

“Physico chemical analysis of nimbadi ubatan and its conversion into soap with its antimicrobial activity”

Shivani J. Mishra*¹, Sachin S. Sheth²

1. P. G. Scholar,
2. Guide and Assistant Professor,
Dept. of Rasashastra and Bhaishajya Kalpana,
APM's Ayurved Mahavidyalaya, Sion, Mumbai, Maharashtra, India

*Corresponding author: dr.shivanimishra25@gmail.com

Abstract:

Aim: to study physico chemical analysis of nimbadi ubatan and its conversion into soap with its antimicrobial activity.

OBJECTIVES: 1. Preparation of Nimbadi Ubatan. 2. Preparation of Nimbadi Soap (Oil based using Nimbadi kwath). 3. Preparation of Nimbadi Soap (Glycerine based). 4. Analytical study of Nimbadi ubatan and its soap. 5. Antimicrobial study of Nimbadi ubatan and its soap. **MATERIALS AND**

METHODS: Preparation of Nimbadi Ubatan according to the reference Astang Hrudaya Chikitsa Sthana 19/65-66. Conversion of Nimbadi ubatan into Nimbadi soap according to standard method of preparation of Soap. Analytical study of Nimbadi Ubatan and Nimbadi Soap (Oil Based using Nimbadi Kwath) and (Glycerine Based). In-vitro

antimicrobial activity of Nimbadi ubatan and Nimbadi soap (Oil Based using Nimbadi Kwath) and (Glycerine Based). In-vitro antimicrobial activity of Ketostar Soap.

CONCLUSION: Antimicrobial activity of all the three samples was studied by agar well diffusion method and Time Kill Test method. Ketostar soap Standard drug was used for a comparative study. From above results we can conclude that Nimbadi Soap (Oil based using Nimbadi kwath) is much more effective than Nimbadi Soap (Glycerine Based) and Nimbadi Ubatan.

Keywords: Nimbadi ubatan, Nimbadi Soap, Ashtang Hruday, Antimicrobial activity.

INTRODUCTION:

Rasa Shastra and Bhaishajya Kalpana is one of the branch of

Ayurveda in which all methods of ayurvedic medicine purification, formation, dose and indication are available. Ashtang hrudaya is a very famous samhita which has many kalpas for various diseases.

Now a days with increasing competition in every field, the fast life with unhealthy eating habits like fast food, Milk shakes (Virudha aahar) and lack of exercise , lack of sleep , stress, more use of electronic gadgets (Mithya Vihar) add to the cause of skin diseases. Aacharya Charak have explained detailed information about Kushtha in Charak Samhita.

सकन्दुरागपिडकं दद्रुमण्डलमुद्वतम्।

(च.चि. ७/२३)

Udavartan is one of the method of application of shushka dravyas with some liquid media on a body. Properties of Udavaratan are given as,

उद्वर्तनं कफहरं मेदसः प्रविलायनम्।

स्थिरीकरणमङ्गानां त्वक्प्रसादकरं परम्॥

(अ.ह.सू. २/१५)

In Astang Hrudaya, Nimbadi ubatan is a formulation mentioned in Kushtha adhikar, it can be used as varnya and to treat skin disorders in the form of udvartan, churna or as lepa. In today's busy life it is very difficult to use of lepa. In market various types of herbal soaps are available but it's effects are

uncertain. Hence a reference from classical text was selected i.e. Nimbadi Ubatan, it was converted into soap which can be easy to use and it was decided to check their antimicrobial activity. It is the need of hour to prepare such a formulations which can be used in skin disorders.

STUDY RATIONALE: This study has been taken to improvise new form of medicine for kushtha with respect to ayurvedic formulations.

Aim: to study physico chemical analysis of nimbadi ubatan and its conversion into soap with its antimicrobial activity.

OBJECTIVES:

1. Preparation of Nimbadi Ubatan.
2. Preparation of Nimbadi Soap (Oil based using Nimbadi kwath).
3. Preparation of Nimbadi Soap (Glycerine based).
4. Analytical study of Nimbadi ubatan and its soap.
5. Antimicrobial study of Nimbadi ubatan and its soap.

