

**AYURVEDIC METHODS OF STERILIZATION: A CONCEPTUAL REVIEW**

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**ABSTRACT**

There are two principle treatment modalities which are Medicinal (*Aushadh*) and surgical (*Shastrakarma*). Sterilization is the process of freeing an article, a surface or a medium of all micro-organism. For the success of any surgical treatment Sterilization is of prime importance. Lack of sterilization leads to complication like infection, impaired wound healing etc. In *Sushrut Samhita* various surgeries like Cataract (*Lingnash*), plastic surgeries, excision, orthopaedic, fistula in ano, gynaecological procedure etc. are described. So for the success of surgery, they explained various methods of sterilization( for patients lived in *vranitagar*, *sutikagar*, *kumaragar* etc, for *vrana*, for *yantra shastra* etc) like *kashaya*, *dhupana*, *parishekah*, *agnitapana* etc. They are mentioned sporadically in the classical text under various diseases, surgical procedures, and health routine. The drugs which are explained sterilization and disinfection most of which possess anti microbial properties without affecting natural flora. Present study is to compile various methods of sterilization and disinfection.

**Keywords-** Sterilization, Disinfection.

**INTRODUCTION**

Sterilization is the process of freeing an article, a surface or a medium of all micro-organisms both in vegetative and in spores states by removing or killing them. There are two principle treatment modalities, medicinal (*Aushadh*) and surgical (*Shastrakarma*). It is true that modern surgery has evolved on basic principles of *Shalyatantra* laid by *Acharya Sushruta* but with advances in technology & biophysics. For the success of any surgical treatment Sterilization is of prime importance. Lack of sterilization leads to complication like infection, impaired wound healing etc. In *Sushrut Samhita* various surgeries like Cataract (*Lingnash*), various

plastic surgeries, urinary calculi, excision, orthopaedic, fistula in ano, sinus, gynaecological procedure etc are described. So for the success of surgery they explained various methods of sterilization( for patients lived in *vranitagar*, *sutikagar*, *kumaragar* etc, for wound [*vrana*], for instruments [*yantra shastra*] etc) like *kashaya*, *dhupana*, *parishekah*, *agnitapan* etc are used. They are mentioned sporadically in the classical text under various diseases, surgical procedures, and health routine.

“Agnitapten Shastren Cchindyat / Anyatha atapta Shastachedane Paakabhayam syata ||”

Su. Chi. 2/46 Dalhana

“TatoGuggulvagarusarjarasavachagaursarshapachurnailavananimbapatravimistrairajyayuk  
te Dhupayet, Aajyasheshenachasya Pranana samalabhet ||” “Sarshaparishatapatrabhyam  
Sarpisha lavanena cha / Dviranha karyeda dhoopam Dasharatramatndrit ||”

Biocides & fumigants play an important role in agriculture, industry and health. They contribute to the conservation and durability of a multitude of raw materials and manufactured products during production, storage and final use. In Ayurveda, there are many such measures described in the management of individual and social health & disease.

In *Carakasamhita* an independent chapter dealing with *janapadodhvamsa* (epidemics) has many such references dealing with measures for the purification of air, water and soil. These measures can be broadly grouped under preventive and curative measures. These are aimed at control and elimination of harmful macro & microorganism e.g. use of preservatives for drugs, food, beverages; use of fumigants to kill or drive away the harmful pathogens and insects etc. However, these natural biocides and fumigants are mostly scattered in the context of control and treatment of various diseases and very few of them have been studied on modern scientific parameters for their nature and mode of action. These plants, animal or mineral derivatives usually appear to have some common property e.g. they possess strong bitter or pungent taste, strong unpleasant smell and a few are poisonous, if consumed in sufficient quantity.

In terms of protection from and prevention of disease or unwanted harmful animals and insects we find use of certain trees and plants e.g. *Nimba* (*Azadirachta indica* A. Juss.), *Tulasi* (*Ocimum sanctum* Linn.), *Vanatulasi* (*Ocimum basilicum* Linn.) in and around houses, evening fumigation of house with *Nimbapatra*

(leaves of *Azadirachta indica* A. Juss.), *Sarsapa* (seeds of *Brassica campestris* Linn.), *Sarjarasa* (exudates of *Shorea robusta* Gaertn. f.), *Hingu* (exudates of *Ferula foetida* Regel) etc. on charcoal or cow dung fire to repel insects, or purify the places like *Vranagara* (operation theater), *Sutikagara* (puerperal chamber). Fumigants are also used in disinfecting the fermentation pots used for *Asava* & *Arista*.

