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Pharmaceutico-Analytical Study of *Tribhuvanakirti Rasa*

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ABSTRACT

Tribhuvanakirti Rasa is an important *Kharaliya Rasayana*. It is prepared by using *Hingula* (cinnabar), *Tankana* (borax), *Vatsanabha* (Aconitum), *Trikatu* (*Sunthi*, *Maricha*, *Pippali*), *Pippalimoola* in equal proportion. This mixture is to be subjected for 3 *Bhavanas* each with *Tulsipatra*, *Adraka*, *Dhaturapatra*, and then last with *Nirgundipatra Swarasa*. In the present study keeping the chief aim of elucidating pharmaceutical and physiochemical analysis of *Tribhuvanakirti Rasa* (TKR) are prepared adopting methods advocated in *Rasamrutam*/AFI. The study was carried out in 2 stages - purification of Raw materials (*Ashodhita* - *Hingula*, *Tankana*, *Vatsanabha*), and preparation of *Tribhuvanakirti Rasa.* Physiochemical parameters such as LOD (12%), Total ash (16%), acid-insoluble ash (1.6%), Alcohol-soluble extractive (10.4%), water- soluble extractive (37.6%), pH (8.20) and TLC revealed maximum 6 spot in short wave. TKR requires continuous Trituration, until it dry**,** 60 hour's duration of repeated levigation was required *Bhavana* by 4 *Swarasa* (each 3 times). Total weight gain after preparation of TKR was 12%. The inference from this study may be used as reference standard in the further quality control and clinical researches.

Key words: *Tribhuvanakirti Rasa, Bhavana, Shodhana, Pharmaceutical study, Analytical study.*

INTRODUCTION

Ayurveda is the repository of safe and therapeutically officious remedies and Ayurvedic physicians handle diseases with great success. Ayurvedic recipes are formulated only after centuries of trial and experience, and these are well known to be free from toxicity. *Rasashastra*, the ancient alchemical science, a branch of Ayurveda originated with the twin aim of attaining *Deha Siddhi* and *Loha Siddhi*.[1] The verse quotes that, while using *Rasausadhis* (*Rasa-chikitsa*) the physician may give minimal attention towards the *Dosa* involvement (*Ekadosa*, *Dwidosa*, and *Tridosa*), disease condition (origin and the prognosis of disease condition), gender (male, female) of the patent, the place (*Jangama*, *Anupa* and *Sadharana*) and the *Kala* of treatment (season of disease origin and treatment).[2]

It is very much clear that theoretical and practical are two essential aspects of knowledge which only can make man a perfect physician who fights against the diseases with the weapon of drugs so; result of drugs

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always depends on its preparation. Pharmaceutical study is the science of drug, their discovery, and uses the general aspects of the how and why a drug is used. Thus in nut shell, it can be stated that pharmaceutical study especially in the field of Ayurved has supreme importance because it includes all herbo-mineral preparation which needs to be processed by *Shodhana, Jarana, Marana* etc.[3] The study not only includes drug manufacturing but only includes its dispensing to the patients in suitable form. Pharmaceutical study includes mainly preparation of crude drugs and pharmaceutical processing, process, standardization in which drugs ratio, intensity of fire and duration etc are concerned. TKR comes under *Kharaliya Rasayana* that is drugs prepared by trituration in *Khalva Yantra* (mortar and pestle). In AFI (Ayurvedic formulary of India) TKR has been mentioned under *Rasa Yoga* section.[4] As per the reference in *Rasaamruta, Hingula, Tankana, Vatsanabha, Trikatu* & *Pippalimoola* are the basic ingredients in equal proportion. *Tulsipatra, Adraka*, *Dhaturapatra*, & *Nirgundipatra Swarasa* are the *Bhavana Dravya* (levigation media) in respectively meaner. Here *Bhavana* of *Nirgundipatra Swarasa* are mentioned according to AFI/ *Rasaamruta*. (AFI) Here an attempt has been made to standardize the formulation and analyse the organoleptic and physco-chemical parameters.

