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ANALYSIS OF STRYCHNOUS NUXVOMICA (KUCHALA) AS AN HERBAL EMBALMING DRUG

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ABSTRACT

Background: In ayurveda, *Strychnous nuxvomica L(Kuchala)* is said as *Upavisha* and used *as* a popular folk medicine from ancient times. *Kuchala* is still being used in rural india in the medicinal form. The antimicrobial screening of the extract was performed by determining the zone of inhibition using the standard method. **Aim:** The present study was undertaken to investigate the role of *Strychnous nuxvomica L(Kuchala)* as an herbal embalming drug. **Materials and Methods:** Purified (Shodhit) *Strychnous nuxvomica L(Kuchala)*seed extract was prepared by soxhlet extraction method, extract was evaluated for its embalming properties like antimicrobial action(Antibacterial, antifungal etc),anti-inflammatory activity, nontoxic nature (heavy metal analysis) by ICP-MS(Inductively coupled plasma mass spectrometry),analytical method adopted by AOAC(Association of official analytical chemists) and USP(united states pharmacopeia),a set of reference standards and methods. **Results:** From the heavy metal analysis studies(ICP-MS), seed extracts of *Strychnous nuxvomica(Kuchala)* were found to be nontoxic. It has antimicrobial action (Total plate count -955cfu/gm) against yeast, molds (26 cfu/gm), E.coli, Salmonella and Staphylococcus were inhibited. **Conclusions:** It is concluded that hydroalcoholic extract of *Strychnous nuxvomica L (Kuchala)* can serve as an herbal embalming drug due to its embalming properties.

Keywords: *Strychnous nuxvomica L, embalming,* herbal extract etc.

INTRODUCTION

Kuchala or the *Strychnous nuxvomica L* is one of the *Upavisha* that has been explained in detail in *Rasa-tarangini* regarding its properties, therapeutic uses, and methods of purifications etc. Nuxvomica is a deciduous tree up to 15 meter tall, often with short, strong, axillary spines. It is widely distributed in india and found throughout tropical areas of india, sri Lanka, Vietnam, Thailand, Cambodia, and Malaysia. It is described in *Surasadi gana* of *sushruta* and *Amradi phala varga* of *bhavprakasa*[1,2]. The *Kuchala* tree contains many alkaloids of medicinal importance, but its seed is richer in these constituents as described in pharmacopoeias. It is rich in *alkaloids*, *flavonoids*, *tannins* and *triterpenoids*, *glycosides*, *lignins* and *steroids*[3]. More than 90 chemical compounds have been isolated from different parts of nux vomica, but *strychnine* and *brucine* are the principal toxic *alkaloids*. They occur not only in the seeds but also in roots, wood, bark, fruit pulp and hard fruit shells[4].Seeds contain 2.6 to 3.0% of total alkaloids, of which 1.25 to 2.5% is *strychnine* and 1.5 to 1.7% is *brucine*. The seeds contain *chlorogenic acid*, a *glycoside* (*loganin*) and 3.0% of fixed oil in addition[5].Research studies have reported its anti-allergic, anti-inflammatory, antimicrobial, anticancer, antipyretic, gastroprotective, antidiabetic, antialcoholic, hepatoprotective, antioxidant, antinociceptive, anti-snake venom and neuropharmacological properties[6].

Materials and Methods

Plant material

The seeds of *Strychnous nuxvomica L were* commercially procured and identified from a cultivated source, authenticated from NAAC A+ grade botanical institute as per reference, singh np, lakshinarsimhan p, karthikeyan s and prassana p.v. 2000, flora of Maharashtra dicotyledons, vol. ii, botanical survey of india, Calcutta, india.

