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INTERNATIONAL JOURNAL
OF INNOVATIVE AND APPLIED RESEARCH

RESEARCH ARTICLE

Article DOI:10.58538/IJAR/2092

DOI URL: <http://dx.doi.org/10.58538/IJAR/2092>

INSTANT AND AUTOMATIC KSHAR-SUTRA MAKER MACHINE (SYSTEM & METHOD TO PREP ARE KSHAR-SUTRA THREAD)

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Manuscript Info

Manuscript History

Received: 26 February 2024
Final Accepted: 29 March 2024
Published: March 2024

Keywords:

Kshar-Sutra, Machine, Fistula in Ano

Abstract

This model is developed for making of Kshar-Sutra (a medicated thread) which is routinely used in the treatment of Fistula in Ano & Haemorrhoids. Even today when the modern surgery is at its peak, fistula-in-ano is still a challenge to the surgeons for its incidence of recurrence and post operative complications. Kshar-sutra is an Ayurvedic surgical treatment which involves management of Anorectal disorders for treating fistula-in-ano & Haemorrhoids. Use of Kshar-Sutra in fistula in Ano, this technique being used traditionally in India from last 10 centuries. So in rest of the world, there is no chance of making of Kshar-Sutra and such kind of model or machines. Traditional method of preparation of Kshar-Sutra is so hectic / difficult and time consuming. Generally in traditional method, it took at least 7 days to make in summer season and more in other seasons, but due to this model/ instrument, same thing can be perform only within 2 hours in any season. This model saves time, raw material, maintains sterility, freshness with more efficacy and produce more quantity at a time. Various kind of treatment methods are available today still treatment of Fistula in Ano is very complicated. Fistula in Ano is very notorious for its recurrence. But Kshar- Sutra therapy is very efficient in the treatment of Fistula in Ano. Not only it cures but also avoids recurrence. But there are scarcity of Kshar- Sutra. Everybody can not make it. Preparation of Kshar-Sutra is very difficult task. Till today, surgeons restored kshar-sutra in large quantity, but after some period, the efficacy of old kshar-sutra is remains questionable. But this instant automatic kshar-sutra machine makes it easy. Not only this but also overcomes all problems of preparation method of Kshar sutra.

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Introduction:-**Introduction of the Invention-**

“ एषण्यागतिमन्विष्यक्षारसूत्रानुसारिणीम्।

सूचीनिदध्यादगत्यन्तेतथोन्नम्याशुनिर्हरेत्॥30॥

सूत्रस्यान्तंसमानीयगाढबन्धंसमाचरेत्।

ततःक्षारबलंवीक्ष्यसूत्रमन्यत्प्रवेशयेत्॥31॥

क्षाराक्तंमतिमान् वैद्योयावन्नच्छिद्यतेगतिः।

भगन्दरेऽप्येषविधिःकार्योवैद्येनजानता॥32॥”

सु.चि.30 - 32 / 17

Method of using Kshar Sutra– After finding out the direction of Fistula in Ano with the help of probe (*Eshani*), put a long Kshar Sutra in the fistulous tract from the external opening and put it in the direction towards the internal opening and take out the Kshar Sutra with probe from the anal region. Tie both the ends of Kshar Sutra tightly. After 2-3 days, when the alkaline thread becomes loose, replace it and insert another alkaline thread as before and tie both the ends tightly again. Tie Kshar Sutra until the fistulous tract cuts & heals completely. A wise physician should use Kshar Sutra in this way.

“ भावितंरजनीचूर्णैः स्नुहिक्षीरैः पुनःपुनः।

बन्धनात्सदृढंसूत्रंच्छिनतिअशोभगन्दरम्॥ ”

चक्रदत्त-12, 13 / 45

Bhāvitam rajani cūrnaih snuhi ksiraih punah punah |

Bandhanāt sadrudham sutram cchinati arśo bhagandaram ||

(Chakradatta - ArshoAdhikāra -12, 13 / 45)

The thread which is impregnated or smeared repeatedly by Rajani churna (turmeric powder) and Snuhi ksheer (latex of *Euphorbia Nerifolia*) when tied will cut and eliminate Arsha (Piles) and Bhagandara (Fistula in Ano) from their roots.

