PHYSIOLOGICAL STUDY OF SHUKRA DHATU- A REVIEW

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ABSTRACT

Individual Purusha is consists of three Dosha, seven Dhatu and three Mala which are the primary basic of living body. Shukra Dhatu is considered as best among all seven Dhatu. Shukra is white, pure, excellent Dhatu which is located in entire body. Sperm along with spermatic fluid and male sex hormones are also one part of Shukradhatu. Shukra is Saumya which is derived from Jala Mahabhuta and counted as a Kapha Vargiya Dravya. It possesses Shadrasa. Quantity of the Shukra Dhatu is Ardha (½) Anjali in human body. Nearly one month is required for metamorphosis of Ahara Rasa into Shukra Dhatu. Main function of Shukra Dhatu is Garbhotpadana (reproduction) Vitiation of Shukradhatu shows Shukradhatudusti (pathology) in the form of Vridhi (hyper state) Kshaya (waning). This vitiation may leads to male infertility. So it is an important entity in context to reproduction.

Keywords: Shukradhatu, Semen, Reproduction

INTRODUCTION

Shukra is the substance which is responsible for all systemic body activities including metabolic functions and part of which comes out of the body at the time of sexual act and performs specific functions of reproduction. It is the product of four proto elements, Vayu, Agni, Aapaa and Prithvi with all six Rasa. Shuddha Shukra Lakshanas resembles the physical properties of the seminal fluid. Garbhotpadana i.e., fertilization is a prime function of Shukra. Garbha is formed by fusion of Shukra and Artava. This main function of Shukra is attributed to spermatozoa. While enumerating Shukra Pradoshaja Vikara, it has been stated that, the vitiation of Shukra hampers one’s fertilizing capacity. Shukra is Saumya which is derived from Jala Mahabhuta but Charakacharya consider that Shukra contain all the bhutas except Akash. All the four bhutas (Vayu, Agni, Prithvi and Am-
Shukra individually share one fourth of the attributes of each of the Mahabhutas. Shukra is pittrijha bhava. Shukra Dhatu is counted as a Kapha Vargiya Dravya according to Harivansha Purana and also Acharya Vagbhata stated Shukra as Ashraya Sthana of Kapha Dosha. Shukra Dhatu possesses Shadrasa and one of Pranayatanas of Sharira. Shukra is one and ultimate dhatu of body. Shukra is produced as result of successive evaluative metamorphosis of Ahara rasa. Quantity of the Shukra Dhatu is Ardha (½) Anjali in human body as per Acharya Charaka but Acharya Bhela stated that quantity of Shukra is Eka (1) Anjali.

AIMS AND OBJECTIVES:

- To study methods of production of Shukra Dhatu.
- To study what is the characters and normal physiological function of Shukra Dhatu.

DISCUSSION

PRODUCTION OF SHUKRA FROM SOMA:

As described earlier Bhautic origin of Shukra is considered to be Soma or Jalamahabhuta. As Soma or Jala Mahabhuta is the predominant basic element from which Kapha is derived. So it can be said that Shukra has originated from Jala or Soma Mahabhuta.

PRODUCTION OF SHUKRA FROM AHARA RASA:

Beginning from Rasa Dhatu upto Shukra all the Dhatu are produced in a fashion of progressive evolutive metamorphosis. This means that Rasa Dhatu is basically produced from Ahara Rasa which is ingested by the action of Jatharagni. Rasa Dhatu gets converted into Rakta Dhatu and so on. Previous Dhatu is precursor to next and higher by the action of respective dhatvagni in it. So from Majja Dhatu, Shukra Dhatu is produced. The mode of conversion of Ahara Rasa into Shukra is explained by these hypotheses namely –

1. Ksira-dadhi Nyaya
2. Khale-kapota Nyaya
3. Kedari-kulya Nyaya
4. Eka-Kaal Dhatuposhana Nyaya

The ingested Chaturvidha Ahara converts in to Ahararasa after acting upon it by Jatharagni and Bhutagni. Then the action Dhatwagni starts. The former Dhatu gets converted and divided into two portions by the action of Dhatvagni. They are

i) Prasada Bhaga
ii) Kitta Bhaga

KSHIRA-DADHI NYAYA

According to this hypothesis, prior Dhatu is completely transformed into the next Dhatu like the milk is completely transformed into curd, then curd into butter and then butter into ghee. It is called Krama-Parinam Paksha also because the formation of next Dhatu up to Shukra Dhatu goes step by step and because the prior Dhatu transforms completely into the next Dhatu so it is called Sarvaatma-Parinam Paksha also. After acting the Agni, two parts are formed - Prasad Bhag and Kitta Bhag. Firstly the Jatharagni acts on Ahara and forms Anna Rasa as the Prasad Bhag and Purisha and Mutra as the Kitta Bhag. This Anna Rasa is processed by Rasa Dhatvagni and forms the Prasada and Kitta Bhag.

