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REVIEW ARTICLE

RAKTHA VARGA DRAVYAS AND THEIR UTILITY IN RASASHASTRA

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ABSTRACT:

Rakta varga dravyas are that group of drugs of herbal, mineral, animal origin. The common characteristic found in all is that they possess red colour in common. The utility of these drugs as group in *Rasa Shastra* is mainly seen in *Loha vada* i.e transmutation of lower metals to higher metals. They are used in procedures of *Parada samskaras* like *Ranjana samskara, Sarantaila vidhi, Garbhadruti nirmana*,then in preparation of *Musha* and also in *Shodhana/* purification of certain *Rasa dravyas* such as *Sasyaka***.** The main purpose of their usage is to impart the red color to drugs/ instruments.Their usage as a group is limited**,** however they are used for different purposes individually. Most of the *Rakta varga dravyas* are herbal drugs and the color of these drug is due to the presence of pigments in them. *Makshika* and *Laksha* are two non-herbal drugs in this group. *Makshika* could be taken as the *Swarna makshika bhasma* / incinerated ash of Copper pyrite while there is an opinion that it could be *madhu*/ honey also. Laksha is the resin of animal origin**.** This article deals elaborately with the *Rakta varga* group of drugs, their detailed description, identification, uses and their importance in *Rasa Shastra* on scientific background.

Keywords: *Rakta varga dravyas, laksha,* pigments*, swarna makshika bhasma, madhu, Ranjana samskara, Sarantaila vidhi, Garbhadruti, Musha, shodhana.*

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INTRODUCTION

Rasashastra is one of the branches of *Ayurveda* which deals with different metals, minerals , mercurial preparations along with their therapeutic efficacy. There is description of different group of drugs of plant, animal or metallic origin used for various procedures such as for purification, incineration, conversion of lower metals to higher metals and so on. *Rakta varga dravyas* are one such group of drugs, having a common characteristic – red color.

Different classical texts have enumerated different drugs under this category. Mostly drugs are of herbal origin. The non herbal drugs described include *Makshika* and *laksha.* The usage of these drugs have been told in *Ranjana samskara, Sarantaila vidhi, Garbhadruti nirmana,* preparation of *Musha* and in *Shodhana.*

Table 1 : *Raktavarga Dravyas* According To Different Classical texts

Dravyas	**Rasa hrudaya tantra[1]**	**Rasarnava [2]**	**Rasaratna Samuchaya [3]**	**Rasa.Jala Nidhi.[4]**	**Raja Nighantu.[5]**
Kusumbha	-	-	+	+	+
Khadira	-	+	+	+	-
Laksha	+	+	+	+	+
Manjista	+	+	+	+	+
Raktha Chandana	+	-	+	+	-
Akshiva	-	-	+	+	-
Bandhujiva(Asana)	+	+	+	+	+
Karpuragandhini	-	-	+	+	-
Makshika	-	-	+	+	-
Dadima	+	-	-	-	+

Palasa	+	-	-	-	+
Haridra	+	-	-	-	+
Daruharidra	-	-	-	-	+
Kumkuma	-	+	-	-	-

In the text *Aananda kanda* there is no mention of drugs under *rakta vargas*. The author has quoted the use of *Rakta Varga Dravyas* in preparation of *Varamoosha/ Swarna Moosha* but the drugs have not been enlisted. But in the preparation of *Ranjana Taila* he has mentioned certain drugs as *Rakta pushpa* (plants having red coloured flowers). They are *Palasha Pushpa, Manjistha, Lohita Karabeera, Khadira, Rakta Chandana, Saralakashtha , Devadarukashtha , Japasuma*, etc.

Table 2: *Rakta varga dravys* of herbal origin with their Latin names and useful parts[6].

Sl. No.	***Rakta Varga Dravys***	**Latin names**	***Prayojya Anga***
1	*Kusumbha*	Carthamus tinctorius	*Pushpa, Beeja Taila* Fruit, Seed Oil
2	*Khadira*	Acacia catechu	*Twak* (Bark*), Sara(*Resin*)*
3	*Manjista*	Rubia cordifolia	*Mula* Root
4	*Raktha Chandana*	Pterocarpus santalinus	*Kaandasara*
5	Akshiva (shigru)	Moringa oleifera	*Mula Twak, Beeja* Skin Of The Root, Seed
6	*Bandhujiva(Asana)*	Pterocarpus marsupium	*Kandasara, Niryasa*
7	*Karpuragandhini*	Curcuma amada	*Kanda* Stem
8	*Dadima*	*Punica granatum*	*Phala, Phalatwak, Mulatwak* Fruit And Its Skin, Root Bark

