A CRITICAL REVIEW ON AYURVEDIC RASAAUSHDHI
“KUKKUTAND TWAK (HEN’S EGG SHELL)”

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ABSTRACT
Kukkutand Twak is an important drug in Ayurvedic & Unani literature. It is an animal origin drug obtains from Hen’s egg. In Ayurvediya Rasashastra literature it classified under shuklavarga or sudhavarga. It is used externally in eye diseases and ear diseases as churna form without marana process. In Bhasma form it is used in Hridayaroga, Sukravikara, Prameha, Kapha prakopa, Vatavikara, Swapnadosa, Mastiskaa dourbalyata, Sukra nirbalata, Napunsakata, Raktapradar, Swetapradar, Bahumutrata, Somaroga, Raktapata, many other diseases and minimizing the risk of postmenopausal Osteoporosis. It contains Calcium carbonate upto 90%, phosphates, potassium, magnesium and calcium. It is very cheap source of Calcium for human nutrition. Here this paper review the Ayurvedic literature and modern science to highlighting the importance.

Keywords: Ayurveda, Rasashastra, Kukkutand Twak, Calcium.

INTRODUCTION
Kukkutand Twak is an animal origin drug which presents as mineral form. It is an important drug of suklavarga¹ or sudhavarg². Sudhavarga dravyas are group of drugs that possess high calcium content in them. Sudhavarga dravyas have attained its importance in prevention and cure of the condition like Amlapitta, Grahani,
Parinamshula, Swasa, Kasa, Hridroga, supplementation of calcium and also various alchemical processes like Parada bandh and melana. An egg shell being a rich source of calcium. Ancient acharyas of Rasshastra had not described Kukkutand Twak in sudhavargiya dravya, but later in 20th century A.D. it is included under sudhavarg / suklavarg due to the predominance of calcium or sudha in Ayurvediya Rasshastra. In all samhita external application of Kukkutand Twak is found in eye diseases in churna form, but no references are available regarding its bhasma preparation and internal use. First time the author of Siddhbbaisajya Manimala mentioned shodhana and marana procedure of Kukkutand Twak and its internally use in Upadansha is described. It’s bhasma acts as Rasayan, Snau Balya, Mansavardhaka, Dipana, Pachana, Vajikarana and beneficial to build bony tissues in our body. Egg Shell Calcium has as much as 38% of calcium & low Phosphorus content. It has been shown to exhibit higher absorptive and availability than Calcium carbonate. Now a days it is used as a single drug or as ingredient in many Ayurvedic medicines preparations. The present study was undertaken to review the Ayurvedic as well as modern concept of Kukkutand Twak.

SYNONYMS
Kukkutanda twak, Kukkutanda kapala, Kukkutanda dala, Kukkutanandavarana, Swetand bhasm, Swet bhasm, Daksanda twak.

HISTORICAL REVIEW
There is no description of Kukkutanda twak observed in Vedic Granthas. In all samhita and sangraha grantha Kukkutand twak is used in as churna form only for external application. In Charak samhita Kukkutand twak has been used as an ingredient in Sukhavati varti and Drstiprada varti to Timir and Kach (Eye diseases). In Sushrut samhita Kukkutanda twak is included in Avasadana dravya and used in for Pratisarana karma to treat Vrana and also used as an ingredient in Lekhyanjan, Bhadrodaya anjana and Siladyanjana in eye disorders. In Astanga Sangraha it is used in Sandhisitasitarogapratishedhan adhyaya. In Bhav Prakasha the author has mentioned a few yogas containing Kukkutanda twak for eye diseases. In Yoga Ratnakar Kukkutanda twak has mentioned as an ingredient of anjana yoga for eye disease. In Rasamrit Kukkutanda twak is mentioned for the purpose of Vanga marana. In samhita granthas only external use is mentioned sodhana and
marana process is not described. First time Siddhbhaiyajya Manimala has described sodhana, marana and therapeutic use of Kukkutand twak bhasm internally in Updansha⁴. It is also mention Kukkutand twak churna as external use in Ear disease⁴.