Now this Prasad Bhag is divided into Sthula and Sukhsma Prasadansh. SthulaPrasadansh nourishes the respective Dhatu - Rasa. Sukhsma Prasadansh nourishes the Upadhatu and
forms the next *Dhatu* by its part resembling to that next *Dhatu* - Rakta. Now this next *Dhatu* nourishing part of prior *Dhatu* is processed by the respective *Dhatvagni* and forms the Prasad and Kitta Bhaga. In this series when the *Shukradhatu* resembling part of *Shukshma Prasadansh* of Majja *Dhatu* is processed by the *ShukraDhatvagni*, Prasada and Kitta Bhaga should be formed here. Because the *Shukra* is the last and purest *Dhatu* of our body so only Prasad Bhaga is formed which totally transforms into Shukra *Dhatu* and no Kitta Bhaga is formed here.

**KEDARI-KULYA NYAYA**
According to this hypothesis, *Anna Rasa* reaches at the specific *Dhatu* formation site of a *Dhatu* and transformed into that respective *Dhatu* by action of respective *Dhatvagni* on it. Pattern of reaching of *Anna Rasa* is like the pattern of a tributary of canal serving water to the field rows. It means which row is near to the tributary, water reaches there first. Like this, *Anna Rasa* nourishes Rasa *Dhatu* first and then Rakta and so on. *Shukra Dhatu* is nourished by the *Anna Rasa* lastly. *Shukra Dhatu* resembling part of the *Anna Rasa* is processed by Shukragni there and produces Prasada Bhaga without producing Kitta Bhaga. Now this Prasada bhaga nourishes the Shukra *Dhatu* completely without forming any Upadhatu.

**KHALE-KAPOTA NYAYA**
When the pigeons return back to their dwellings after feeding from field, every pigeon takes time according to the distance between the field and their dwelling. According to this hypothesis, there are different paths of the *Anna Rasa* to reach the site of formation of a *Dhatu*. So as far as the site of formation of a *Dhatu* is, the path will also be lengthy and *Anna Rasa* will take more time to there and nourish that *Dhatu*. When the part of the *Anna Rasa* resembling *Shukra Dhatu* reaches at the site of *Shukra* formation through proper channels, *Shukra Dhatvagni* acts upon it and forms the *shukra dhatu* as described in Kedari-Kulya Nyaya.

**EK-KAAL Dhatu Poshana Nyaya**
*Charaka* and *Vagbhatta* says that the *Ahara Rasa* is spread and distributed into the entire body at the same time, continuously and always by the help of *Vyan Vayu*. *Arundatta* comments that all the seven *Dhatus* are nourished at the same time due to the entry of this *Ahara Rasa* into channels of all seven *Dhatus* at the same time.

**PRODUCTION OF SHUKRA FROM MAJJA DHATU:**
The highest stage to which food attains is the semen. *Shukra* is the seventh and final *Dhatu* as a *Sara* (essence) of all *Dhatu* and produced in a progressive evolutive metamorphosis. *Shukra Dhatu* derives from Prasada *Bhaga* of Majja *Dhatu* by the action of Shukra *Dhatvagni*. *Vayu* and *Akasha Mahabhuta* produce porosity in *Asthi Dhatu*. From this pores, *Shukra* oozes out like water from a new earthen pot and spreads all over the body. On the basis of *Dalhana Acharya*’s commentary on *Sushruta* it is stated that *Mastiska* or *Mastulunga is Majja*, Prof. V. J. Thaker opines that brain and pituitary gland can be taken as functional representative of *Majja*. The production of *Shukra* and secondary hair growth at particular age can be understood in this way. (*Purushvichaya*)
TIME REQUIRED FOR PRODUCTION OF SHUKRA DHATU:
According to Acharya Sushruta nearly one month is required for metamorphosis of Ahara Rasa into Shukra Dhatu. But Parashara opines that eight days are enough for Shukra Nirmana from the Ahara Rasa. Finally, Acharya Vaghbata quoted all views of different authors, either it may take twenty four hours or six days or one month. Acharya Chakrapani has correlated all the above opinions and brought the concept according to the status of Dhatvagni. According to Acharya Chakrapani, if Dhatvagni is at optimum level, then process of Shukra production occurs at speed of “Archi” (Fire) and produced within eight days. If Dhatvagni is at moderate level, Shukra Nirmana takes place at the speed of “Shabda” (Sound) and produces Shukra Dhatu within two to three weeks. And if Dhatvagni is at mild level, the process of Shukra production takes place at the speed “Jala” (water).