Materials and Methods

Collection and authentication of raw materals

Raw *Hingula, Tankana, Vatsnabha, Maricha, Pippali, Sunthi, Pippali Moola* used in the processing were procured from the P.G. department of Rasashastra and Bhaishajya kalpana, Government Ayurved College Raipur (C.G.). *Tulsi Patra, Nirgundi patra* were collected from the herbal garden, Government Ayurved College Raipur (C.G.), and *Adraka* were purchased from the local market and *Dhatura patra* were collected from Amarkantak valley (M.P.) and Nandanvan area of Raipur. All the herbal drugs were authenticated from the department of *Dravyaguna vigyna* Government Ayurved College Raipur (C.G.). The preparation of *Tribhuvanakirti Rasa* was carried at lab of Department of Rasashastra and Bhaishajya kalpana, Government Ayurved College Raipur (C.G.).

Purification of *Raw matrials*

Shodhana of *Hingula* was done by giving *Bhavana* with *Nimbu Swarasa* (lemon juice) as per the reference of *Rasatarngini*.[5] 300gm *Hingula* was made into powder and levigated with sufficient quantity of *Nimbu Swarasa* for 6 hours. The same procedure was repeated for six times, after that it was washed, dried, and stored in air tight container as *Shodhita Hingula*. (Table 1) The well grown *Vatsanabha* collected and cut into smaller pieces (*Canaka* size) and *Shodhita* by the *Go-dugdha* (cow's milk) for one *Yama* (3 hours) in *Dolayantra* methods. Later when cool down the drug inside the *Pottali* is collected, washed, with warm water, and removed the outer layer of *Vatsanabha*, dried under sun, powdered and stored in suitable airtight container.[6] Purification of *Tankana* was done by following classical guidelines. 500gm of *Tankana* was taken in a clean wide mouthed iron vessel. The vessel was placed over fire and heated with regular stirring when the drug loses all its moisture and becomes light and brittle like *Lajja* the heating is stopped and stored in air tight container.[7] Preparation of *Churna*[8] for TKR and preparation of *Swarasa*[9] at the same time for *Bhavana* like *Swarasa* of *Tulsipatra*, *Adraka*, *Dhaturapatra*, and *Nirgundipatra*.[4]

Preparation of *Tribhuvanakirti Rasa*

The *Sodhita Hingula* was taken in a *Khalvayantra* and *Shodhita Tankana* was added to it in the prescribed quantity. *Mardan* was done until a homogenous mixture was made, then *Shodhita Vatsanabha churna, Trikatu Churna, and Pippalimoola Churna* was added in prescribed quantity and *Mardan* was continued until all the ingredients became a homogenous mixture. Details of ingredients used for the batch study are listed in table 2. This was subjected to *Bhavana* with *Tulsipatra Swarasa* of adequate amount, i.e., to wet all the ingredients and they attain semisolid consistency and *Mardana* was carried out for 5 hours till the homogenous, soft, and dried mixture was obtained. *Bhavana* with *Tulsipatra*

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Swarasa was given 3 times. The same procedure was repeated by using *Bhavana dravya* i.e., *Adraka Swarasa*, *Dhaturapatra Swarasa, Nirgundipatra Swarasa* respectively for 3 times in sufficient quantity. The mixture was dried properly by *Mardana* and then collected and stored the prepared TKR in air tight container.

Observation and Results

Analysis of raw *Vatsanabha* revealed the presence of pure *Vatsanabha* in the sample. Total 10 days were required to achieve *Shodhita Hingula* which is lusture less and bright in color. The details of the purification of *Vatsanabha* and *Hingula* are listed in (Table 3,4,5). In the *Shodhana* of *Tankana* the temperature of 160˚C was required for *Nirajalikarna* of *Tanakana* its look like the *Lajja* (popcorn) (Table – 6). The pilot study inferred that minimum amount of *Swarasa* required for total ingredients for levigation was added first. Observation and results of the TKR preparation pilot study are given in (Table- 7). On the basis of inferences of pilot study TKR was prepared according to AFI. Observation profile of media used in the preparation of TKR is presented in (Table 8). In preparation of TKR 1050ml of *Tulsipatra Swarasa* and 815ml of *Adraka Swarasa* was used for levigation. On addition of *Adraka Swarasa* lightness decreased to some extent making levigation convenient and it became stickier. Weight was also increased on addition of *Dhaturapatra Swarasa* (570ml), hardness decreased and making the levigation easier. 446ml *Nirgundipatra Swarasa* was used the mixture turned blackish brown making levigation laborious. As the levigation advanced starch portion within mass was increased gradually. In TKR weight gain was observed after completion of levigation. (Table 8) 60 hours of levigation with all (*Tulsipatra*, *Adraka*, *Dhaturapatra*, *Nirgundipatra*) was required to attain end point of levigation which may prolong upto 80 hours in the rainy season. The final product was blackish brown in colour, pungent in taste, and potent smell as its characteristics and was completely dry. Physicochemical analysis of TKR was carried out details of which are present in table 9; TLC revealed maximum 6 spot in short wave in 0.03, 0.15, 0.24, 0.36, 0.44, and 0.60. Physico-chemical test & TLC was done at Drug testing lab, Directorate of Ayush, Raipur Chhattisgarh.