VERNACULAR NAME⁵,¹⁶
Sanskrit – Andakapala, Andatwak
Farasi – Posta, Baiza, Murga
English – Hen’s egg shell

CLASSIFICATION
Kukkutanda twak is classified in 2 different group in different Rasa literature i.e. suklavarga¹ or sudhavarga²,⁶,¹⁷.

MORPHOLOGY
The Hen’s Egg shell is composed of two main layers an inner mammary layer and outer spongy layer. There layers contain pores so water and gases can pass through the shell. A thin film called bloom covers the outer side of a fresh egg. Bloom tends to seal the egg’s pores, reducing the loss of water and gases. Eggs laid by different hen’s sometimes vary greatly in thickness of shell and the size & numbers of pores⁶.

DESCRIPTION
Egg shell which is obtain from Hens belongs to kingdom Animalia, phylum Chordate and Aves class. Its latin name is Gallus domesticus. All acharyas of ayurveda have mentioned two types of kukkut (hen) i.e. Gramya and Vanya kukkut, hence Kukkutanda twak is of 2 types Gramya Kukkutand twak & Vanya Kukkutand twak⁷. There are 3 part of hen’s egg¹⁶ –
1. Jardi (yellow part) - yolk of egg
2. Saphedi (white part) - white egg or albumen
3. Chhilaka - egg shell or ova testa

The egg shell or ova testa is white hard fragile calcareous, rigid yet porous structure and is mainly composed of inorganic salts. Though it is sufficiently porous to permit an embryo to breath, it has great resistance to the entry of micro-organism. When it is kept dry, and offers considerable resistance to loss of moisture by evaporation the surface of shell is covered by a thin cuticle. Inside the shell are two tough and fibrous membranes - one attached to the shell and the other to the thick white (
albumen) at the small end of the egg. As the shell contents shrink with cooling and evaporation of moisture, the membranes separate to form the air cell usually found at the large end of the egg\textsuperscript{18}.

**PHYSICAL PROPERTY**

Hen’s eggs are white in color, oblong in shape with tapering blond ends. It is commonly 1 inch - 2 inch thick and 2 inch - 3 inch long\textsuperscript{6}.

**PURIFICATION**

*Shodhana* is a process of separation by which physical and chemical impurities get separated from the substances. Purification of *Kukkutanda twak* mention in different Rasa literatures is given in Table No 1.

**INCINERATION**

*Marana* is a process by which, raw materials like metals, minerals, and gems etc. are converted into a microfine, tasteless, non-hazardous, acceptable and absorbable form, which can be used as a medicine. Literary meaning of *marana* is to destroy the natural form of anything. Incineration of *Kukkutanda twak* mentioned in different Rasa literature is given in Table No.2.

**KUKKUTANDA TWAK BHASMA**

*Kukkutanda twak bhasma* is prepared from purified hen’s egg shell ground and triturated with *nimbu swarasa / kumari swarasa / changeri swarasa* in sufficient quantity to make a homogenous paste and given temperature up to 800°C for 3 - 4 times. In incineration process white color *bhasma* can be prepared. *Kukkutand twak bhasma* used in various condition like Raktapradar, Shwetapradar, Swasa, Kasa, Napunshakata, Prameha etc. with suitable drug or vehicles.

**PHARMACOLOGICAL AND THERAPEUTIC PROPERTIES**

*Rasa* – Kasaya\textsuperscript{7}

*Guna* – Ruksha, Shita\textsuperscript{19}

*Virya* – Shita\textsuperscript{7}

*Vipaka* – Katu\textsuperscript{7}

*Karma* – Rasayan, Balya, Mansavardhaka, dipana, Pachana, Vajikarana\textsuperscript{5}, Sangrahi, Upshosan\textsuperscript{16}, Vranaavasadana, Lekhana, Stambhan, Sothhar, Raktastambhak\textsuperscript{19}.
DOSE

125 – 250 mg, 2 – 4 $\text{ratti}^{16,19,20,21}$, 1 – 4 $\text{ratti}^{2,23}$, 3 $\text{ratti}^{24}$.

ANUPANA

Navneet, Sita, Malai, Cow milk, Aamlaki Swarasa, Dadim Phalrasa, Chyavanprashaveleha, Honey, Mishri, Adaraka swarasa. $^{2,4,5,6,16,20,21,23,24}$ Table No 3.