9	*Palasa*	*Butea monosperma*	*Panchanga*
10	*Haridra*	*Curcuma longa*	*Kanda* Rhizome
11	*Daruharidra*	*Berberis aristata*	*Mula* Root
12	*Kumkuma*	Crocus sativus	Stigma

MATERIALS AND METHODS: Different texts of Rasashastra , Nighantus were scanned to collect the information regarding rakta varga dravyas. The details of morphological description of the drugs were collected from the texts of dravyaguna while details of the pigments they contain were taken from texts and relevant articles. The utility of the rakta varga group of drugs in rasa Shastra were written from classical texts of rasashastra and inferred on basis of present day scientific background.

Literary Review

Brief description of *Raktavarga Dravyas*

Kusumbha: (Safflower), is 30 to 150 cm tall with globular flower heads having yellow, orange or red flowers. Flower heads containing 15 to 20 seeds per head[7].

Pigment: Carthamin (red & yellow color). Carthamin is responsible for to produce water-insoluble red dye and Carthamidin for water-soluble yellow color dye[8].

Khadira: is a medium sized tree. Trunk rough and spiny, Yellowish from outside and reddish from inside. Leaves compound, Flowers- small, yellowe, having three petals,Fruit – legume, smoky in colour, contain 5-8 round seeds[9].

Pigments: Catechin & Catechutanic Acid. (flavonoids)[8].

Manjista is a climber whose branches spread over long distance. Trunk – square shaped and reddish. Its leaves are heart shaped and Root is reddish, long & thick. Flower- yellowish white, Fruit – round, fleshy, violet or black in color[10].

Pigments: Purpurin & Rubiacordone (anthraquinones**)[11].**

Raktha Chandana is a tree growing to a height of 5 -10 mtrs. Bark is blackish grey.Trunk is externally white but red inside. Legumes 6-9 red seeds[12].

Pigment present is Santalin[13].

PHOTOS

KUSUMBHA

KADHIRA

LAKSHA

MANGISTHA

RAKTACHANDANA

SIGHRU

BINDUJIVAKA

KARPURAGANDHINI

DADIMA

PALASHA

HARIDRA

DARUHARIDRA

KUMKUMA

Shigru is a tree 7 to 8 meter high with soft bark and wood. Leaves are compound, 14 – 24 cm. in length. Seeds have 3 striation and are winged and bitter in taste. According to Bhavprakasha text it is 2 types White (katu shigru) and Red (madhu shigru) [14].

Pigments : Oleic Acid [15].

***Bandhujiva(Asana*)** is a tree which grows to 10 -15 meters in height, smoky skin of the trunk bears vertical slits. Gum is red in color. Flowers are yellowish, Legume contain two seeds.Water turns yellow at the beginning and then black when trunk is dipped in it[16].Pigment : Xanthophyll (carotenoid)[17].

Karpuragandhini is a herb which looks like

turmeric. Leaves are 0.6 to 1 mtr. long. Rhizome are round, stout and resembles ginger[18].

Pigment : Curcumene[19].

Dadima is a shrub which is 3-5 meter in height. The stem bark is red externally and yellow internally, Fruits are round with a diameter of 5 cms, containing many seeds. Based on its rasa 3 types – 1) Madura 2) Madhuramla 3) Amla[20].

Pigments: Punicalgin & Isopelaterine[21].

Anthocyanins are water-soluble pigments primarily responsible for the attractive red purple colour of pomegranate juice**.** It contains chief constituents such as punicalagin, punicalin, gallagic and ellagic acids[22].

Palasha: deciduous tree grows upto 15 m high. Flowers are brilliant orange - red in color, fruits – pods, silvery white, broad, with flat, elliptic, reddish grey seeds[23].

Pigment: Butrin (anthocyanin**)**[24].

Haridra is a annual shrub, its rhizome grows underground. Leaves are 30-40 cms. In length and they smell like ginger. Fruit is oval with deep yellow pulp[25].

Pigment: Curcumin. Turmeric contains about 5% of volatile oil, resin and yellow colouring substances known as curcuminoids[26].

Daruharidra is a evergreen shrub having height 1.25 – 3 mts. Inflorescence 508cm long with yellow flowers.fruits are bluish purple and small. The stem is yellow colored from outside but is dark yellow inside. Constituents are Alkaloids[27].