“सुधादुग्धवस्त्रपूतहरिद्राचूर्णसंयुते।

निषिकतेनतुतूलेनस्वल्पेनखलुयत्नतः॥

प्रलिप्तंसुदृढंसूत्रंच्छायायाम्अथशोषयेत्।

विलिप्यसप्तधाहिएवंशोषयेत्भिषक्वरः॥

सूत्रम्एतत्समाख्यातंक्षारसूत्रंतुनामतः।

गुदान्कुरच्छेदनार्थममोघंअस्त्रंइदंमतम्॥

भगन्धरच्छेदनार्थमपि एतद्विनियुज्यते।

प्रयोक्तव्यंक्षारसूत्रंसावधानतयासदा॥”)रसतरंगिणी(

Sudhādugdhevastrapūtaharidrācūrnamsamyute |

Nisiktenatutūlenasvalpenakhaluyatnatah ||

Praliptamsudrudhamsūtramcchāyāyamathashosayet |

Vilipyasaptadhā hi evamśhoshayetbhisakvarah ||

Sūtrametsamākhyātamkṣārasūtramunāmatah |

Gudānkuram cchedanartham amogham astram idam matam ||

Bhagandhara cchedanartham api etad vinyujyate |

Prayoktavayam ksāra sūtram sāvadhānatayā sadā || (RasTarangini)

A thread should be smeared with a cloth dipped in sudha milk / Snuhi Ksheer (latex of *Euphorbia Nerifolia*) mixed with Haridra churna (turmeric powder). Later the thread should be dried in shade. This procedure

should be repeated 7 times. This thread is called 'Kshara Sutra'. This is highly beneficial in rooting out *Gudankur* (piles) and *Bhagandar* (Fistula in Ano).

“ अर्कस्नुहिपयोःलिप्तपुनःसूत्रंविशोषयेत्।

त्रिवारान्शोषयित्वातुक्षारेणएवंप्रलेपयेत्॥”)रसकामधेनु(

Arka snuhi payoh liptam punah sūtram vishosayet।

Trivārān śosayitvā tu ksārena evam pralepayet || (Rasa Kāmadhenu)

The thread smeared with Snuhi Ksheer (latex of *Euphorbia Nerifolia*) or Aarka ksheer (latex of *Calatropis Gigantea*) 3 times, should be dried in shade and after having applied with kshar (alkali) should be used in the treatment of *Arsha* (Haemorrhoids) and *Bhagandara* (Fistula-in-Ano).

Today also same traditional method of making of Kshar-Sutra is being followed. Traditional method is - on the wooden frame of standard size 1.5 × 2 feet, unbreakable, cotton thread no. 20 is to be tied in zigzag position on the frame. Then, these three drugs –

- 1) Latex of *Euphorbia nerifolia* (Snuhi Ksheer),
- 2) Alkali of *Achyranthus Aspera* (Apamarg Kshar)
- 3) Powder of *Curcuma Longa* (Haldi)

are to be coated respectively on framed thread manually. Then, it should be dried completely in the sun rays. This is a one cycle. Same kind of 7 cycles is to be followed in next 7 days. Then preserve in a cabinet, where 5 to 6 frames are accumulated.

The use of Kshar-Sutra in the treatment of Fistula in Ano is being used since 1970. Dr. P. J. Deshpande, former Professor & HOD of Shalya Dept. BHU, Varanasi, was first time used this Kshar-Sutra, since those days, this traditional methods are using countrywide. But no one invented such model / machines to make instant kshar-sutra. **Hectic procedure of making of Kshar-Sutra** and collection of fresh latex of *Euphorbia Nerifolia*, making of Apamarg kshar (Alkali of *Achyranthus Aspera*) is quite difficult. So this methods are purposely set aside by old Vaidyas and popularity / fame not given by modern world. So this Kshar-Sutra was remain ignored.

