



# A COMPARATIVE PHARMACEUTICO-ANALYTICAL STUDY OF TUTTHADRAV PREPARED FROM SHUDDHA TUTTHA By DIFFERENT SHODHAN METHOD WITH SPECIAL REFERENCE TO ITS IN – VITRO ANTIBACTERIAL ACTIVITY

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## Abstract:-

Rasashastra is branch of learning of Ayurvedic pharmaceutics specially dealing with metal and minerals. Rasaushadhi have occupied superior status among the ayurvedic medicine because of the their small dose, quick effectiveness, dreadful disease curing capacity etc.

Tuttha is a mineral and chemically copper sulphate, that has been indicated in various diseases from skin diseases to eye diseases etc. Reviews of classical texts of Ayurveda suggest to use more in the form of external use than internal use. Charaka samhita is the texts of general medicines suggest to use mainly in external dosage form.

The present Antibacterial study was carried out from Tuttha Drava prepared by different Shodhan Method named Bhavana with nimbu swaras, Bhavana with Raktachandan, Bhavana Amla varga drug and Swedan by Gomutracrude Tuttha . Antibacterial activity on Staphylococcus aureus, Streptococcus pyogens, Pseudomonas aeruginosa and Escherichia coli were carried out by agar disk diffusion method.

Key word – Shodhan, Drava Nirman,Analytical Study, Antibacterial Study

## I. INTRODUCTION

Tuttha is one among the Maharasas, well known and frequently used mineral in Rasaaushadis. Ayurveda classical texts indicate to use in the treatment of various diseases like Kushta, Putigandhitvrana, Phirangaja vrana, Arsha, Switra, Krimiroga...etc. Its various forms were used as applicationlike, Drava, Vatii, Bhasma. Rasatarangini told that external use of Tuttha in the form of Tutthadrava. Here Tutthadrava used externally in the Putigandhit vrana, Dushta vrana, Phirangaj vrana, Updaounshaj vrana, Netravartma as Dhawana. These Vrana creates due to various micro-organisms which delayed the process of healing.

So in present study we saw the 'Comparative Pharmaceutico - Analytical Study of Tuttha Drava, Prepared From shuddha Tuttha by Different Shodhana Methods with Special Reference to it's In -Vitro Antibacterial Activity.

## Materials and Methods

### Aims

1. Comparative Pharmaceutical and Analytical Study Of Tuttha Shodhana and Tutthadrava Nirman .
- 2- Comparative Antibacterial Study of Tutthadrava.

### Objectives

1. Tuttha shodhana done by four different methods.
2. Tutthadrava nirman by using four Shodhit tuttha samples.

### Materials

1. Raw Tuttha
2. Shodhana Dravyas - 1. Nimbu. 2. Raktachandan. 3. Manjista.  
4. Gomutra. 5. Dadim.

### Method of preparation:

Method of preparation of Tuttha Shodhana and Tutthadrava Nirman are described here after as,

1. Pharmaceutical study
2. Analytical study

## 1. Pharmaceutical study

### Tuttha Shodhana methods:

The whole method of preparation was divided in four different way's with reference of Rasatarangini 21 tarang.

1. Shodhana Method 1: Shodhana Method 1: Tuttha Shodhana by Nimbu swarasa mardan.
2. Shodhana Method 2: Tuttha Shodhana by Raktachandan and Manjista kwath Bhawana.
3. Shodhana Method 3: Tuttha Shodhana by DadimmSwaras Bhavana.
4. Shodhana Method 4: Tuttha Shodhana by Gomutra Swedana.

### Shodhana Method -1

Shodan method	Raw Tuttha	Dravya Used for Shodhana		Finally Obtained Shodhit Tuttha		Loss during Shodhan in gms	Required time in hrs.
		Dravya	Quantity	Wt.	colour		
Nimbu Swarasa Bhavana	200 gms	Nimbu Swarasa	55ml	193 gms	Sky blue	7 gms	3 hrs.