There are several *Dhupana* (fumigation) formulations to combat foul smell emanating from *Vrana* (wound), *Yoni* (vagina), *Gatra* (body). Fumigants were also used to disinfect the atmosphere and various *Dhupa* (fumigants) e.g. *Dasan-gadhupa* and other *Havisa* (oblation for burning) of *Ghrta* (clarified butter), *Guggulu* (exudates of *Commiphora wightii* Bhandari), *Devadarukastha* (woods of *Cedrus deodara* etc. were used whenever some epidemic broke out in the villages.

For the prolong preservation of potency and prevention from getting rotten; the drugs & dietary items were extensively stored in or formulated with *Ghrta* (clarified butter), *Taila* (vegetable oil), honey, *Asava*/*Arista*.

*Caraka in Sutrasthana* 3<sup>rd</sup> chapter (*Arag-vadhiyam*) has described 32 *Lepa* & *Pradeha* (drugs for local application) consisting of various drugs including formulations in the management of skin affections like scabies, eczema, leprosy etc. There are fifteen *Kusthahara* (curing skin diseases including leprosy) formulations and in each group some drugs are biocides while others are soothing or healing agents. There is one *Sarira-daugandhahara* (re-

mover of foul smell from body) *Pradeha* (drugs for local application) also. There are many *Lepa*, *Pradeha* (drugs for local application) and drugs to be worn on the body of an infant to cure some of the *Grahabadha* (Paediatric idiopathic syndrome) of the infant.

Likewise in *Sutrasthana* 4<sup>th</sup> chapter there are *Kusthaghna* (drugs curing skin diseases including leprosy), *Kandughna* (drugs curing skin diseases with itching), and *Krimighna* (anthelmintics) *Mahakasaya* (great decoctions) that consist of biocides as well. These are enumerated as *Khadira* (*Acacia catechu* (Linn. f.) Willd.), *Haritaki* (*Terminalia chebula* (Gaertn.) Retz.), *Amalaki* (*Phyllanthus emblica* Linn.), *Haridra* (*Curcuma longa* Linn.), *Bhallataka* (*Semecarpus anacardium* Linn.f.), *Saptaparna* (*Alstonia scholaris* (Linn.) R. Br.), *Aragvadha* (*Cassia fistula* Linn.), *Karavira* (*Nerium indicum* Mill.), *Vidanga* (*Embelia ribes* Burm. f.) and *Jatipravala* (young leaves of *Jasminum officinale* Linn.) being *Kusthaghna* (drugs curing skin diseases including leprosy).

In the *Arkadigana* plants viz. *Arka* (*Calotropis procera* Dryand ex W.Ait.), *Alarka* (*Calotropis gigantea* (Linn.) Ait.f.), *Karanjadvaya* (*Pongamia pinnata* (Linn.) Pierre), & (*Holoptelea integrifolia* (Roxb.) Planch.), *Nagadanti* (*Croton oblongifolius* Roxb.), *Mayuraka* (*Achyranthes aspera* Linn.), *Bhargni* (*Clerodendrum divaricatum* Jack), *Rasna* (*Pluchea lanceolata* Oliv. & Hiern), *Indrapuspi* (*Gloriosa superba* Linn), *Ksudrasveta* (*Albizia lucida* Benth.), *Mahasveta* (*Albizia procera* (Roxb.) Benth.), *Vrscikali* (*Pergularia daemia* (Forsk.) Chiov.), *Alavana* (*Celastrus paniculatus* Willd.) and *Tapasavrksa* (*Balanites aegyptiaca* (Linn.) Delile) are said to have the property to cure *Krmi*

(worms), *Kustha* (skin diseases including leprosy) and *Vranavisodhana* (wound cleansing & purifying).

In recommendation of plants for use as toothbrush *Caraka* enumerated some plants e.g. toothbrush sticks made of *Nimba* (*Azadirachta indica* A. Juss.), *Karanja* (*Pongamia pinnata* (Linn.) Pierre), *Karavira* (*Nerium indicum* Mill.), *Arka* (*Calotropis procera* Dryand ex W.Ait.) etc. that are disinfectant and remover of foul smell from mouth.

In *Caraka Cikitsasthan* 23<sup>rd</sup> chapter (*Visacikitsa*) there is formulation for fumigation, which would kill serpents, rats, insects and tiny insects of clothes. The plants enumerated are *Jatu* (*Laksa* i.e. secretion of *Lacifer lacca*), *Sevya* (roots of *Vetiveria zizanioides* (Linn.) Nash), *Patra* (leaves of *Cinnamomum tamala* Nees), *Guggulu* (exudates of *Commiphora wightii* Bhandari), *Bhallataka* (fruits of *Semecarpus anacardium* Linn.f.), *Kakubhapuspa* (flowers of *Terminalia arjuna* (Roxb.) Wight & Arn.), *Sarjarasa* (exudates of *Shorea robusta* Gaertn. f.) and *Sveta* (white flower variety of *Clitoria ternatea* Linn.). In *Vranacikitsa* also there are formulations for local irrigation, application and fumigation to be used for *vranasodhana* (wound cleansing & purifying), which act as disinfectant. Natural biocides are also used in various types of *Krmiroga* e.g. *Udarakrmi* (intestinal worms), *Krmija-siroroga* (Headache due to hydatid cyst/*Taenia solium*/ *Taenia Echinococcus*), *Krmija-hrdaroga* (Heart disease with infective pathology), *Vranakrmi* (wound infested with worms), *Krmiidanta* (Carious tooth/dental caries) etc.