Limitations of this traditional method of making of Kshar-Sutra –

- 1) Time consuming,
- 2) Chances of infection (can't avoid),
- 3) Wastages of raw materials due to spillage,
- 4) Coating not done alike one,
- 5) Due to not coating properly, pH of the Kshar-Sutra not maintaining the same throughout the length of the thread.
- 6) Less quantity can produce due to more time taken.
- 7) Efficacy reduces due to long period storage.

Kshar-sutra is an Ayurvedic surgical treatment which involves management of Anorectal disorders for treating fistula-in-ano & Haemorrhoids.

The Kshar-sutra is a type of thread / medicated seton prepared by coating and re-coating the thread frequently, i.e. 15 to 21 times with different drugs of plant origin. The mechanical action of the treads and the chemical action of the drugs coated on the thread, works together for cutting, curetting, draining, and cleaning the fistulous track, thus promoting healing of the track/ wound.

Our invention definitely overcome over the limitations of the traditional method of preparation of Kshar-Sutra.

Ability to overcome on these limitations –

Advantages of Our invention –

- 1) Saves time - it makes within 2 hours completely,
- 2) No human handling (avoids chances of infection, under aseptic precautions.)
- 3) No drugs spillage, saves raw materials.
- 4) Coating done like one.

- 5) pH is maintained same throughout the length of thread.
- 6) More quantity can be make at a time.
- 7) More efficacy due to freshness.

Even today when the modern surgery is at it's peak, fistula-in-ano is still a challenge to the surgeons for its incidence of recurrence and post operative complications.

Traditional method of preparation of Kshar-sutra –

Before preparation of Kshar-Sutra, thread should be boiled in distilled water for 20 minutes.

A Barbour flax 100% linen suture thread No-20 is to be used. Then it should be engaged on the wooden/ stainless steel frame made for specially kshar sutra cabinet with UV tube.

Now, use clean and sterilized gauze pieces soaked in latex of Euphoria Nerifolia (Snuhi Ksheer) to smear latex on linen thread evenly.

The frames are placed with smeared linen thread in the Kshar Sutra cabinet for drying.

After the linen thread is completely dry, again smear the thread with Snuhi Ksheer. Repeat this process 7 times on the same thread.

After 7 coating with Snuhi Ksheer, pass this thread through the powdered of Apamarga Kshar and ensure that the Apamarga Kshar is attached to the thread uniformly. If Apamarga Kshar adheres to the thread in excess, then shake the thread frame gently and allow the excess particles of Apamarga Kshar to fall down. Now, again place frame with smeared thread in the Kshar Sutra cabinet for drying. Repeat this process for a total 7 times. When a thread is completely dried, then repeat this step for 7 coating of Haldi. Now, total 21 coatings are done on thread and thread is called Kshar Sutra (a medicated thread) and ready to use.

The preparation of Ksharsutra has undergone many changes and has passed through various stages before it reached the present standard of manufacturing. It is a technique derived from the ancient Ayurvedic text books and modified on the basis of a number of experimentations and experiences.



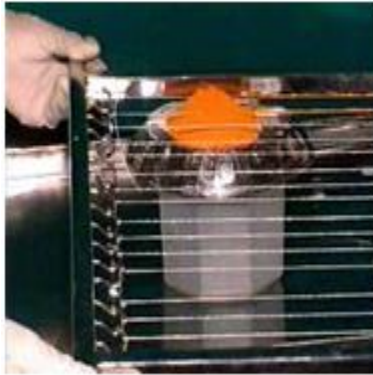
Tying the thread on the frame.



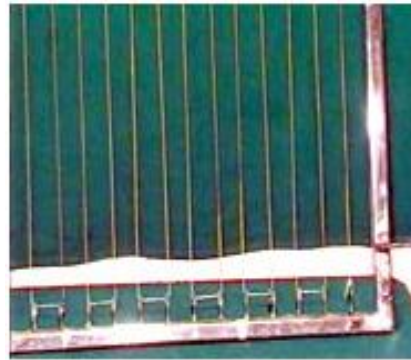
Collection of latex by cutting the Snuhi plant vertically.