### Shodhana Method 2

Shodan method	Raw Tuttha	Dravya Used for Shodhana		Finally Obtained Shodhit Tuttha		Loss during Shodhan in gms	Required time in hrs.
		Dravya	Quantity	Wt	color		
Rakt. & manjishta Kwath	200 gms	Raktchan-dan & mnjista kwath	60 ml each Bhawana	195 gm	Gray	5 gms	6 hrs for each bhawana

**Shodhana Method - 3**

Shodan method	Raw Tuttha	Dravya Used for Shodhana		Finaly Obtained Shodhit Tuttha		Loss during Shodhan in gm	Required time in hrs.
		Dravya	Quantity	Wt.	colour		
Dadim swaras	200 gm	Dadim Swarasa	50 ml each Bhawana	187 gm	violet	13 gm	6 hrs for each bhawana

**Shodhana Method 4**

Shodan method	Raw Tuttha	Dravya Used for Shodhana		Finaly Obtained Shodhit Tuttha		Loss during Shodhan in gms	Required time in hrs.
		Dravya	Quantity	Wt.	color		
Gomutra swedana	200 gms	Gomutra	3 lit	167 gms	Black Brawon	33 gms	9 hrs

**Tutthadrava Nirman-**

Using the above Shodhit tuttha's Tutthadrava was prepared for its in vitro antibacterial study. All above Shodhit Tuttha was used in preparation of Tutthadrava. So the whole method of preparation of Tutthadrava was divided in four different way's.

1. Tutthadrava Nirman by using Nimbu swaras shodhit Tuttha
2. Tutthadrava Nirman by using Raktachandan and Manjista kwath Bhavit Tuttha.
3. Tutthadrava Nirman by using Dadim swaras shodhit Tuttha
4. Tutthadrava Nirman by using Gomutra shodhit Tuttha.

**Observation of Tutthadrava Nirman**

Sr. no.	Tuttha drava	Used Dravya		Colour of drava	Required Time
		Tuttha in Ratti (mg)	Water in pal (ml)		
1	Tutthadrava prepared by Nimbu swaras shodhit Tuttha	Nimbu shodhit Tuttha - 4 ratti (500 mg)	Water 5 pal (50 ml)	Faint blue	5 min
2	Tutthadrava prepared by RkT-manjishta kwath shodhit Tuttha	RkT-manjishta kwath shodhit Tuttha- 4 ratti (500 mg)	Water 5 pal (50 ml)	Faint Gray	5 min
3	Tutthadrava prepared by Dadim swaras shodhit Tuttha	Dadim shodhit Tuttha - 4 ratti (500 mg)	Water 5 pal (50 ml)	Faint violet	5 min
4	Tutthadrava prepared by Gomutra shodhit Tuttha	Gomutra shodhit Tuttha - 4 ratti (500 mg)	Water 5 pal (50 ml)	Faint Brown	5 min

**Analytical Study**

To evaluate quality of finished product, it becomes necessary to subject of prepared drugs in the prospect of science. The drugs, which are manufactured, should be well understood and interpreted in the light of modern chemistry to provide proper scientific background.

**The analytical study of *Shodhit Tuttha* presented by**

Ayurved parameters

Modern parameters

**Ayurved parameters**

1. *Shabda* (Sound)
2. *Sparsh* (Touch)
3. *Rupa* (colour)
3. *Rasa* (Test)
4. *Gandha* (Smell)

**Modern parameters**

Determination of Ph, Loss on drying, Acid insoluble Ash , Total Ash value, Water soluble Ash, Particle size, Assay of Element.

**Observations and Results of Analytical Study of Shuddha Tuttha****Ayurved parameters-**

Sample no.	Sparsh	Rupa	Rasa	Gandha	Shabda
Sample 1	Rough	Sky blue	-	Not permeable	-
Sample 2	Smooth	Gray	-	Muddy smell	-
Sample 3	Smooth	Violet	-	Dadim smell	-
Sample 4	Smooth	Brown	-	Gomutra smell	
Sample 5	Rough	Blue	-	Not permeable	-

**Modern parameters****Comparative analytical study :**

## 1] PH

## PH Observations of All Tuttha Samples

Shodhit Tuttha sample	PH
Sample -1	1. 71
Sample -2	3.75
Sample -3	3.31
Sample -4	7.05
Sample -5	3.47

**2) Total Ash**

## Total Ash Observations of All Tuttha Sample

Shodhit Tuttha sample	Total ash
Sample -1	54.67 %
Sample -2	52.74 %
Sample -3	53.75 %
Sample -4	64.58 %
Sample -5	63.88 %