MECHANISM OF SHUKRA VISARGA (EJACULATION):
The ShukraDhatu formed by the evolutionary metamorphosis pervades all over the body in the Shukradhara Kala and the Kala performs the following functions:

1. Abode for the pervading Shukra Dhatu: it holds and provides the abode for performing the Sarvadaihika (whole body) functions of Shukra.
2. Helps further transformation of Shukra Dhatu into Roopa Dravya. The ejaculated part of Shukra is termed as Roopa Dravya which is the only visible part of the Shukra Dhatu. The formation of the Roopa Dravya takes place in the Vrishana, the Mula of the Shukravaha Srotasa.

The process of its explained metamorphically in classics with following example - similar to water coming out of wet cloth when squeezed, Shukra comes out of man, out of its site during copulation between man and woman, because of Chesta, Sankalpa and Pidana. Above these, Sankalpa is said to be Parama (best) Vrishya by Acharya Charaka.

Process of ejaculation is due to Cheshta (love play – physical stimulus) and Sankalpa (psychological stimulus) of Stri and Purusha, followed by Harsha (Passionate desire for enjoyment) & Tarsha (longing for women or psychic excitement) of both; and Saratva (fluidity), Pichchhilata (slimness), Gaurava (heaviness), and most important is Anutva (atomic nature) and Pravanattva (tendency to move from higher to lower concentration) of Shukra Dhatu. Anutva of Shukra Dhatu and at the same time Anutva of Mana are coincidental to bring out Shukra as ejaculatory part – Roopa Dravya which pervades all over the body.

The filling up of Shukravaha Sira under influence of psychological and physical stimulus i.e. Harsha result in tumescence, leading to erection of penis which facilitate sexual act. Shukra is secreted due to libidinous stimulation generated by woman’s sight, memory and touch.

Vyana Vayu controls Rasavaha Sansthana - circulatory system of the body and Shukra is also present in whole body while Apana Vayu influences sex orgasm acting locally. Vyana Vayu and Apana Vayu are mainly responsible for expulsion of Shukra to exterior through penis. Here both act as interdependent central and peripheral controls of process of ejacula-
tion. The eight psychosomatic factors related to Mana and Shukra play a major role in regulation of ejaculation. In total it is psychosomatic endocrinal mechanism.

CHARACTERS OF SHUKRA:
There are two important features of Shukra namely:
1. Sarvasariragata Shukra
2. Functions of Ejaculatory or Rupadravya

FEATURE OF SARVASARIRAGATA-SHUKRA:
The attributes of Shukra Sara individual can be considered as Sarvasariragata Shukra
a. Saumya (Gentleman)
b. Saumyapreksinaha (Gentle look)
c. Ksirapurnalochana (eyes appearing filled with milk)
d. Praharshabahula (cheerfulness)
e. Snigdha-vrittasamhata- Dasanaha (teeth which are unctuous, round, strong, dense, even)
f. Prasanna - Snigdha-varnasara (pleasant - unctuous voice and complexion)
g. Bhrajisnuta (dazzling appearance)
h. Mahaspica (large buttocks)
i. Stripiya (loved by women)
j. Upabhoga balavana (virile)
k. Sukha (endowed with happiness)
l. Aishwarya (prosperity)
m. Arogya (health)
n. Vitta (money)
o. Sammana (honour)
p. Apatyabahula (many offspring)²¹

FEATURE OF RETAS (EJACULATORY PART):
Shukra is the representative principle of (Roopadravya) of Visvarupa (Atma) in human body²². To achieve this Visvarupa (sariraru-pa), Shukra is principal cause for it. As Atma is invisible to bare human eyes and also nirguna²³, similarly Sarvasariragata Shukra is also in covert form. But this Shukra trickles down during copulation between a man and woman, caused by Chesta (physical stimulus), Sankalpa (desire), and Pidana (stimulation of erogenous area of body). As a result of Harsa (stimulation), Tarsa (longing for women) Sarattva (fluidity), Picchilata (slimness), Gaurava (heaviness), Anuttva (automicity), Prvanattva (tendency to flow out) and Druttattvamaratasya (pace of motion of Vata) covert Shukra is ejaculated out of body as Roopadravya or Semen²⁴. This overt tangible Shukra or Roopadravya or Semen has physical characteristics that can be attributed to semen as well as sperm.