Coating the thread with Snuhi Ksheer.



Coating the thread with Apamarg Kshar.



Coating the thread with powder of Haridra.



Prepared Ksharsutra on the wooden frame.

Prepared Ksharsutra on stainless steel frame.



Prepared Ksharsutra restored in the Cabinet.

Mode of action of Kshar-sutra -

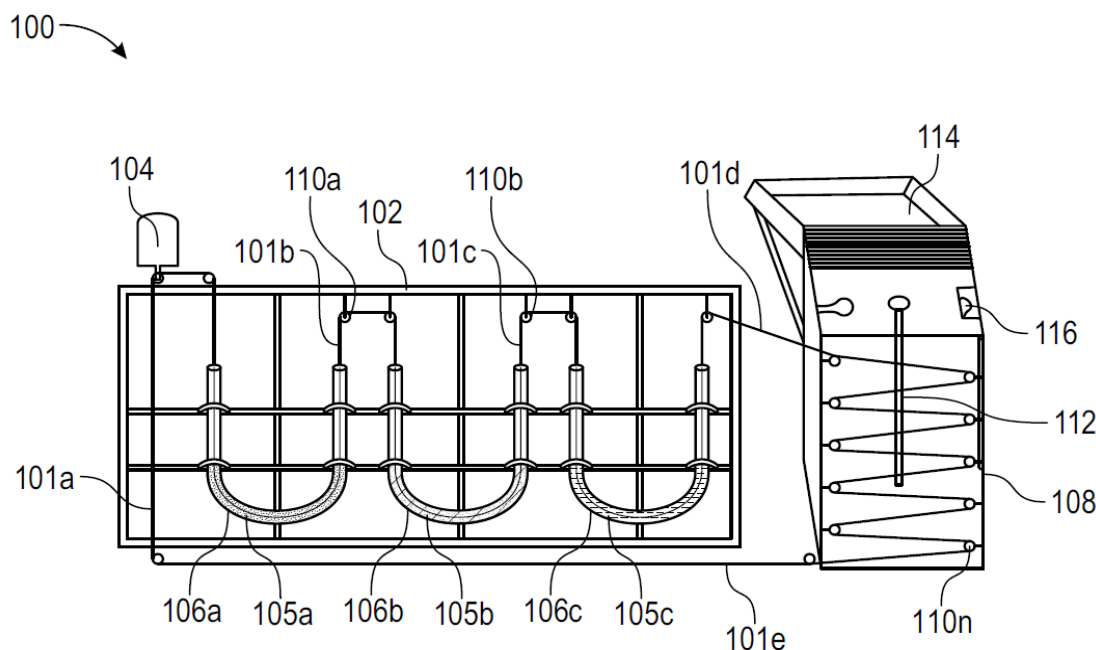
1. Kshar-sutra remains in direct contact with the tract and chemically cures the tract and cleans, keep the passage patent and drainage of pus and other substances, allowing the fistulous tract to gradually cut and heals simultaneously.
2. pH value of Kshar-sutra towards alkaline side; not allow rectal pathogens to invade the cavity.
3. Kshar-sutra ligation exerts mechanical pressure along with chemical cauterization, in the initial three days, there is cutting & healing of the tract takes place.
4. After the cutting the fistulous tract by Kshar-sutra in initial 3-4 days, next 3-4 days heals.
5. As cutting and healing goes simultaneously, there is no recess for accumulation of pus in the cavity.

Why do you need Kshar-sutra Therapy?

1. The "Kshar-sutra Therapy" technique is safe.
2. It is safe and simpler procedure in the application.
3. The therapy dose not requires long time hospitalization, needs only one day care.
4. In the major cases the patient requires 2 days bed rest and can resume his daily routine within 3 days.
5. Local or Spinal Anaesthesia is needed.
6. The Cost of this therapy is comparatively cheaper than other operative procedures.
7. The success rate of Kshar-sutra therapy have a great significance.
8. No Large wound at a time.
9. None chances of incontinence of anal sphincters.