**3) Acid insoluble ash**

Acid Insoluble Ash Observations of All Tuttha Samples

Shodhit Tuttha sample	Acid insoluble ash
Sample -1	1.10 %
Sample -2	1.50 %
Sample -3	1.63 %
Sample -4	1.33 %
Sample -5	0.49 %

**4) Water Insoluble Ash**

Water Insoluble Ash Observations of All Tuttha Samples

Shodhit Tuttha sample	Water insoluble ash
Sample -1	1.34 %
Sample -2	1.63 %
Sample -3	3.08 %
Sample -4	3.39 %
Sample -5	1.62 %

**5) Loss on drying at 105<sup>0</sup> c**Loss on drying at 105<sup>0</sup> c observations of all Tuttha Samples

Shodhit Tuttha sample	Loss on drying at 105 <sup>0</sup> c
Sample -1	28.69 %
Sample -2	28.04 %
Sample -3	24.09%
Sample -4	10.88%
Sample -5	36.04%

**6) Particale Size :**

Partical size observations of all Tuttha Samples

Shodhit Tuttha sample	Partical size
Sample -1	2-25 Um
Sample -2	3-20um
Sample -3	2-40um
Sample -4	1-12um
Sample -5	3-50um

**7. Assay of element****1) For Cu**

Assay of element of 'Cu' observations of all Tuttha samples

Shodhit Tuttha sample	Assay of element
Sample -1	23.23 %
Sample -2	23.57 %
Sample -3	23.10 %
Sample -4	22.03 %
Sample -5	25.65 %

**2) For Fe**

Assay of element of 'Fe' observations of all Tuttha Samples

Shodhit Tuttha sample	Assay of element
Sample -1	0.43 %
Sample -2	0.37 %
Sample -3	0.55 %
Sample -4	0.12 %
Sample -5	0.06 %

**3) For Sulphur (S):**

Assay of element of 'S' observations of all Tuttha Sample

Shodhit Tuttha sample	Assay of element
Sample -1	9.71 %
Sample -2	10.72 %
Sample -3	10.52%
Sample -4	9.02%
Sample -5	12.92 %



**Antibacterial study observations and results****1. Staphylococcus aureus**

<b>Staphylococcus aureus</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
<b>Organism/ Concentration</b>	<b>100</b>	<b>75</b>	<b>50</b>	<b>25</b>	<b>10</b>	<b>5</b>	<b>No drug</b>
Nimbu Swaras shodhit Tuttha Dravya	22	20	15	NZ	NZ	NZ	NZ
Rakta Chandan & manjista Kwath sodhit Drava	22	17	15	NZ	NZ	NZ	NZ
Dadin swaras sodhit tuttha Drava	28	20	16	10	6	NZ	NZ
Gomutra Swedit suddha tuttha Drava	25	20	15	NZ	NZ	NZ	NZ

Zone of Inhibition (ZOI) of Nimbu Swaras shodhit Tuttha Dravya at 25ul, 50ul, 75ul and 100ul concentration were 0mm, 15mm, 20mm and 22 mm respectively. ZOI of Rakta Chandan & manjista Kwath sodhit Drava at 25ul, 50ul, 75ul and 100ul concentration were 0mm, 15mm, 17mm and 22 mm respectively. ZOI of Dadin swaras sodhit tuttha Drava at 10ul, 25ul, 50ul, 75ul and 100ul concentration were 6mm, 10mm, 16mm, 20mm and 28 mm respectively. ZOI of Gomutra Swedit suddha tuttha Drava at 25ul, 50ul, 75ul and 100ul concentration were 0mm, 15mm, 20mm and 25mm respectively.

