidant Profile And Activity Of Amalaki (Emblica. 2.Evaluation Of Antioxidant Profile And Activity Of Amalaki ... - NCBI - NIH 3. Evaluation Of Antioxidant Profile And Activity Of Amalaki (Emblica	33,34,35
4)Rasna	1.In-Vivo Antioxidant Activity Of RasnaSapthakaya Decoction In Wistar... 2.In Vitro Antioxidant Activity Of Root Extracts Of PlucheaLanceolatahot! 3.Pluchea Lanceolata (Rasana): Chemical And Biological Potential Of ...	36,37,38
5)Aparajita	1.In Vitro Free Radical Scavenging Activity Of ClitoreaTernatea Leaf Extracts 2.Clitoria Ternatea (Aparajita): A Review Of The Antioxidant ...	39,40
6)Shatavari	1.In Vitro Antioxidant Activities Of Root Extract Of Asparagus RacemosusLinn. 2.Pharmacological Significance Of Shatavari; The Queen Of Herbs ...	41,42
7)Mandukaparni	1.In-Vitro Antioxidant Activity Of Ethanolic Extracts Of CentellaAsiaticaL ... 2.In Vitro Antioxidant Activity Of The Callus Extracts Of CentellaAsiatica	43,44
8)Shaliparni	1.Antioxidant Effects Of Ethyl Acetate Extract Of DesmodiumGangeticum ... 2.Medicinal Plants: DesmodiumGangeticumShalaparniDhruva ...	45,46
9)Punarnava	1.In Vitro Estimation Of The Antioxidant Activity And ... - Researchgate 2.Phytochemicals And Antioxidant Activity In BoerhaviaDiffusa	47,48
10)Jivanti	1.In Vitro Antioxidant And Free Radical Scavenging Potential Of ... 2.Phyto-Chemical Evaluation Of Dried Aqueous Extract Of Jivanti...	49,50

ANTIOXIDANT IN RETINA

Lutein and zeaxanthin are the only carotenoids existing in the retina and lens. Zeaxanthin is the most important carotenoid in the fovea of adults and Lutein in the peripheral retina. Lutein and Zeaxanthin has important biological functions in three aspects:1)Acting as antioxidants 2)Filtering out photo-toxic short-wavelength of visible light 3)Minimizing the effect of chromatic aberration. Oxidative stress played an important role in the pathogenesis of cataract and retinopathy. Studies have shown that serum Lutein and Zeaxanthin concentrations were significantly lower in High myopic than those in emmetropic eyes. Various researches have shown direct relationship between lutein intake and pigmentation in the eye[51,52,53,54,55,56,57].

Oxidative stress in retina[58]

The generation and neutralization of radical with unpaired electron(s) is physiological process provided that radicals are effectively scavenged by cellular antioxidant defense system. If there is imbalance between oxidants and antioxidants in favor of oxidants, result in oxidative stress. This is pathogenic condition leading to damage of numerous cellular components including lipids, protein, and nucleic acid. A concept formulated by Denham Harman states that aging is result of ROS- induced damage . Oxidative stress accelerate the process of aging & play important role in pathogenesis of many age related diseases including AMD and Myopic Degeneration.

The retina is a tissue abundant in ROS.

i. The oxygen consumption in the retina is the highest among all human tissues.
ii. RPE and photoreceptors are exposed to high-energy light, which is focused in the macula.
iii. The cell membrane of photoreceptors is rich in polyunsaturated fatty acids (PUFA), which are readily oxidized.
iv. There are many photosensitizers in RPE and photoreceptors.

Finally, the phagocytosis of POS (photoreceptor outer segment) conducted by RPE cells may be accompanied by a respiratory burst—a rapid eruption of ROS. POS which are wearing out contain lipids, proteins and others oxidized particles, the driving force of a respiratory burst, born as a result of exposure to light and oxygen-rich environment in the photoreceptors.

CONCLUSION

Acharya Charaka has explained at the end of his treatise that, though hundreds and thousands of combination of drugs are mentioned in various forms in different contexts of the *samhita*, a wise *bhishak* should select a formulation which fulfils the need, condition, *prakruti*, prognosis, *doshabala, rogibala, kala* etc. Keeping this view in mind, the drug '*Vayasthapaka Gana'* was selected for the present study.

Review of literature w. s. r. to chemical constituent of *Vayasthapak Gana* in *Ayurvedic* and modern text is summarized in the given study.

RESULT

- The antioxidant activity of *Vayasthapaka Gana* has not direct reference but this property of drugs will definitely have good result in degenerative disorders of eye.
- As drugs in this *Gana* have *Rasayana* and *Chakshushya* properties it will be useful in degenerative disorders of eye
- Further study is required to evaluate with the reverse pharmacology and recent advances with modern medical science.
- We can substitute with so called antioxidant available in market with the *Vayasthapak Gana* and they will definitely give best result than artificially manufactured antioxidant
- This will be the new avenue for younger generation *Shalaki.*

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