Method of preparation of Kshar Sutra by Instant Automatic Kshar-Sutra Maker Machine - Material –

- 1) Poly filament, linen no. 20 size, unbreakable cotton thread (with good tensile strength)- which is easily available in the market.
- 2) Metal Gear DC Motor – 12 Volts , 1.0 - AMP, RPM- 10
- 3) 'U' shape Boro-Silicate 3 tubes - which is using in laboratory.
- 4) A cabinet of size 1.5 × 1.5 × 3 feet (length × width × height) made in stainless steel body is compacted with glass and 10 mm fiber sheet (double door) because this cabinet have U.V. tube inside. (Safety purpose to avoid direct radiation of UV rays)
- 5) A stainless steel square pipe, frame, loaded with pulleys where coated thread rolls in the cabinet.
- 6) This cabinet is assembled with - pH counter,
- Exhaust fan,
- U.V. Tube - 16 watt
- Room Heater (warmer),
- Light.
- Digital Thermometer, Humidifier & Clock
- 7) a) 'U' shape 'A' tubes contains latex of *Euphoria Nerifolia* (Snuhi Ksheer),
b) 'U' shape 'B' tubes contains *Achyranthus Aspera* (Apamarg Kshar powder)
c) 'U' shape 'C' tubes contains Powder of *Curcuma Longa* (Haldi).

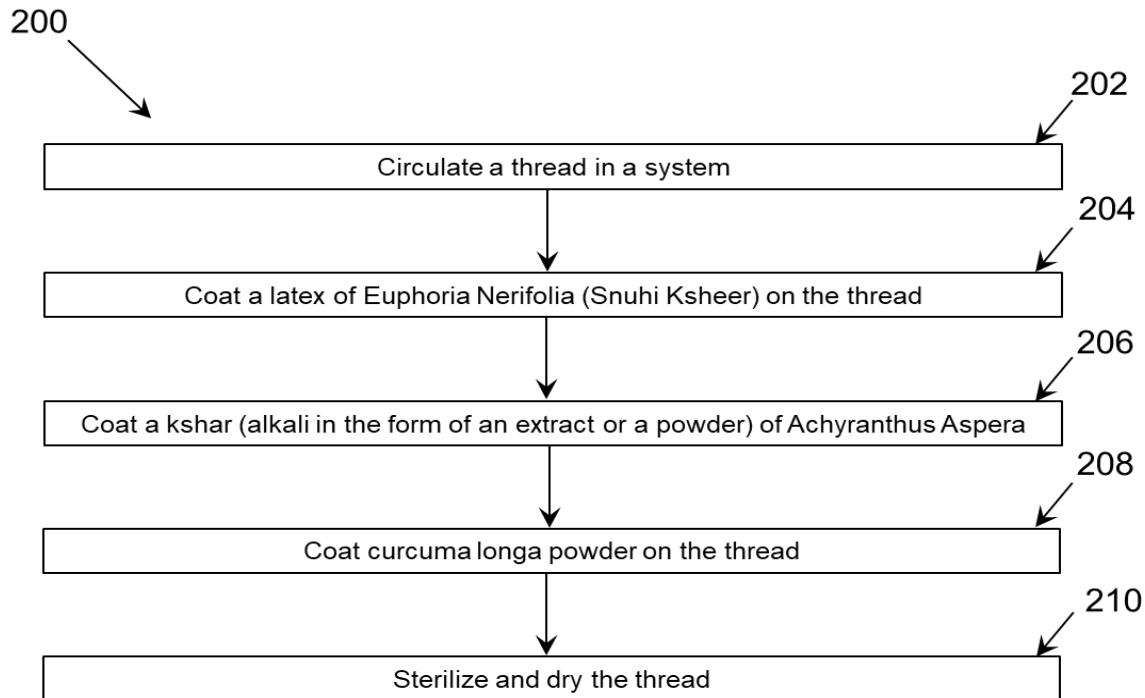


100 = Fig. No.1	106a = Latex of Euphoria Nerifolia (Snuhi Ksheer)
101a--101e = Thread	106b = Kshar of Achyranthus Aspera (Apamarg)
102 = Unit -1	106c = Powder of Curcuma Longa (Haldi)
104 = 12 volt Gear Motor	108 =Unit -2 (Cabinet)
105a = U shape tube no. -1	110a—110n = Pulleys
105b = U shape tube no. -2	112 = 16 watt UV Tube
105c = U shape tube no. -3	114 = Warmer
	116 = 5 volt Exhaust Fan