PHYSICAL CHARACTERS REPRESENTING SEMEN:
Acharyas have described the qualities of Shukra. The qualities are quoted as Shuddha Shukra Lakshanas.

- Sphatikabha (crystalline), Ghrita- Ksaurdra-Taila- nibha (color that of ghee, honey, oil),
- Madhugandhi (smelling like honey)²⁵
- Drava (liquid), Picchila²⁶
- Bahu (abundant), Bahala (thick)
- Avisra (no bad smell), Shukla (white)
- Kaphavarga²⁷
- Madhura (sweet), Snigdha (unctuous)²⁸
- Sara (mobile), Sandra (dense), Ambasi kinchitmajjati (which dips in water)-these represent Rupadravya or Shukra or Semen.

1) Sphatikabha indicates the colour of semen which is white and translucent.
2) Quantity of semen indicated by Bahu / Bahala is the normal 1/2 Anjali Pramana.
3) **Madhugandha** is the special odour imparted to semen due to its different components.

4) **Madhura** taste of Shukra is due to fructose of the seminal plasma.

5) **PH** of the semen is referred by the term **Avidahi** i.e., not causing burning sensation during ejaculation indicating neither acidic pH, nor highly alkaline.

6) Normal consistency of semen is indicated by the characters like **Drava** (liquid), **Picchila** (viscous), **Snigdha** (unctuous) and **Sara** (fluid) due to various constituents of seminal plasma.

7) The tendency to flow out (**Pravana Bhava**) also indicates the semen that is expelled during intense pleasure of coitus.

**CHARACTERS REPRESENTING SPERM:**
Some characters of Shukra point to the sperm which forms a part of Retas.

1) **Phalavata**, a main character may be attributed to viability, motility, count and normal morphology of sperms. The sperm endowed with normalcy of all these is able to fertilize the ovum i.e., **Garbhakara**.

2) **Anutva** indicates the minuteness and sperm is a microscopic structure.

**CHARACTERS REPRESENTING BOTH SPERM AND SEMEN:**
The density of Shukra includes characters like **Guru, Ghana** which can be considered as pertaining to both semen and sperm.

**FUNCTIONS OF SHUKRA:**
Main function of Shukra Dhatu is reproduction; besides this a number of other functional characteristics are also attributed. These can be classified as under:

1. **Sarvadaihika** i.e. systemic function
2. **Maithunagata** i.e. related with sexual act
3. **Roopa Dravyagata** i.e. functions related to seminal fluid
4. Other functions

Specific function of Shukra is to maintain generations by producing healthy progeny. **Sushruta Acharya** says that main function of Shukra is **Beejartha**, means for production of offspring; It is the **Roopadravya** which comes out of man along with subtle sperms as a result of sexual intercourse which is **Falavat** meaning its potential for reproduction, when it combines with **Artava** in female uterus under favorable condition, can develop as a fetus.

**SARVADAIHKA** – (General body functions):
As earlier described that Shukradhara Kala percade the whole body and hence, the Shukra is spread throughout the body just as Ghee in milk or juggery in sugarcane juice. **Sushruta** has beautifully noted certain important functions of the Shukra Dhatu eg. **Dhairya, Chyavana, Preeti** etc. They are like –

**Dhairya:**
Dhairya is noted as the quality of Satvika Pra-kriti. It has been explained as the remedy for mental morbidity. **Dhairya** is the control over mind, stability and adherence by which one follows the good and avoids the bad. By this property one can stand difficulties on account of strong will power without much anxiety. **AcharyaDalhana** described it as the capacity to fight against any condition and is related to the physical and mental alertness. (Apte, 1984) **Dhairya** of patient is examined by virtue of **Avishada** Bhaya is the opposite quality of **Dhairya**.
Dehabala:
Acharya Dalhana said that Dehabalam includes both DehaUpachaya i.e. physical fitness as well as Utsaha i.e. enthusiasm. Utsaha the stimulation to perform any activity or enthusiasm to perform any activity is dependent on Shukra Dhatu and can be explained as a physical as well as mental attribute. While Upachaya – physical fitness is characterized by the maintenance of optimal level of all Dhatu which imparts Bala to the individual.