Kumkuma It is shrub. On every flower there 3 yellow colored stamens. In Seeds the ovary is trilobed and in each lobe many round seeds are found. The stalk of gynaecium is made of three fibers of kesar and twenty flowers yield 120 mg kesar[28].

Pigments**:** Picrocrocin and Crocin. α-crocin is a carotenoid pigment which is primarily responsible for saffron's golden yellow-orange colour[29].

Laksha : It is the resin of animal origin, being actually the secretion of a tiny insect, *Laccifer lacca [30].*

In the Vedic period it was known as *Laksha,* a name suggestive of the labour of myriads of insects which produce it [31].

It is presently used for dyeing silk sarees, filling of hollow gold and silver ornaments by goldsmiths, in wood turnery, bangle making etc.

Lac Insect – The commonest and the most widely occurring species of lac insect in India is *Laccifer lacca (Kerr),* which produces the bulk *of* commercial lac[32]..

The major constituents present in lac is the resin (70-80%);sugars, proteins, and soluble salts – 2-4;colouring matter – 1-2;wax – 4 – 6;sand, woody matter, insect bodies and other extraneous matter– 8-12;a volatile oil is

present in traces. Lac contains a water soluble red dye[33].

Makshika, : *Makshika* in *Rakta varga dravya is* considered as two different things by different authors. It is believed to be *Swarna Makshika bhasma* while others consider it has *Madhu* (honey).

Swarna Makshika is classified in the *Maharasa* group in Rasaratnasamuchya[34]. As per *Rastarangini* it is included in *Upadhatu* group[35]. Since it has the color of honey so it is called *maksika*(Ayurveda rasasastra, C,B Jha)[36].

Utility of Rakta Varga Dravyas

1. *Parada samskaras:*
   Garbhadruti nirmana
   Ranjana samskara
   Sarantaila vidhi
2. *Musha* preparation
3. *Shodhana* of *Tutha* and *Tikshanaloha*

- ***Parada Samskaras***: In *Rasashastra, Parada* or Mercury is given supreme importance. 18 different procedure or *samskaras* have been told for purification of this Mercury, adding more therapeutic qualities and making it capable for use in *Dhatu Vada. Paarada* purified with the first 8 procedures will have both properties i.e; *vyadi naashaka Shakti*/ diseases pacifying and *Rasaayana /* rejuvenate properties. The remaining 10 procedures are mainly used in *Dhatuvada* or the technique of converting non precious metals in to precious metals.
- **With respect to *Rakta varga dravyas*, they are used in following *Parada samskaras***

***Garbhadruti Nirmana*:** this is the 11th *Parada samskara*. After the 8 *samskaras ,* to the processed mercury the metal specified *(graasa*) is added and liquefied inside the proceesed mercury[37].

Svaranamakshikasatva (metallic extract of Copperpyrite) is levigated with by *Raktavarga Dravya rasa or kwatha* (juice/decoction)for 3 days. Then to this *svaranamakshikasatva, svarna/ gold* and other. *dhatu* are mixed. By this *garbhadruti* is formed easily[38].

Ranjana Samskara

Ranjana samskara is one among the *astadasha samskara of Parada*. *Ranjana* means coloring. This step aims for imparting colors to *Parada* or Mercury using different processed metals which are termed as '*beeja'*. This process is of importance in *dhatuvada* of Parada[39].

The placement of the procedure is different in different books. Example: 17th *samskara* as in *Rasa Jala Nidhi* which comes after *Marana* and before *Bedhana samskara*[40]. where as in *Ananda Kanda* it is placed as the 14th one after *Bahyadruthi* and before *Sarana*[41].

In *Ranjana Samskara*, the role of *Rakta Varga Dravyas* is as follows:

1). Preparation of *Ranjana taila*

The herbs mentioned in *Rakta varga* are levigated with *Laksha rasa*(secretion of Laciffer lacca). The paste obtained from levigation is mixed with 4 parts of sesame oil, then 4 parts of kwatha/ decoction is prepared with the *Rakta Varga Dravyas*. All the ingredients are mixed and cooked according to *Taila Paaka vidhi* (medicated oil preparation). Once the watery portion is evaporated, the oil is filtered using a cloth and collected in a glass bottle. This oil can be used to for *Ranjana* (coloring) of different *Pakwa Beeja*[42].