Discussion

Kharaliya Rasayana is the most important type of preparation in the Ayurved, and the *Tribhuvanakirti Rasa* is most effective *Kharaliya Rasayana* in the treatment of *Sannipattaj Jwara*. In the preparation of TKR, *Bhavana* (levigation) and *Mardana* (trituration) are the most important factors. The act of trituration of drug with any liquid not only reduces the drug particle to a finer state but also facilitates the breakage and reunion of bonds in the material during trituration. As a result of which we find an entirely different compound formation by the end of total trituration. *Hingula Shodhana* was performed by *Nimbu Swarasa Bhavana* for 7 times. After purification these was significant increase in weight of *Shodhita Hingula* (1.03%). This may be due to addition of solid contents of *Nimbu Swarasa*. The pH of *Nimbu Swarasa* was 2 and it is acidic media. *Nimbu Swarasa* might help in detoxification of *Hingula* due to its *Amla Rasa*. *Nimbu Swarasa* is rich in complex of organic acids such as citric acid, mallic acid, which may react with the unwanted materials in *Hingula* and from a complex, which is soluble in water. The *Hingula* was washed with water thoroughly so that it may help in separation of water-soluble complex of impurities. *Prakshalana* continued till *Hingula* attained *Ujjwala Varna* and loses *Amlatva* of *Bhavana dravya*. Prior preparation *Vatsanabha* should be used after *Shodhana*. *Shodhana* of *Vatsanabha* was carried out in *Go-dugdha* as per specification of Rasatangini. After *Shodhana* process the yield of *Shuddha Vatsanabha* was about (475gm) less as compared to *Ashodhita* one i.e. (700gm). the loss may be due to washing out of soluble part of *Vatsanabha* while *Swedana* by *Dolayantra* and separation of outer cover of *Vatsanabha*.

After *Shodhana* of *Tankana* loss of total amount (350gm) was observed which may be due to evaporation of water content from *Tankana* as the chemical formula of *Tankana* ($Na_2B_2O_7.10H_2O$)

