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# Pharmacological and Therapeutic action of *Rasaushadhis* in *Netra Vikaras*

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## ABSTRACT

The use of herbomineral preparations is vast in Ayurveda medicine. It also has significant impact on health of sense organs. The *Netra Chikitsa* utilizes *Rasa Dravyas* blended in different folds. The minerals are necessary for the normal function of the body. It plays as a catalyst, co factor for an enzyme and many more. The references of preparation and the therapeutic effect of herbomineral complexes are available in plenty. The complexes help in exerting faster action of the drug.

**Key words:** *Rasoushadhi, Parada, Anjana, Putapaka.*

## INTRODUCTION

The *Rasa Dravyas* and its formulation are used widely in numerous disorders. Among them *Netra Vikaras* in *Shalaky Tantra* is not an exception. As mentioned, in *Rasa Ratna Samuchaya*,<sup>[1]</sup> small doses of *Rasoushadhis* (metal and mineral preparations) yield desired effect and its intake doesn't produce *Aruchi* (distaste). There is immediate spreading action exerted by *Paarada* and hence by these properties it is said to be the best.

It is also observed that herbomineral complexes are more stable and interactive compared to plain herbs. It also results in faster therapeutic action and has a longer shelf life.

The *Rasoushadhis* in *Netra Vikaras* (Eye disorders) are used in following modalities. They are;

1. Internal Medicine
2. *Anjana* ( Collyrium application)
3. *Putapaka*

### Internal Medicine

Many formulations are indicated exclusively for *Netra Vikaras* and some are indicated along with other disorders. The most commonly used *Rasa Dravyas* are,

- *Swarna, Abhraka, Kamsya, Swarnamakshika, Tuttha, Vanga - Chakshushya* (Ocular Protective)
- *Tamra - Netramayeshu Uttamam* (Best in Ocular Disorders)
- *Yashada - Nayanamaya Naashakaram* (Cures Ocular Disorders)
- *Kaseesa - Netrya* (Ocular Protective)

### Iron (*Louha*)

#### Role of iron in vision

- It is an essential component of cellular metabolism.
- In Lens, the increased expression of H - ferritin (One of iron complex stored in cell) in epithelial cells decreases the amount of intracellular free iron and improves cellular defense against oxidative stress.

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- The RPE enzyme RPE 65 that converts 11 cis-retinal to all-trans retinyl, as part of the retinoid cycle necessary for photo transduction requires iron.

Too much of iron is toxic. It is involved in the cellular metabolism, continuously absorbed, transported throughout the body. If this cycle gets disrupted, it leads to various diseases. *Triphala* has antagonizing activity and laxative which counteracts the constipating property of iron. Thus too much of iron absorption is prevented. This may be one of the reasons behind to add *Triphala* in major preparation having *Loha*.<sup>[1]</sup>

*Triphala* mainly contains of tannic acid, gallic acid, ascorbic acid (Vitamin C), phenols. Ascorbic acid increases bioavailability of iron by converting  $Fe^{+3}$  to  $Fe^{-2}$ , while phenolics can reduce the iron by binding to it. The presence of ascorbic acid or lack of dietary tannins has both been contributing to pathological iron storage disease.

#### Gandhaka (Sulphur)

Sulphur is required for the proper structure and biological activity of enzymes. It plays a major role in electron transport system. Its synthesis glutathione.<sup>[2]</sup>

#### Glutathione

- Mother of all anti oxidants
- It is present in choroid, Lens, Aqueous part of tear.

#### MSM - Methylsulfonylmethane

- It is an organic form of sulphur and a potent antioxidant.
- Naturally found in onion, garlic, nuts, milk, egg.
- It Improves the cellular uptake of many nutrients Vit A,B,C,D,E, amino acids.
- It also prevents neurological diseases by repairing oxidative damage and restoring cell membranes elasticity.
- The MSM supplement is guaranteed by GMP-FDA.

- It is indicated in chronic pain, OA, eye inflammation etc.<sup>[3]</sup>

#### Yashada (Zinc)

Zinc is an essential trace mineral or helper molecule.

- It plays a vital role in bringing vitamin A from the liver to the retina in order to produce melanin, a protective pigment in the eyes.
- It is highly concentrated in the eyes i.e retina and choroid.
- It is believed to be important for vision because high levels of the zinc are found in the macula.