2) Beeja ranjana

In Ananda kanda text, there are 6 different procedure being explained for *beeja ranjana* that is coloring of *Beejas*. Here, the use of *Raktavargadravyas* have been told in 5 methods, while in one there is using of *Swanra Makshika bhasma* alone and not the other drugs of *Rakta varga*[43].

3) *Rasaranjaka(rasakrusti*)

Haratala and *Manshila* (Orpiment and Realgar) are mixed and *Bhavana*(levigation) is given with *Taila varga* (oils), *Ksharas* (alkalies*), Pancha lavana* (salts) and *Amla varga* (sour/acidic) drugs and the mixture is set aside.

1 part of *Tamra*(copper) is taken and melted. To this molten copper 1 part each of *Vanga*/Tin and *Naga*/lead are added. To this mixture of molten metals previously prepared mixture of *Haratala* and *Manshila* (compounds of Arsenic) are added little by little and *Teevragni*/ higher temperature is maintained. Heating is done till only the *Tamra r*emains. To this *Tamra, nishechana* (Heating and dipping in specified liquids) is done in *Rakta varga mishrita sneha /* fatty substance mixed with drugs of *Raktavarga* and this *samskarita* or processed *Tamra* is called *Rasakrushti*[44].

4) *Rasaranjaka*

Svranamakshika (Copper pyrite)or *Gandhaka* (Sulphur) or *Manashila* (Realgar)is given *Bhavana*/ levigation with the *raktavarga dravya* which is mixed with *gomutra*/ cow's urine. This is added to the *Tamra* (Copper) which is melted in the *musha.* It is stirred continuously while adding. By this process *bhasma* of *Tamra* will be obtained after one hour. This will do the *Ranjana* of *Parada*[45].

Saranataila Vidhi : *Sarana* is the *Parada samskara* after *Ranjana*. In this procedure *Tamra* etc processed metals are mixed with *Parada* to make it capable for *Vyadhana* or transmute lower metals to higher metals.

The procedure: Oil of any of these drugs 1 part**:** *Jyotishmati (Celastrus peniculatus), Vibitaki (* Terminalia bellerica) ,*Karanja (* Pongamia pinnata)*, Katutumbi* (Lagenaria siceraria)

Rakta varga dravya Kashaya 2 parts: decoction, *Dugdha* :4 parts of milk are taken

mixed & heated on *mandagni* (medium flame) to obtain oil for *saarana*[46].

Tikshana Loha Ranjana: *Teekshna Loha* is a variety of Iron comparable to present day Carbon Steel. The procedure aims to impart specific color to this type of Iron.

To the *Tikshana loha churna*(powdered Iron) *bhavana* is given with *kadali* (Musa pasadisiaca)& *chitraka* (Plumbago zeylanica) *svarasa*/ juice. 3 *putas* (incinerations) are given. By this process it will get purified. Then it is pounded with swarasa of *Raktha varga dravyas* & *gomutra;* then *puta* is given. By this *ranjana* of *tikshanaloha* will be seen[47].

Varna Musha: *Musha* are different types of crucibles used in *Rasashastra.*

The red clay devoid of stone is given the *bhavana* of the drugs of *rakta varga* and a *musha* is prepared. Then it is smeared with the mixture of s*phatika* (Potash alum)and *kasis* (Ferrous sulphate)and dried. This *varna musha* is useful in enhancing the color of the metals[48].

Sasyaka Shodana: *Sasyaka Shodhana* is purification of Copper Sulphate. *Sasyaka* is purified by giving seven *bhavanas* with the decotion of the drugs belonging to *Raktavarga* or by boiling in the *snehavargadravyas* for seven times (boiling in *snehavarga* drugs after grinding in *Raktavarga* drugs)[49].

DISCUSSION:

Rakta Varga implies to certain group of drugs of herbal, animal and metallic origin and the division of this as a group may be done due to the similarity of color in the drugs i.e red. The herbal drugs mentioned in the group such as *Kusumbha, Dadima* etc possess the red color in their morphological structures due to presence of pigments. The principal pigments are Carotenoids ex; Xanthophyll and Anthocyanins ex; Butin. Also, Natural pigments that are derivatives of anthraquinone are found, inter alia, in aloe latex, senna, rhubarb, and cascara buckthorn, fungi, lichens, and some insects. Laksha is the drug of animal origin referring to the exudate from Laccifer lacca. Makshika is the mineral drug being referred to the medicated ash of Copper pyrite.

Mostly the utility of this group of drugs in Rasashastra is found in different procedures of Dhatu vada which implies to conversion of lower metals to higher metals. The application of these drugs is mainly found in the Ranjana and Sarana Samskara of Parada.