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contains 10 parts of water. The colour of *Tribhuvanakirti Rasa* was changed after each *Bhavana*, according to the *Swarasa* used and the end products was Blackish brown in colour, The quantity of *Swarasa* required was also decreased after each *Bhavana* because of absorption capacity of the material was decreased after each *Bhavana*. And the weight increased but at the time of *Adrak Swarasa Bhavana* weight was increased (5.93%) because of starch part of *Adraka* (*Adraka* major constituent upto 50% starch (carbohydrate)) and because of solid part of each *Swarasa*. Lightness and hardness at time of levigation also depends on solid part of herbs. 60 hrs of levigation with all 4 *Swarasa* was required to attain end point of levigation which was prolonged up to 80 hours in the rainy season. Particular liquid media are used in *Bhavana* process of specific materials. In present study, *Tulsipatra Swarasa, Adraka Swarasa, Dhaturapatra Swarasa, and Nirgundipatra Swarasa* were used as a *Bhavana Dravya*. The logical behind proceeds of above drug was that these drugs were easily available, cheap and effective in treatments of *Jawra*, *Kapha Vata* disorder. The sequence of the *Bhavana dravya* also importance, it also improves the efficacy and potency of the Formulation as the required for the *Sampraptibhanga* of the diseases. *Tulsi*, *Dhatura*, *Nirgundi* retains *Laghu* and *Ruksha Guna*. *Laghu Guna* reduces the tissue weight (*Langhana*) it reduces *Mala* and clean the Channels of the body it under goes *Laghupaka*, it improves the digestion being easily digestible, and *Ruksha Guna* responsible for dryness or which results in absorption of moisture. *Adraka* having *Guru Guna* that was control the and balance the *Laghu Guna* of above drugs, and also seen *Tikshna Guna* that is the quality which is responsible for the quick activity of a drug or sharpness of a drug.[10] *Tulsi* having active compound like Eugenol (1-hydroxy-2-methoxy-4-allylbenzene) and Vit like C and A, Ca, Zn, Fe like metals also presents. Eugenol also called Clove oil it treat gastrointestinal and Respiratory complaints. It has a role as an allergen a plant metabolite, a human blood serum metabolite.[11] *Adraka* having Vit. A and gingerals (6,8,10 gingerol), gingerols are phenolic compounds. Effectiveness of *Adraka* as an antioxidant, anti-inflammatory agent, antinausea and anti-cancer, infectious disease.[12] Sitosterol and stigasterol present in *Dhatura*, it has a role as a sterol methyltransferase inhibitor an anticholesterenic drugs. And also present of Mn, Zn, Co, Cu, Ni in the form of metals.[13] β-caryophyllene, sabinene are present in *Nirgundi*.[14] It has a role as a non-steroidal anti- inflammatory drug. A fragrance a metabolite anti -inflammatory agents that is non-steroidal in nature that has analgesic, antipyretic and platelet-inhibitory action. They act by blocking the synthesis of prostaglandins by inhibitory cyclooxygenase which convert arachidonic acid to prostaglandins inhibition of prostaglandin synthesis accounts for their analgesic, antipyretic and plate inhibitory action.[15] All the ingredients and *Bhavana Dravya* adding to all action, therapeutic effects, into the formulation (TKR) and gives synergetic action. The sample shown organoleptic characters like blackish brown in colour, pungent in odour, *Katu* and *Tikta* in taste, smooth to touch and fine powder. The sample was subjected to physical contents analysis. pH of TKR was 8.34, alkaline in nature because of *Bhavana dravya*, Moisture content of sample was 10%, Ash value was 20%, Water soluble extractive 36%, Acid insoluble ash 1.6, alcohol soluble extractive 14%, were noted. The analysis of TLC reveals that the TKR contains most of the ingredients of all the raw materials.

CONCLUSION

Pharmaceutical standardization of formulation is an important and essential requirement to establish the safety and efficacy, and Physic-chemical parameters and standardization helps to assess the quality of the drugs or formulation. Application of TLC techniques which is identification and purity the drug by comparing with standard ones. *Shodhana* is a process of separation by which physical and chemical impurities get separated from the substance by different process with various drugs, which literally means purification and converting the drug fit for further procedure. *Bhavana* is an important *Samskara* with the help of which, not only the potency of a drug can be altered, but is also capable to bring about changes in characteristics of drug viz. regulation,

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addition of new or deletion of undesirable characteristics. *Tribhuvanakirti Rasa* has analgesic, antipyretic, antioxidant, anti-inflammatory, and effective in infectious disease gastrointestinal and Respiratory complaints. Thus, can be concluded that the procedure adopted for the preparation of TKR all procedure can be considered ideal and will help the further study.

Table 1: *Yantra* specification

Method	*Yantra*	Specification
Purification of *Hingula*	By *Bhavana* in *Khalvayantra*	Length 34cm, thickness 3 cm, width 10.5 cm, depth 10 cm, weight -2.300kg
Purification of *Tankana*	*Bharjana* in Vessels	Depth 10 cm, Diameter 30 cm thickness 0.5cm, weight 1kg 130gm
Purification of *Vatsanabha*	*Swedana* in *Dolayantra*	depth 12 cm, Diameter 24.5 cm, weight 550 gm, capacity 5 liter