Methodology:-

Loaded thread is moving from electric motor to A, B, C tubes respectively & slowly. So this thread is coated in a same alignment. First from 'A' tube's drug, then 'B' tube's drug & finally 'C' tube's drug. This thread will dip & rest for 2 minutes in each tube's drug. Then this well coated thread enters into the cabinet and walks on the pulleys

in the cabinet. When this coated thread reach just outside of the cabinet, the electric motor stop, then warmer, U.V. tube start and dry that medicated thread. Temperature of the cabinet is managed, so thermometer & exhaust fan is placed. Hence 1st cycle is complete. After drying, again electric motor is starts, following the same method. For this settings, timer is also set to co-ordinate all these devices simultaneously. In this way, our model completes 7 cycles / 7 coatings of each drug on the thread within 2 hours & coatings of drugs are in same alike. Then end product i.e. Kshar-Sutra shifts on the another wooden/ stainless steel frame and keep safely in another Kshar-Sutra reservoir cabinet or in the formalin chamber. This structure of model, we can place on table or mount on wall also.



For understanding this method, one can refer following link –

<https://www.youtube.com/watch?v=T9D2LkTzt3E&t=1s>

Monopoly -

- 1) Instantly, automatically and perfectly making of Kshar-Sutra,
- 2) Comparative and clinical studies suggests that ‘Kshar-Sutra’ made by our model have a great significance rather than the Kshar-Sutra made by traditional method. We have already using this model since last 5 years and Kshar-Sutra made from this model /machine.
- 3) Sterility properly maintains. No human interference.
- 4) pH maintains the same throughout the length of the thread.

Novelty –

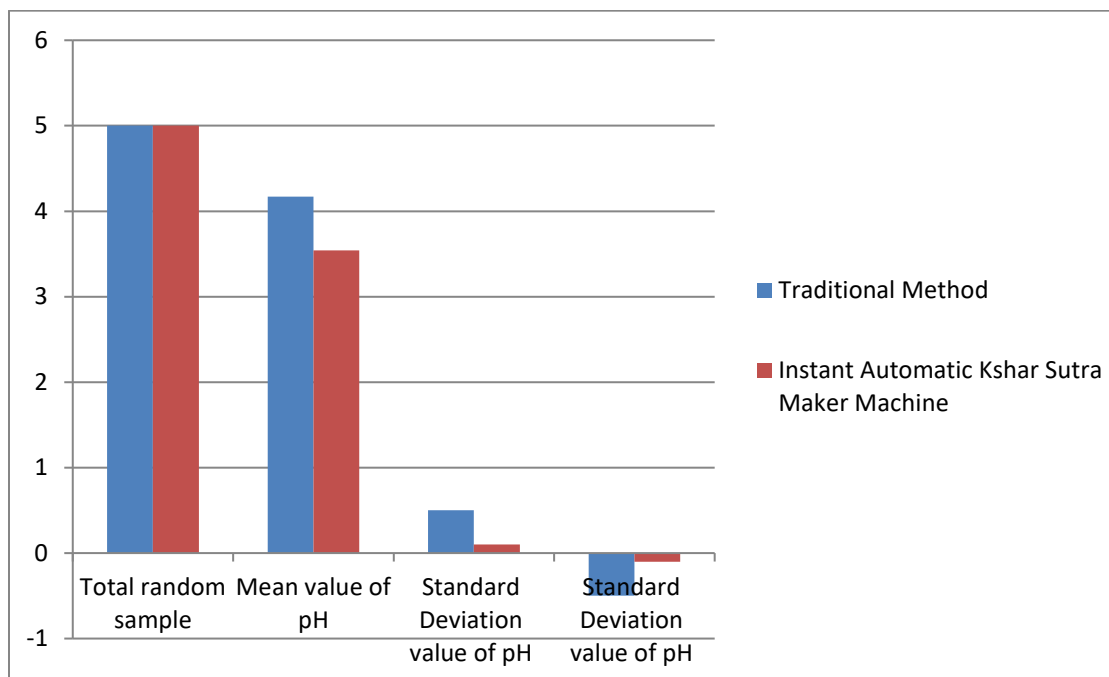
We are conducting novelty/ inventiveness search for our invention. Use of Kshar-Sutra in fistula in Ano, this technique being used traditionally in India from last 10 centuries. So in rest of the world, there is no chance of making of Kshar-Sutra and such kind of model / machines.