The Ashta samskarita Parada[50] (Mercury after 8 steps of purification) is useful in Dehasiddhi means attains ability to cure disorders. Also it imbibes rasayana/rejuvenative properties after the 8 samskaras. The other 10 procedures are aims to make Parada attain Dhatusiddhi means conversion of lower metals

to higher metals. Ranjana and Sarana are included in these 10 procedures.

A brief utility of these samskaras before Ranjana is as follows: *Grasamana* – 9th samskara (quantity of *graasa/*metal to be added is quantified) ,*Charana* – 10th (quantified metal mixed with *Astasamskarita Parada*) , *Garbhadruti* -11th (metal is liquified inside *Parada*), *Bahyadruti* – 12th (liquified metal mixed with *Parada*),*Jarana* – 13th (metal assimilated into Mercury without increasing its weight) . These are followed by *Ranjana* and *Sarana Samskaras*

Rakta varga drugs are used in preparation of *garbha druti*. When the *Satvas* (metallic extracts) of various drugs are added to *Parada* in different proportions for the purpose of *Jarana*, they melt and attain a liquid state inside Mercury what is called as *Garbha druti*. Once the *garbha druti* state of *graasa* is achieved*, jaarana* the next procedure becomes possible.

Ranjana samskara mainly aims at imparting colors to the beejas such as Gold/ Silver which are obtained by different alchemical processes which will ultimately be used in coloring the Parada/ Mercury. With regard to this samskara ,rakta varga drugs are used in preparation of Ranjana taila, Beeja ranjana, Rasakrushti and Rasa ranjaka.

Rakta varga dravyas are used in the preparation of Sarana taila. This oil is used in sarana samskara of Parada. This particular procedure aims to increases the Dhatuvedhana karma of Parada. That means to increase the potency of mercury and making it eligible to convert the lower metals to higher valuable metals like gold/silver etc.

With regard to the usage of *Rakta varga drugs* in these procedures mainly signify imparting colors to specific metals which inturn color Mercury. The natural dyes present in these plants help in colring the metals. It is seen that substances like *lavanas* (salts), *kshara* (alkalies) and metals like *Tamra* (Copper) were used in different procedures of *Ranjana* etc. These substances may act as Mordants which are at present used as dye fixatives.

A mordant or dye fixative is a substance used to set (i.e. bind) dyes on fabrics by forming a coordination complex with the dye, which then attaches to the fabric (or tissue). It may be used for dyeing fabrics or for intensifying stains in cell or tissue preparations[51]. Common dye mordants include tannic acid, alum, chrome alum, sodium chloride, and certain salts of aluminium, chromium, copper, iron, iodine, potassium, sodium, tungsten, and tin[52].

The *Ranjana taila* and *Sarana taila* can be compared to dye lake.

The dye lake is an insoluble complex formed upon combining the dye and mordant, which

then attaches to the substrate[53]. The heat applied during these procedures may increase the reaction temperature enabling proper dyeing / coloring.

Rakta varga drugs used in preparing the *varna moosha*/ a crucible. it is said that the drugs being cooked or heated in this type of crucible attains varna utkarsha or color enhancement. The usage of *sphatik*a/alum in preparing *varna mushas* is because of color fixing ability of it. Alum may help in stabilising and brightening the color.

In *Sasyaka shodhana*/ purification of copper sulphate *rakta varga* drugs have been used for levigation purpose. The process may help in eradicating impurities, nullify the toxic effects, reduce the particle size and making it eligible for either consumption or next procedures such as *Marana.*The *shodhita* or purified *Tuttha* is used in different skin diseases, vitiligo, intoxication, digestion related issues, anal disorders etc. the drugs of *Rakta varga* have similar therapeutic benefits in addition to their anti-helminthic properties. Therefore the levigation of *Tuttha* with *Rakta varga* drugs may enhance its therapeutic efficacy.

CONCLUSION:

Rakta varga dravyas are group of drugs used in *Rasashastra*, having red color as a common property. The drugs have plant, animal and metallic origin. The utility of these drugs as a group is mainly found in the *Dhatu vada*. The main purpose of using this group is coloring/ to attain the desired color to metals or instruments like *moosha*. The therapeutic efficacy of individual drugs of this group is well explained while this as a whole group is not clearly found. Analytical and experimental study of the drugs as a whole group, the pigments, the afore said procedures are required to establish their utility more scientifically.

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