Ojoposhaka:
Shukra is also responsible for production of Ojas.
These action of Sarvadaihika Karya of Shukra can be compared to systemic function of Androgen i.e. testosterone.

MAITHUNAGATA KARMA – (Functions related to sexual act):
The functions of Shukra pertaining to the sexual act are not par independent to the Sarvadaihika Shukra and these are –

Chyvana:
According to Acharya Dalhana Chyavana is the ejaculation of semen. It should have optimum timing. The timing of ejaculation depends on Dhairya.

Preeti:
Preeti explained by different authors as described below:

1) Love/inclination towards the opposite sex.
2) Peace/pleasure of mind is also Preeti.
3) Preeti is the pleasure which is reflected by joyous appearance of the face or eyes etc.
4) Preeti is examined by Toshena. Dalhana Acharya also explained that Preeti is indirectly induced by Ojas under the control of Shukra Dhatu.

Harsha:
The term Harsha has been used to denote different meanings like Ananda, horipilations (Romancha), Preeti, Kama, Tushti etc. In the present context the term Harsha means psychological process developed from the enjoyment of different sensorium leading to the arousal and alteration of consciousness which is gradually developing.

Harsha is stimulating pleasure to initiate the sexual act by psychological means. Harsha in relation to sexual act may be termed as anxiety/desire (Utkantha Jananam) with regard to sex. Harsha can be most appropriately termed as excitement produced due to determination (Samkalpa) of mind leading to erection and ejaculation.

Decrease in Harsha causes decrease in MaithunaShakti therefore Harsha does not develop and since there is no Harsha even in the presence of Maithuna Shakti Chyavana and Preeti cannot be achieved. It is this Harsha developing as a result of the sight, thought, or coitus with female that is responsible for the semen to be ejaculated.

Manoharshana is quality of Rajasika Prakriti Harsha is tested by Amoda which is the indulgence in dancing, singing, playing musical instruments and being in festive mood.

RETAS RELATED FUNCTIONS OR FUNCTIONS RELATED TO SEMEN:
The main function of Shukra besides other important functions is Garbhajanana. Sushrutaacharya says that main function of Shukra is Bejartham, means for production of offspring. It is the Rupra Dravya which comes out of man along with subtle sperms as
a result of sexual intercourse\textsuperscript{46} which is Phalvat meaning - its potential for reproduction, when it combines with Rajas (ovum) in female uterus under favourable condition, can develop as a foetus\textsuperscript{47}.

**GENERAL BODY FUNCTIONS:**

*Shukra dhatu* imports physical power to the individual. *Dalhana* explains that the dehabala is provided by *Shukra* in two ways.

1) Utsahalakshanam
2) Upachayalakshanam

*Utsaha*: The stimulation to perform any activity or enthusiasm to perform any activity is dependent on *Shukra Dhatu*\textsuperscript{48} and can be explained as a physical as well as mental attribute.

*Upachaya*: Physical fitness is characterised by the maintenance of optimal level and all *Dhatus* which imports *Bala* to individual. *Shukra* is also responsible for production of *Ojas*.\textsuperscript{49}

**OTHER FUNCTIONS:**\textsuperscript{50}

1) *Ksheerapornalochanatvam*
2) *Snigdhavrittasara samhata*
3) *Prasanna and Snigdha Svara*
4) *Prasanna and Snigdha varna*
5) *Bhrayishnuta*
6) *Mahashpika*
7) *Sukha*
8) *Aishvarya*
9) *Vitta.*

**UPA-DHATU OF SHUKRA:**

Acharya Sharngdhara has mentioned *Ojas* as the *Upa Dhatu* of the *Shukra*.\textsuperscript{51} Also Acharya Bhavmishra supports the opinion regard *Upa Dhatu*.\textsuperscript{52}

**MALA OF THE SHUKRA DHATU:**

Acharya Vagbhata stated *Ojas* while some Acharya indicate *Smashru* as the *Mala* of *Shukra*.\textsuperscript{53} Vaktra Snigdhata (sebum of the face) and *Yuavana Pidaka* (Acne) are *Mala of Shukra* according to Acharya Sharnghdara.\textsuperscript{54} But Acharya Chakrapani mentioned that Shukra has no *Mala*.\textsuperscript{55}

**CONCLUSION**

*Shukradhatu* is produced from *aahar ras* through *Majjadhatu* it is somya or *Jala mahabhuta pradhana*. *Shukra* is situated entire body. There are so many functions of *Shukradhatu* but main function of *Shukra Dhatu* is reproduction.