Table 2: All ingredients name, parts used, quantity of *Tribhuvanakirti Rasa*

SN	Plants name	Scientific/Botanical name	Parts used	Quantity
1.	*Shodhita Hingula*	Purified Cinnabar	Mineral	One part
2.	*Shodhita Tankana*	Purified Borax	Mineral	One part
3.	*Shodhita Vatsanabha*	Purified *Aconitumferox* Linn.	Root	One part
4.	*Shunthi*	*Zingiber officinale* Rosc.	Rhizome	One part
5.	*Maricha*	*Piper nigrum* Linn.	Fruit	One part
6.	*Pippali*	*Piper longum* Linn.	Fruit	One part
7.	*Pippalimoola*	*Piper longum* root Linn.	Root	One part
8.	*Tulsi*	Juice of *Ocimum sanctum* Linn.	*Patra*	QS (for *Bhavana* 3 times)
	Swarasa			
9.	*Ardraka Swarasa*	Juice of *Zingiber officinale* Linn.	*Rhizome*	QS (for *Bhavana* 3 times)
10.	*Dhattura Swarasa*	Juice of *Datura stramonium* Linn.	*Patra*	QS (for *Bhavana* 3 times)
11.	*Nirgundi Swarasa*	Juice of *Vitex negundo* Linn.	*Patra*	QS (for *Bhavana* 3 times)

Table 3: Observation of *Hingula Shodhana*

Wt. of Raw *Hingula*	*Bhavana dravya*	No. of *Bhavana*	Date	Total quantity of *Nimbu Swarasa* used (ml)	Total duration of *Mardana* in each *Bhavana* (hrs.)	Weight of *Shuddha Hingula* after each *Bhavana* (gm)
300 gm	*Nimbu Swarasa*	1	20/01/20	50	4	300 (after 1st *Bhavana*)
		2	21/01/20	30	4	301(after 2nd *Bhavana*)
		3	22/01/20	25	4	305(after 3rd *Bhavana*)
		4	23/01/19	25	3.30	305(after 4th *Bhavana*)
		5	24/01/19	25	3.30	308(after 5th *Bhavana*)
		6	25/01/19	22	3.20	308(after 6th

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						Bhavana)
		7	27/01/19	20	3.20	309(after 7th *Bhavana*)

Table 4: Observations during *Vatsanabha Shodhana*

***Ashodhita Vatsanabha* (g.)**	***Quantity of Go-dugdha* (ml.)**	**Duration of heating (tem. Range)**	***Shodhita Vatsanabha* (g.)**	**Gain /loss%**
700	750	100°C	475	33% loss

Table 5: Observation of *Shodhita Vatsanabha*

Color	**Odour**	**Touch**
Yellowish brown	Milky sweet	Smooth

Table 6: Observations during *Tankana Shodhana*

***Ashodhita Tankana*(g.)**	**Duration of heating (tem. Range)**	***Shodhita Tankana* (g.)**	**Gain /loss%**
500	160°C	350	30

Table 7: Preparation of *Tribhuvanakirti Rasa*

No. of *Bhavana*	**Weight of material obtain (pr. 6) *(g)***	***Swarasa* (ml)**	**Total duration of *Bhavana* (hrs)**	**Weight after *Bhavana***	**Gain/loss (%)**
1 *Tulsipatra Swarasa* (1)	300	450	5	300	0
2 *Tulsipatra Swarasa* (2)	300	320	5	305	1 Gain
3 *Tulsipatra Swarasa* (3)	305	280	5	305	0
4 *Adraka Swarasa* (1)	305	280	5	322	5 gain
5 *Adraka Swarasa*(2)	322	275	5	322	0
6 *Adraka Swarasa*(3)	322	260	5	325	.93 gain
7 *Dhatruapatra Swarasa*(1)	325	200	5	325	0
8 *Dhatruapatra Swarasa*(2)	325	200	5	327	.61 gain
9 *Dhatruapatra Swarasa*(3)	327	170	5	330	.91 gain
10 *Nirgudipatra Swarasa*(1)	330	156	5	335	1.51 gain
11 *Nirgudipatra Swarasa*(2)	335	150	5	335	0
12 *Nirgudipatra Swarasa*(3)	335	140	5	337	.59 gain