Vata roga and Kapha roga - Honey, Pitta roga - Butter $^6$

CHEMICAL COMPOSITION

The shell of the egg consists predominantly of Calcium Carbonate - up to 90 %. It has the following average composition: - Calcium – 38%, Magnesium – 0.6%, Carbonates – 55%, Protein – 1.5 %, and remainder (water, trace minerals etc.) – 5%. The shell membrane constitutes 4 – 5 % of the shell and contains 20 % of Protein and 10 % inorganic matter.$^{18}$

USES AND INDICATION

Kukkutand twak bhasma is useful in children in treating rickets and also to facilitate dental eruption. In hair fall it works as a prevention & as cure. It also helps in nursing mothers during pregnancy and after delivery as best supplement of Calcium. It is indicated in cough, asthma, tuberculosis with cavitations, diarrhea and menorrhagia.$^6$ It is used in Prameha and Mutraroga with Vanga bhasma with cream of milk as sahapana. In Dhatu vikara it is used with small Ela and Kanta Lauha bhasma with Drakshasava as anupana. It is also used in Swapana dosha. In Females problems like Pradara, Somaroga, etc. it mixed in Prataplankeshwar Rasa and given with Dadim panaka and Dashmularista or Dashmula kwatha as anupana.$^{21}$ Kukkutand twak bhasma is an excellent asthi mansa dhatu poshaka and vajikarana as well as rasayan and vajikarana. It is easily absorbable and rich form of calcium which is useful in Asthikshaya (osteoporosis) developed after delivery as well as due to other reasons like Leucorrhoea, Menorrhagia, Dysmenorrhoea, post menopausal osteoporosis. It is indicated in Khalitya- Palitya, as kesha is mala of asthi dhatu. It is also Vajeekara, so probably used effective in treatment of seventh dhatu, shukra dhatu which can be treated only if above six dhatu are nourished properly.$^3$ Swetapradara is a condition where vitiation of kapha and vata are predominant Kukkutand twak bhasma have the kapha vata shamak properties which can subside the vitiation of kapha and vata in Swetapradar.$^{22}$
**PHYSIOCHEMICAL ANALYSIS**

*Kukkutand twak bhasma* - physiochemical analysis

Ash value – 97.376 % w/w, pH value – 12.44

Acid soluble matter – 97.713 w/w

Calcium present in form of oxide – 76.559%

*Kukkutand twak bhasma* provided more ash value as compared to other *Sudhavargiya bhasma*.

**AYURVEDIC FORMULATIONS**

*Sukhawati varti, Dristiprada varti, Lekhyanjana, Bhadrodaya anjana, Siladyanjana, Triphala varti, Lekhana churnan, Triphaladi varti.*

Table No. 1 *Shodhan of Kukkutand Twak*

<table>
<thead>
<tr>
<th>No.</th>
<th>Media</th>
<th>Procedure</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Lavanambu</td>
<td>Prakchalana</td>
<td>4</td>
</tr>
<tr>
<td>2.</td>
<td>Water containing Salt &amp; Navasadar (1/8&lt;sup&gt;th&lt;/sup&gt; part salt &amp; 1/8&lt;sup&gt;th&lt;/sup&gt; part Navasadar)</td>
<td>Maceration for 4 – 6 days</td>
<td>2, 5, 23, 28</td>
</tr>
<tr>
<td>3.</td>
<td>Water containing Salt</td>
<td>Maceration</td>
<td>5, 16</td>
</tr>
<tr>
<td>4.</td>
<td>Salt Water</td>
<td>Boiling</td>
<td>27</td>
</tr>
<tr>
<td>5.</td>
<td>Vinegar</td>
<td>Maceration for 4 – 6 days</td>
<td>2, 23</td>
</tr>
<tr>
<td>6.</td>
<td>Saline Water</td>
<td>Soaking 5 – 6 hours</td>
<td>6</td>
</tr>
</tbody>
</table>