MATERIALS AND METHODS:

1. Preparation of Nimbadi Ubatan:

Reference:

निम्बादि उबटन -

निम्बं हरिद्रे सुरसंपटोलं कुष्ठाश्च गंधे सुरदारु शिग्रुः।

ससर्षपंतुम्बरुधान्यवन्यंचण्डाचचूर्णानिसमानिकुर्यात्।

तैस्तक्रपिष्टैः प्रथमं शरीरं तैलकमुद्वर्तयितुं यतेत्।

तथास्य कण्डूः पिटिकाः सकोठाः कुष्ठानि शोफाश्च शमं व्रजन्ति॥

Table No. 1: Herbal raw materials for Preparation of Nimbadi Ubatan

Coarse powder (Pata churna) form with mesh no.60.

Sr. No.	Name	Latin Name	Part Used	Quantity
1	Nimb	Azadirachta indica	Patra	50gms
2	Haridra	Curcuma longa	Kand	50gms
3	Daruharidra	Berberis aristata	Twak	50gms
4	Surasa	Ocimum sanctum	Beej	50gms
5	Patol	Tricosanthes dioica	panchang	50gms
6	Kushtha	Saussurea lappa	Mool	50gms
7	Ashwagandha	Withania somnifera	Mool	50gms
8	Surdaaru	Cedrus deodaru	Saar	50gms
9	Shigru	Moringa pterygospermum	Twak	50gms
10	Sarshap	Brassica campestris	Beej	50gms
11	Tumbaru	Zanthoxylum alatum	Phal	50gms
12	Musta	Cyperus rotundus	Kand	50gms
13	Chanda	Angelica glauca	Mool	50gms

Procedure Of Nimbadi Ubatan:

- Coarse powder (patachurna) of the ingredients of Nimbadi Ubatan is required for this Kalpana.
- Coarse powder (patachurna) of all the ingredients of Nimbadi Ubatan was purchased from local market.
- All the ingredients of Nimbadi Ubatan were authenticated from certified Lab.
- All the ingredients of Nimbadi Ubatan were weighed on a weighing scale.

- 50gms of each of the raw material were taken.
- Coarse powder of all the ingredients of Nimbadi Ubatan was taken in sieve no. 60 according to the sequence explained in the shloka.
- Equal quantity of Nimba Powder, Haridra powder, Daruharidra powder, Surasa powder, Patol Powder, Kushtha powder, Ashwagandha powder, Shurdaru powder, Shigru Powder, Sharshap Powder, Tumbaru Powder, Musta

Powder, Chanda Powder were taken into sieve respectively.

- After sieving all the above ingredients, the mixture was taken into khalvayantra for mardan process.
- 80 ml of Takrawas added to the mixture and it was triturated in khalvayantra for 30 minutes.
- Another 50 ml of Takra was added to the mixture and triturated in khalvayantra for 40 minutes.
- After trituration, mixture was taken out of the khalvayantra .
- The final product obtained was then weighted on a weighing scale which was 650 gms of Nimbadi Ubatan and kept in an air tight container.

2. Preparation of Nimbadi Soap (Oil Based Using Nimbadi Kwath)

Table No. 2: Chemical Ingredients Of Nimbadi Soap (Oil Based Using Nimbadi Kwath)

Sr. No.	Name of Chemical	Quantity
1	Nimbadi kwath	37.5 gms
2	NaoH	19.2 gms
3	Takra Siddha Coconut oil	125 ml
4	Methyl Paraben	0.15 gm
5	Propyl Paraben	0.15 gm

Preparation of Nimbadi Ubatan siddha tail:

Other Ingredients:

Table No.3: Other Ingredients for Preparation of Nimbadi Ubatan siddha tail

Sr. No.	Name of Dravya	Quantity
1	Cocunut Oil	175ml
2	Takra	21.875 ml ≈ 22 ml

Procedure:

- Took 700 ml of prepared Nimbadi Kwath, then to that prepared kwath 175 ml of Coconut oil was added and along with 21.875 ml ≈ 22ml of Takra was added according to reference of Sharandhar Samhita, in order to prepare Nimbadi Ubatan Siddha tail for preparation of Oil based Soap.
- Prepared 44 gms of Nimbadi kalka was then added to the mixture of Nimbadi kwath and Coconut oil and Takra.
- Mixture of Kalka, kwath and coconut oil and Takra was heated to boil on a low flame till the whole amount of moisture gets

evaporated and characteristic features of tail appears.

- After paka, the kalka became harder and rolls into varti.
- Varti burnt without crackling sounds when exposed to fire.
- Froth appeared over the tail.
- The prepared tail had odour, color and taste same as raw materials.
- Filtered the oil while hot (about 80⁰) through muslin cloth and allowed to cool.
- Total yield obtained was 150ml of Nimbadi Ubatan siddhi tail.
- Out of which 125 ml tail was used for preparation of Nimbadi Soap (Oil based using Nimbadi Kwath).
- Total time required for preparation of Nimbadi Ubatan Siddha tail was 3 hours and 30 minutes.