Table 8: Properties of yield material

Weight		
Initial	Final	Change
300	337	More fine, and smooth

Table 9: Physico-chemical analysis

SN	**Physico-chemical characters**	**TKR**
1.	pH of 1% aqueous solution	8.34
2.	Loss on drying 5% W/W	10
3.	Total ash % W/W	20
4.	Acid insoluble ash	1.6
5.	Water soluble extractive % W/W	36
6.	Alcohol soluble extractive % W/W	14

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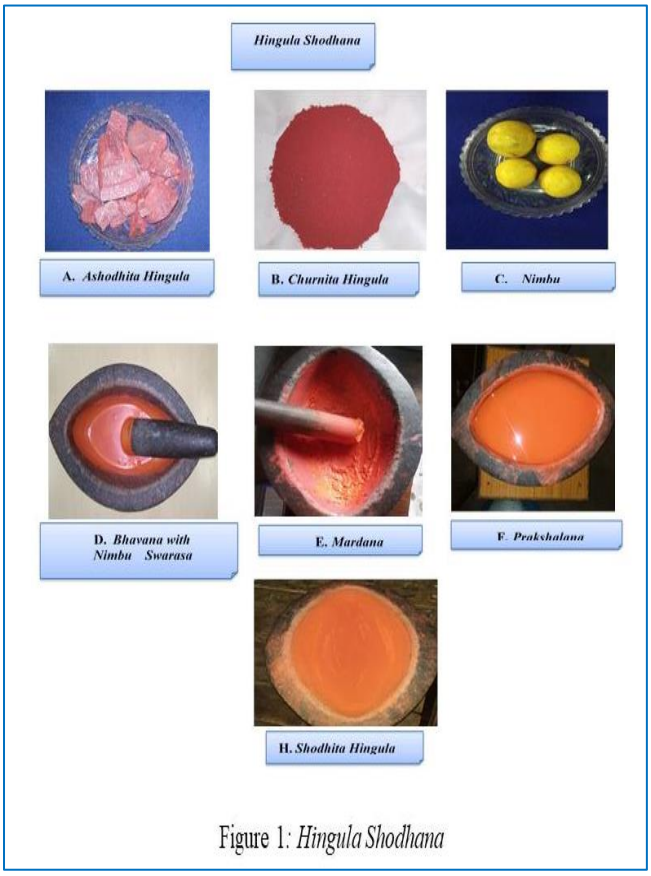

Figure 1: *Hingula Shodhana*

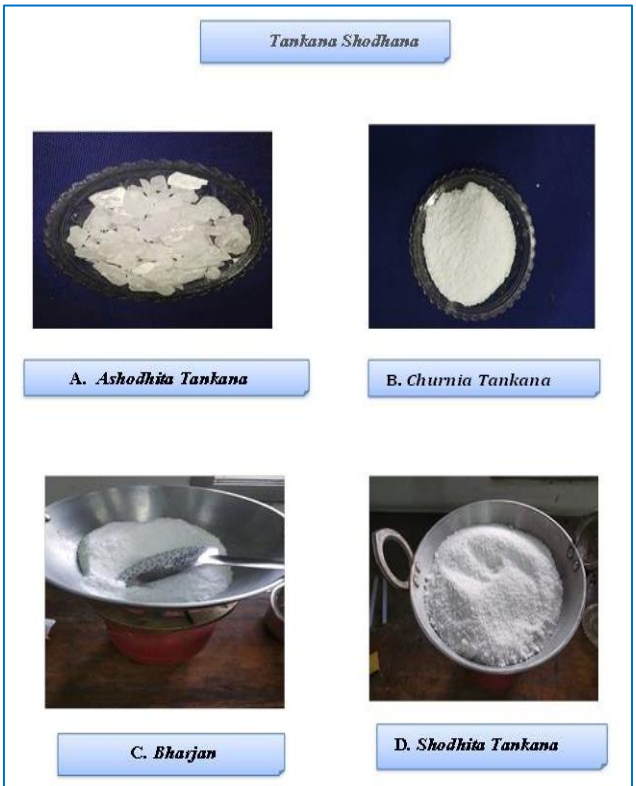

Figure 3: *Tankana Shodhana*

Figure 2: *Vatsanabha Shodhana*

Figure 4: Preparation of TKR

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