Table No. 2 *Marana of Kukkutand Twak*

<table>
<thead>
<tr>
<th>No.</th>
<th>Bhavana Dravya</th>
<th>Puta &amp; No.</th>
<th>Agni Pramana</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td><em>Nimbu swarasa</em> – 3 times</td>
<td><em>Gajaputa</em> – 3</td>
<td>-</td>
<td>4, 27</td>
</tr>
<tr>
<td>2.</td>
<td><em>Changeri swarasa</em> – 1 time</td>
<td><em>Putapaka</em> – 1</td>
<td><em>4 ser upala</em></td>
<td>5</td>
</tr>
<tr>
<td>3.</td>
<td><em>Changeri swarasa</em> – 2 times</td>
<td><em>Gajaputa</em> – 6</td>
<td>-</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>+ <em>Kumari swarasa</em> – 12 hrs,</td>
<td>2- without</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>after 2&lt;sup&gt;nd&lt;/sup&gt; puta adding</td>
<td><em>Hingula</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Hingula</em></td>
<td>4 – with <em>Hingula</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td><em>Nimba swarasa</em> / <em>Arka Kshir</em> / <em>Kumari swarasa</em> – 1</td>
<td><em>Gajaputa</em> – 1</td>
<td>-</td>
<td>5, 16</td>
</tr>
<tr>
<td></td>
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</tbody>
</table>
| 5. | Kumari rasa / Pyaja rasa / Nimbu swarasa  
Adding 1/4<sup>th</sup> Hingula / Equal Hingula / 1/20<sup>th</sup> Hingula | Putapaka | 10 ser / 15 ser / 20 ser cow dung cake |
| 6. | Kumari rasa – 2 tola  
Navsadar – 6 tola | Putapaka – 7 | 10 ser cow dung cake |
| 7. | Nimbu swarasa  
10 tola Kukkutand twak churna, 1 tola Parad | Putapaka – 100  
50 – with Parad  
50 – without Parad | 2 ser upala |
| 8. | Nimbu rasa – 1 time + Aadrak rasa – 1 time + Sirka – 1 time + Sharab – 1 time  
Total – 4 times bhavana | Putapaka – 4 | 20 ser upala |
| 9. | Arka kshir – 9 times | Putapaka – 9 | 15 ser upala |
| 10. | Sharab – 24 times | Putapaka – 24 | 2 & ½ ser upala |
| 11. | Changeri swarasa – 2-3 times | Putapaka – 2-3 | 10 ser upala |
| 12. | Kumari swarasa – 5-6 times  
10 tola Kukkutand twak churna + 4 tola Hingula  
(Hingul only 1<sup>st</sup> puta)  
8 tola Kukkutanda twak churna + 1 tola Hingul | Gajaputa – 5-6 | - |
| 13. | Changeri swarasa / Kumari swarasa – 1 or 2 time | Putapaka – 1 or 2 | 5 ser upala |
| 14. | No Bhavana | Gajaputa – 1 | - |
| 15. | Without bhavana – 2 puta in | Gajaputa – 5 | 5 ser upala, every time |

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Ghada
Nimbu swarasa – 3 times bhavana (after 2 puta)
Kukkutand twak churna – 1 ser first 2 puta without bhavana in Ghada after this 1/8 part Hingula adding

16. Nimbu swarasa 1 time
then Kumari swarasa 1 time then Shatavari kwath
Varahaputa – 3 - 24

Table No. 3 Anupana for Kukkutand twak bhasma

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<tbody>
<tr>
<td>1.</td>
<td>Navaneet</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2.</td>
<td>Mishri/Sita</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3.</td>
<td>Malai</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>4.</td>
<td>Milk</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>5.</td>
<td>Honey</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>6.</td>
<td>Amalaki swarasa</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>7.</td>
<td>Anar swarasa</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>8.</td>
<td>Chayavan Prashaleha</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>9.</td>
<td>Aadrak swarasa</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
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</table>

CONCLUSION
The Hen’s egg shell is animal source of calcium which included in suklavarga and sudhavarga in Rasa literature. It is rich source of calcium. It enhances physical and mental health in all type of condition like childhood, pregnancy and after delivery in female, general and sexual debility in male. It gives strength to muscle fibers and nerves. It acts as a tonic and cures the diseases. It is the review study of Kukkutanda twak according to different Rasa literature.

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