Procedure of Nimbadi Soap(Oil Based Using Nimbadi Kwath):

Part A:

Preparation of lye:

- 37.5 ml Of Nimbadi kwath was taken in a beaker and 19.2 gms of NaOH flakes were added in it. Stir the mixture gradually till it dissolves, with safety precautions.
- The temperature of the mixture rised due to exothermic reaction of NaOH.

- The solution was kept in cold water till the temperature reduced up to 35⁰c.

Part B:

- 125 ml of Takra siddha coconut oil was taken and maintained the temperature of coconut oil at 35⁰c.
- The temperature of lye and oil was kept same.
- The lye was added to the oil mixture and stirred continuously and vigorously till a thick consistency obtained.
- Then 0.15gms of methyl paraben and 0.15 gms of propyl paraben was added to the mixture as preservative.
- Poured the mixture in moulds and kept aside for 24-48 hrs without disturbance to form a proper Soap.

3. Preparation of Nimbadi Soap (Glycerine Based)

Table No. 4: Chemical Ingredients for Preparation of Nimbadi Soap (Glycerine Based)

Sr. No.	Name of Chemical	Quantity
1	Glycerine Soap base	250gms
2	Nimbadi Ubatan	13gms

Procedure:

- Glycerine soap base was purchased from the local market.
 - 250 gms of Glycerine soap base was weighted on a weighing scale.
 - Using double boiler method 250 gms of Glycerine soap base was melted.
 - Total 19 gms of fine powder of Nimbadiubatan was obtained.
- Out of which 13 gms of fine powder of Nimbadi ubatan was added in melted Glycerine Soap base.
 - Mixed it vigorously by using spatula.
 - Then poured the mixture into moulds.
 - Allowed it to cool.

OBSERVATION AND RESULTS:

1. Observations and Result of Analytical process of Nimbadi Ubatan:

Sr. No.	Test	Result
1	Appearance	Fine powder
2	Colour	Faint yellowish green
3	Odour	Herbaceous
4	Taste	Bitter
5	Moisture Content	4.0%
6	Toal Ash Value	8.71%
7	Acid Insoluble Ash	3.30%
8	Alcohol Soluble Extractive	12.96%
9	Water Soluble Extractive	25.03%
10	Ph	4.9

Thin Layer Chromatography of Nimbadi Ubatan:

- At 254 nm wavelength 4 bands at different Rf were observed, at 365nm wavelength another 7 bands at different Rf were observed.
- No specific results were noted.

2. Observations and Result of Analytical process of Nimbadi Soap (Oil based Using Nimbadi Kwath):

Sr. No.	Test	Result
1	Appearance	Smooth dry soap bar
2	Colour	Light chocolate colour
3	Odour	Characteristic
4	Taste	Salty
5	Ph	9.45
6	Density	1.1340

7	Moisture Content	6.36%
8	Foam Height	3.30cm
9	Foaming Value	79.25%
10	Saponification Value	392mg/ml
11	Solubility	Completely soluble in lukewarm water

3. Observations and Result of Analytical process of Nimbadi Soap (Glycerine based):

Sr. No.	Test	Result
1	Appearance	Smooth dry Soap vadi
2	Colour	Dark blackish green
3	Odour	Characteristic
4	Taste	Salty
5	Ph	8.9
6	Density	1.1340
7	Moisture Content	7.39%
8	Foam Height	3.1 cm
9	Foaming Value	82.56%
10	Saponification Value	398mg/ml
11	Solubility	Completely soluble in lukewarm water

4. Observations and Result of Antimicrobial process of Nimbadi Ubatan, Nimbadi Soap (Glycerinebased), Nimbadi Soap (Oil based Using Nimbadi Kwath) and Ketostar Soap (By Zone of Inhibition Method)

Sample Identification	Zone of Inhibition in average(mm)			
	S. aureus	S. pyogenes	P. aeruginosa	C. albicans
Nimbadi Ubtan	No zone	No zone	No zone	No zone
Nimbadi soap (Glycerine base)	27 mm	12 mm	No zone	25 mm
Nimbadi soap (Oil based Using Nimbadi Kwath)	41 mm	19 mm	16 mm	15 mm
Ketostar	32 mm	12 mm	No zone	31 mm

Results: From above method i.e. by Well diffusion method, In Nimbadi

Ubatan there is no zone of inhibition present & all 3 samples i.e. Nimbadi

Soap (Glycerine based), Nimbadi Soap (Oil based using Nimbadi Kwath) and Ketostar Soap showing Zone of Inhibition.