Calibration & measurement of pH of Kshar Sutra–

Calibration & measurement of pH of Kshar Sutra is done on digital pH meter. For this we collected the random sample of small pieces of Kshar sutra, made from traditional method & Instant Automatic Kshar sutra maker Machine & measured on digital pH meter.

	Sample from traditional method	Sample from Instant Automatic Kshar sutra maker Machine
Total random sample	5	5
Mean value of pH	4.17	3.54

Standard Deviation value of pH	± 0.50	± 0.10
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We found, the kshar sutra is more acidic with very little deviations in random sample from Instant Automatic Kshar- sutra maker machine rather than traditional method.

Facility available in the Cabinet (2nd unit) –

- 1) Same pH is maintained throughout the length of the thread. It is confirmed by pH counter machine.
- 2) Cabinet temperature is maintained by assembling the digital thermometer & exhaust fan in the cabinet. (45°C for 15 minutes)
- 3) Exhaust fan helps to maintain the specific temp. of the cabinet.
- 4) 16 watt U.V. tube disinfects the thread.
- 5) Warmer quickly dried the thread, so all these layers of 3 drugs fixed/ adheres on thread.
- 6) We set light arrangement in the cabinet.
- 7) Digital pH meter is also set aside.

Discussion:-

Preparation of Kshar Sutra makes very easy by this Instant Automatic Kshar sutra Maker Machine. Still shelf-life of Kshar sutra need to be determined. Culture & Sensitivity reporting should be done.

Conclusion:-

Efficacy of Kshar-Sutra made up by this Instant Automatic machine have a great significance. pH is consecutively maintains in same level.

Comparative and clinical studies suggests that 'Kshar-Sutra' made by this model have a great significance rather than the Kshar-Sutra made by traditional method.

**References:-**

- 1) Sushrut Samhita - Visarp-Nadi-Stan rog Chikitsa Adhyay -Ayurveda Tattva Sandipika (Hindi Explanation) Part-1, P.N.- 81, Kaviraj Dr.Ambikadatta Shastri, Chaukhambha Sanskrit Institute, Varanasi, 11th Edition - 1997.
- 2) 'Chakradatta' – a Critic by **Sri. Chakra-PaniDatt**– a criticizer of Sushruta Samhita in 11th century, Author – Dr.IndradevTripathi, Publisher - Chaukhamba Sanskrit Sansthan, Varanasi, first edition, 1970, Chapter – 45, 'Nadi-VranChikitsa', Version Number - 12 and 13, Page No. 268.
- 3) Kshar-Sutra preparation method : detailed explanation – Article by Dr. Raghuram Y.S. & Dr. Manasa
Courtesy - <https://www.easyayurveda.com/2017/03/09/ksharasutra-preparation/>
- 4) SarthVagbhat - Dr. Ganesh Kodre, Anmol Prakashan, Pune, First Edition-2003.
- 5) You Tube Channel – Dr. Mahesh Chaudhari's NiramayeeVasudha –link -
[youtube.com/channel/UCmwbbL3tmKGF0Nkq60sarfg](https://www.youtube.com/channel/UCmwbbL3tmKGF0Nkq60sarfg)
Video link – Instant Automatic Kshar-Sutra Maker Machine
<https://www.youtube.com/watch?v=T9D2LkTzt3E&t=1s>