High level of zinc in the intestines can promote the synthesis of a binding protein *Metallothionin*, which also binds the copper. This mechanism leads to high dose zinc reducing copper absorption.<sup>[4],[5]</sup>

#### Tamra (Copper)

- It acts as a co-factor for enzymes making a metalloenzyme complex.
- Catalyses the reduction-oxidation reactions. It stimulates immune cells.
- It is present in retina but the concentration is lesser than zinc. It promotes the uptake of iron, zinc in the body.
- Copper is present in the retina where it functions as REDOX balances as a cofactor for the enzyme copper, zinc - superoxide dismutase (antioxidant enzyme).<sup>[5]</sup>

#### Parada (Mercuric Oxide)

In Organic chemistry mercuric sulphate is used as catalyst. Mercuric salts help in the uptake of metal complexes into the cell. It improves the other drug action. *Parada* acts as *Yogavahi* (synergistic action) and also has *Rasayana* (rejuvenating) effect.

#### Swarna

*Swarna Bhasma* has an excellent radical scavenging activity. The research also has revealed that it acts on ischemic conditions in the brain. It is proved to be a Nootropic drug (Smart drug) which works by increasing the oxygen supply to neuro chemicals

(neurotransmitters, enzymes, hormones). It also increases oxygen supply to brain and also has stimulatory nerve growth.<sup>[6]</sup>

### Abhraka

It is a complex of hydrous silicate of aluminium containing K, Mg, Fe, Na, F and traces of Ca. It is having high penetrating property which spreads in the body at a faster rate and impacts micro tissues quickly. It helps in cell regeneration also improves blood circulation.<sup>[7]</sup>

### Anjana

Anjana is a *Kriyakalpa* where medicinal pastes or powders are applied to the inner side of lower lid. *Souveeranjana* (Sb<sub>2</sub>S<sub>3</sub>), *Rasanjana* (Sb<sub>2</sub>S<sub>3</sub>), *Pushpanjana* (ZnO), *Neelanjana* (PbS) are the *Netrya Rasanjana* preparations. *Shodhita Rasa Dravyas* like *Tamra*, *Shanka*, *Tuttha* etc. are mixed with herbal medicines to prepare *Anjana*.

The traditional use of Antimony Sulphide was earlier across North Africa, Middle East. This provided relief from the glaring sun, reflection from the sand before sunglasses were invented. As preventive care, the irritation from having soot in one's eye caused tearing which kept the eyes washed by contaminated grit and bacteria.<sup>[8]</sup>

The drugs mainly get absorbed through conjunctiva and cornea in *Anjana Kriyakalpa*. The nanoparticles of *Bhasma* help in better absorption and enhance other drug actions also.

### Putapaka

*Putapaka Kriyakalpa* is mentioned after *Tarpana* to strengthen the eyes. This is a combination of aqueous (*Swarasa*) and lipid (*Sneha* in the form of *Ghrita*, *Vasa*, *Mamsa*). *Lekhana Putapaka* has an addition of *Bhasmas* like *Tamra*, *Loha*, *Kaseesa*, *Samudraphena*. The media becomes herbomineral which helps in triggering the action of drugs. This crosses the blood aqueous barrier and reaches the target site of eye quickly than the same drug when taken internally.

## DISCUSSION

Eye disorders occur as individual diseases and also manifest as secondary to primary cause like DM, Hypertension, Autoimmune disorders. By treating primary cause, part of eye complaints can be relieved. *Swarna*, *Abhraka*, *Parada* and other *Rasa Dravyas* help in stimulating enzyme necessary for a normal function, form complexes to enhance the drug delivery. These also acts on other systems of the body, thus helps in correcting the underlying cause of the disease. Recently zinc supplementation is given to treat and prevent the Age Related Macular Degeneration. Researchers have suggested that both zinc and antioxidants delay the progression of age-related macular degeneration (AMD) and vision loss, possibly by preventing cellular damage in the retina.

## CONCLUSION

Minerals play a vital role in various biochemical events in the body. They act mainly as carriers, catalyst and also give a synergistic action to whole formulation. Nanoparticle size helps in penetrating into deeper tissues, crossing the blood brain barrier and blood aqueous barrier.

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