5. Observations and Result of Antimicrobial process of Nimbadi Ubatan, Nimbadi Soap (Glycerine based, Nimbadi Soap (Oil based Using Nimbadi Kwath) and Ketostar Soap : By Time Kill Test

Test Product labeled as **Nimbadi Ubtan** has shown **2 – 4 log reduction/ >99% reduction** of *Staphylococcus aureus*, *Streptococcus pyogenes*, *Pseudomonas aeruginosa*, and *Candida albicans* in 1 minute when analysed as per ASTM E 2315 - 16 Method.

Nimbadi soap (Glycerine based) has shown **> 4 log reduction/ >99.99% reduction** of *Staphylococcus aureus*, *Streptococcus pyogenes*, *Pseudomonas aeruginosa* and *Candida albicans* in 1 minute when analysed as per ASTM E 2315 - 16 Method.

Nimbadi soap (Oil based Using Nimbadi kwath) has shown **> 4 log reduction/ >99.99% reduction** of *Staphylococcus aureus*, *Streptococcus pyogenes*, *Pseudomonas aeruginosa* and *Candida albicans* in 1 minute when analysed as per ASTM E 2315 - 16 Method.

Ketostar Soap has shown **> 4 log reduction/ >99.99% reduction** of *Staphylococcus aureus*, *Streptococcus pyogenes*, *Pseudomonas aeruginosa* and *Candida albicans* in 1 minute when

analysed as per ASTM E 2315 - 16 Method.

DISCUSSION:

The physicochemical parameters of all the three samples i.e. Nimbadi ubatan, Nimbadi soap (Glycerine based), Nimbadi soap (Oil based using Nimbadi kwath) were within in limits. After analysing Physicochemical parameters all three samples had given for antimicrobial testing.

By Well Diffusion Method:

From above method i.e. by well diffusion method, we can conclude that Nimbadi Soap (Oil based using Nimbadi kwath) had shown better antimicrobial activity against 4 organisms than standard drug ketostar. Nimbadi soap (glycerine based) also showing good antimicrobial activity against 4 organisms which had taken for test. Antimicrobial activity of Nimbadi ubatan could not be seen might be due to there was no diffusion of sample in agar plate.

By Time Kill Test:

According to above method i.e. by time kill test method all Four Samlpes had shown their antimicrobial activities against 4 microbes by killing them in 1 minute by direct contact with sample. Antimicrobial activity of Nimbadi Soap (Glycerin based) and Nimbadi Soap (Oil based using Nimbadi kwath) were as same as Standard drug ketostar used for

comparison. Anti microbial activity of Nimbadi Ubatan was also within limits.

CONCLUSION:

- According to the reference of Ashtang Hruday chikitsasthan “Nimbadi ubatan” was selected for a study.
- Analytical studies of all the three samples were done from reliable institute.
- Antimicrobial activity of all the three samples was studied by agar well diffusion method and Time Kill Test. Ketostar soap Standard drug was used for a comparative study.
- In vitro Antimicrobial activity of Nimbadi Ubatan as compared to Ketostar soap was not seen with agar well diffusion method, but shown good inhibitory activity with time kill test against *Staphylococcus aureus*, *Streptococcus pyogenes*, *Pseudomonas aeruginosa* and *candida albicans*.
- In vitro Antimicrobial activity of Nimbadi Soap (Oil Based) as compared to Ketostar soap was Shown better Antimicrobial Activity with agar well diffusion method and also shown Excellent inhibitory activity with time kill test against *Staphylococcus*

aureus, *Streptococcus pyogenes*, *Pseudomonas aeruginosa* and *candida albicans*.

- In vitro Antimicrobial activity of Nimbadi Soap (Glycerine Based) as compared to Ketostar soap was Shown less antimicrobial activity with agar well diffusion method, but shown Excellent inhibitory activity with time kill test against *Staphylococcus aureus*, *Streptococcus pyogenes*, *Pseudomonas aeruginosa* and *candida albicans*.

From above results we can conclude that Nimbadi Soap (Oil based) is much more effective than Nimbadi Soap (Glycerine Based) and Nimbadi Ubatan.

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