In *Astangasamgraha Uttarasthana*, chapter-1 (*Balopacaraniya*) it is described to tie a cotton pouch containing *Hingu* (exudates of *Ferula foetida* Regel), *Vaca* (rhizome of *Acorus calamus* Linn.),

*Turuska* (*Liquidambar orientalis* Mill.) and *Sarsapa* (seeds of *Brassica campestris* Linn.), on the upper frame of door and head side of bed (cradle) and also in the neck of infant and mother for protection which possibly acts as repellent for insects etc. Further there is mention of fumigants for baby's apartment consisting of dried crow feathers along with *Trivrtta*, *Vaca* (rhizome of *Acorus calamus* Linn.), *Kustha* (*Saussurea lappa* Clarke), *Srivesta* (exudates of *Pinus roxburghii* Sarg.), *Sarsapa* (seeds of *Brassica campestris* Linn.), added with little *Ghrta* (clarified butter).

Further in *Astangasamgraha Uttarasthana*, chapter-30 (*Vranapratisedha*) fumigation with *Srivestaka* (exudates of *Pinus roxburghii* Sarg.), *Sarjarasa* (exudates of *Shorea robusta* Gaertn. f.), *Sala* (*Shorea robusta* Gaertn. f.), *Devadaru* (*Cedrus deodara* (D. Don) G. Don), *Simsapa* (*Dalbergia sissoo* Roxb. ex DC.), *Khadira* (*Acacia catechu* (Linn. f.) Willd.), *Asana* (*Pterocarpus marsupium* Roxb.), *Kaidaryasara* (*Melia azedarach* Linn.), *Yava* (*Hordeum vulgare* Linn.), *Madhucchistha* (bee wax), *Bhurjapatra* (*Betula utilis* D. Don), *Ksauma* (*Linum usitatissimum* Linn.) and *Ghrta* (clarified butter) are indicated to allay exudation and pain of wounds.

In *Astangasamgraha Sutrasthana* chapter-38 (*Sastrakarmavidhi*) also there is mention of *Vrana-raksoghna Dhupa* consisting of *Guggulu* (exudates of *Commiphora wightii* Bhandari), *Agaru* (*Aquilaria malaccensis* Lam.), *Sarjarasa* (exudates of *Shorea robusta* Gaertn. f.), *Vaca* (rhizome of *Acorus calamus* Linn.), *Gaura-sarsapa* (white seeds of *Brassica campestris* Linn.), *Hingu* (exudates of *Ferula foetida* Regel), *Lavana* (salt), *Nimbapatra* (leaves of *Azadirachta indica* A. Juss.), and *Ghrta* (clarified butter) for the fumigation of wound. This also finds men-

tion in *Uttarasthana* chapter-1 for the protection of newborn infant.

*Astangasamgraha Uttarasthana* chapter-8 (*Bhutapratishedha*) contains many formulations, which appear consisting of natural biocides and fumigants. Likewise the external therapeutic measures to prevent or cure various infantile *Grahabadha* (Paediatric idiopathic syndrome) also appear usually consisting of similar nature of drugs.

It may be mentioned here that *Ayurveda* was intricately woven with culture religion in the society and natural biocides and fumigants were widely used on a variety of pretext aimed at prolonging life and providing health, happiness and prosperity.

## DISCUSSION

Various operative procedures are explained in *Sushruta samhita*. *Ayurveda* recommends fumigation (*Dhoopana*) as a method of sterilization in OT rooms and various chambers (such as *Kumaragar*, *Sutikagar* etc.) and for instruments [*yantra shastra*] etc) methods like *kashaya*, *dhu-pana*, *parishekah*, *agnitapan* etc are used. Numerous drugs are explained under the procedure of various methods of sterilization. Indication and effectivity of Sterilization are explained.

However, it has not gained much attention as prospective field with multiple research opportunities.

## CONCLUSION

It is necessary to have a more detailed and systematic evaluation of the phytochemical and pharmacodynamic properties of *Ayurvedic* drugs mentioned under the process of sterilization in order to facilitate the identification of novel bioactive compounds and more effective drugs administration methods.

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