**REFERENCES**

5. Vagbhata, Ashtangahridaya, with the commentaries, Sarvangasundara of Arundatta and Ayurvedarasayana of Hemadri, Edited by Pt. Hari Sadashiva SHhastri Paradakara Bhisagacharya, Published by Chaukhambha Surbharati Prakashana, Va-
ranasi.(2007); Ashtang Hridaya Sutra Sthana 11/26


9. Bhel Samhita Shareer Sthana7/16


13. Charak Samhita Chikitsa Sthana 15/36 and Ashtang Hridaya Shareera Sthana 3/68

14. Vagbhata, Ashtangahridaya, with the commentaries, Sarvangasundara of Arunadatta and Ayurvedarasayana of Hemadri, Edited by Pt. Hari Sadashiva SHhashtri Pradakara Bhisagacharya, Published by Chaukhambha Surbharati Prakashana, Varanasi.(2007); Ashtang Hridaya Shareera Sthana 3/62-63 arundatta


17. ‘Sushruta Samhita’ Ayurveda tatvasandipika hindi vyakhya by Ambikadatta Shashtri Published by Chaukhambha Orientalia, Varanasi, (2010)Sushruta Samhita’ Shareera Sthana10/42and Sushruta Samhita Sutra Sthana35/4,


19. Vagbhata, Ashtangahridaya, with the commentaries, Sarvangasundara of Arunadatta and Ayurvedarasayana of Hemadri, Edited by Pt. Hari Sadashiva SHhashtri Pradakara Bhisagacharya, Published by


27. Harivansh Puran 1:40-50


30. ‘Sushruta Samhita’ Ayurveda tatvastandipika hindi vyakhya by Ambikadatta Shashtri Published by Chaukhambha Orientalia, Varanasi, (2010)Sushruta Samhita, Shareerasthana 1/18

31. Dalhana on Sushruta SamhitaSutrasthan- na15/4


33. Sushraya samhita Commentary by Dalhan.Sushruta SamhitaSutrasthanna15/7

37. Sushryta samhita Commentary by Dalhan. Sushruta, Samhita, Sutra Sthana15/5
38. Sushryta samhita Commentary by Dalhan.Sushruta, Samhita, Sutra Sthana26/39
42. Sushryta samhita Commentary by Dalhan. Sushruta Samhita Sutrasthana15/5
43. ‘Sushruta Samhita’ Ayurveda tatvasandipika hindi vyakhya by Ambikadatta Shashtri Published by Chaukhamba Orientalia, Varanasi, (2010)Sushruta Samhita, Shareerasthana 1/218
45. ‘Sushruta Samhita’ Ayurveda tatvasandipika hindi vyakhya by Ambikadatta Shashtri Published by Chaukhamba Orientalia, Varanasi, (2010)Sushruta Samhita Sutrasthana 15/4
47. ‘Sushruta Samhita’ Ayurveda tatvasandipika hindi vyakhya by Ambikadatta Shashtri Published by Chaukhamba Orientalia, Varanasi, (2010)Sushruta Samhita, Shareerasthana 5/3
49. Charaka Samhita Sutrasthana 1/87 & Sushruta Chikitsasthana .35/4
51. Sharangdhar Samhita Deepika hindi vyakhyya, vyakhyakar Dr Brahmanand tripathi published by chaukhamba surbharti Varanasi 221001. Sharangdhar Samhita. Purvakhand. 5/29
52. Bhavprakash Purvakhand. 2/209
53. Vagbhata, Ashtangahridaya, with the commentaries, Sarvangasundara of Arunadatta and Ayurvedarasayana of Hemadri, Editted by Pt. Hari Sadasiva SHhastri Bhisagacharya, Published by Chaukhambha Surbharati Prakashana, Varanasi.(2007); Astang Hridaya.Shareerasthana 3/64
54. Sharangdhar Samhita Deepika hindi vyakhyya, vyakhyakar Dr Brahmanand tripathi published by chaukhamba surbharti Varanasi 221001. Purvakhand 5/26-28