**2. Streptococcus pyogens:**

<b>Streptococcus pyogens</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
<b>Organism/ Concentration</b>	<b>100</b>	<b>75</b>	<b>50</b>	<b>25</b>	<b>10</b>	<b>5</b>	<b>No drug</b>
Nimbu Swaras shodhit Tuttha Dravya	20	19	18	NZ	NZ	NZ	NZ
Rakta Chandan & manjista Kwath sodhit Drava	14	10	8	NZ	NZ	NZ	NZ
Dadin swaras sodhit tuttha Drava	17	12	7	NZ	NZ	NZ	NZ
Gomutra Swedit suddha tuttha Drava	24	22	15	10	NZ	NZ	NZ

Zone of Inhibition (ZOI) of Nimbu Swaras shodhit Tuttha Dravya at 25ul, 50ul, 75ul and 100ul concentration were 0mm, 18mm, 19mm and 20 mm respectively. ZOI of Rakta Chandan & manjista Kwath sodhit Drava at 25ul, 50ul, 75ul and 100ul concentration were 0mm, 8mm, 10mm and 14 mm respectively. ZOI of Dadin swaras sodhit tuttha Drava at 25ul, 50ul, 75ul and 100ul concentration were 0mm, 7mm, 12mm and 17 mm respectively. ZOI of Gomutra Swedit suddha tuttha Drava at 25ul, 50ul, 75ul and 100ul concentration were 10mm, 15mm, 22mm and 24mm respectively.

### 3. Pseudomonas aeruginosa

<i>Pseudomonas aeruginosa</i>	1	2	3	4	5	6	7
Organism/ Concentration	100	75	50	25	10	5	No drug
Nimbu Swaras shodhit Tuttha Dravya	25	22	25	NZ	NZ	NZ	NZ
Rakta Chandan & manjista Kwath sodhit Drava	22	14	10	8	NZ	NZ	NZ
Dadin swaras sodhit tuttha Drava	22	15	0	NZ	NZ	NZ	NZ
Gomutra Swedit suddha tuttha Drava	17	15	13	10	NZ	NZ	NZ

Zone of Inhibition (ZOI) of Nimbu Swaras shodhit Tuttha Dravya at 25ul, 50ul, 75ul and 100ul concentration were 0mm, 25mm, 22mm and 25 mm respectively. ZOI of Rakta Chandan & manjista Kwath sodhit Drava at 25ul, 50ul, 75ul and 100ul concentration were 8mm, 10mm, 14mm and 22 mm respectively.

ZOI of Dadin swaras sodhit tuttha Drava at 25ul, 50ul, 75ul and 100ul concentration were 0mm, 0mm, 15mm and 22 mm respectively. ZOI of Gomutra Swedit suddha tuttha Drava at 25ul, 50ul, 75ul and 100ul concentration were 10mm, 13mm, 15mm and 17mm respectively.

### 4. Escherichia coli

<i>Escherichia coli</i>	1	2	3	4	5	6	7
Organism/ Concentration	100	75	50	25	10	5	No drug
Nimbu Swaras shodhit Tuttha Dravya	15	13	12	NZ	NZ	NZ	NZ
Rakta Chandan & manjista Kwath sodhit Drava	15	13	12	NZ	NZ	NZ	NZ
Dadin swaras sodhit tuttha Drava	13	13	12	NZ	NZ	NZ	NZ
Gomutra Swedit suddha tuttha Drava	22	19	15	NZ	NZ	NZ	NZ

Zone of Inhibition (ZOI) of Nimbu Swaras shodhit Tuttha Dravya at 25ul, 50ul, 75ul and 100ul concentration were 0mm, 12mm, 13mm and 15 mm respectively. ZOI of Rakta Chandan & manjista Kwath sodhit Drava at 25ul, 50ul, 75ul and 100ul concentration were 0mm, 12mm, 13mm and 15 mm respectively. ZOI of Dadin swaras sodhit tuttha Drava at 25ul, 50ul, 75ul and 100ul concentration were 0mm, 12mm, 13mm and 13 mm respectively. ZOI of Gomutra Swedit suddha tuttha Drava at 25ul, 50ul, 75ul and 100ul concentration were 0mm, 15mm, 19mm and 22mm respectively.

### Conclusion:

The key reason for the notable effectiveness against various microorganisms is the variety of bhavana dravya utilised in the formulation.

Gomutra Swedit suddha tuttha Drava is having minimum inhibitory concentration against *Escherichia coli* & *Streptococcus pyogens*, Nimbu Swaras shodhit Tuttha Drava against *Pseudomonas aeruginosa* and Dadim swaras sodhit tuttha Drava Dadim swaras sodhit tuttha Drava

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