A. *Kuchala* fruits[7]

B. *Kuchala* seeds

Pharmacodynamics

The three primary ayurvedic texts, charaka samhita, Susrut samhita, and Vaghbhata samhita (bruhat trayi) or Dhanvantari nighantu have not mentioned properties of kuchala, while bhavamishra referred to it as kakatinduka or Kupilu, shodhala identified it as visha tinduka and put it in the Karveeradi varga. A medication called vishamushti, which has been analysed by Kaideva nighantu, may be nuxvomica. Kuchala was mentioned by Rajanighantu in prabhadradi varga. Vish dravya like kuchala quickly spread throughout the body as a result of characteristics like ashukaritva, ushna, and teekshna. therefore, they are employed in Indian system of medicine and other systems pharmaceutical formulations for their fast effect [8, 9].

Rasa - *Katu, Tikta*

Guna - Ruksha, *Laghu, Teekshna*

Veerya - *Ushna*

Vipaka - *Katu*

Preparation of extracts

The purified seeds of *strychnous nuxvomica L were* dried in shade and coarsely powdered. The powdered crude drug was subjected to successive soxhlet extraction by using alcoholic solvent. 'Soxhlet extractor', made up of a glass. It consists of a round bottom flask, an extraction chamber, siphon tube and condenser at the top. The crushed plant material (herb ratio 10:1) was placed inside the porous bag (thimble) made up of a strong filter paper and tightly closed. The solvent (250 ml of 70% alcohol) was poured into

the round bottom flask, which was attached to a soxhlet extractor (containing the porous thimble) and condenser, on an isomantle. The solvent was then heated using an isomantle and began to evaporate, moving through the apparatus to the condenser.

The condensate then dripped into the soxhlet extractor containing the porous thimble. Once the level of solvent, containing the dissolved organic compound was reached the top of the siphon, it was poured back into the flask. Finally, the heating was stopped and the solution in the flask was distilled to recover the solvent by rotary evaporator (rotavap), while the organic compound was left behind. The entire process was continued repeatedly for about 16 hrs, until the drug was completely extracted, a point when a solvent was flowing from an extraction chamber didn't leave any residue (analyte) behind[10,11,12].

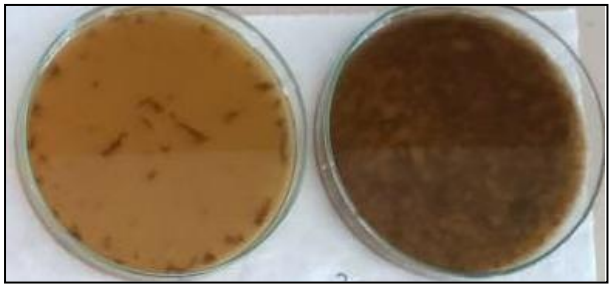

Fig. C: *Strychnous nuxvomica L* herbal extract

Certificate of analysis of strychnous *nuxvomica L* dry extract

Product name		*Kuchala* extract	
Assay herb ratio		10:1	
Batch Number		APO/KE/2019 584	
Batch Quantity		100kg	
Solvent		Hydroalcohol	
Botanical Name		*Strychnous nux-vomica*	
Country of Origin		India	
Manufacture Date		Sept.2019	
Exp. Date		Aug.2022	
ANALYSIS	**SPECIFICATION**	**RESULT**	**TEST METHODS**
Chemical Physical Control			
ASSAY – Herb Ratio	NLT 10:1	Complies	
Characters/Appearance	Fine Powder	Complies	Visual
Colour	Reddish Brown	Complies	Visual
Odour	Characteristics	Complies	Organoleptic
Taste	Astringent	Complies	Olfactory
Mesh Size/Sieve Analysis	NLT100% through 40 Mesh	Complies	40 Mesh Screen
Loss on drying	NMT 5.0%	3.70%	1gm/105/2hrs
Heavy Metal	NMT 10PPM	Complies	ICP-MS
Arsenic(AS)	NMT 1PPM	0.2PPM	ICP-MS
Lead(Pb)	NMT 1PPM	0.24PPM	ICP-MS
Mercury(Hg)	NMT 1PPM	0.1PPM	ICP-MS
Cadmium(Cd)	NMT 1PPM	0.1PPM	ICP-MS
Microbiology control			

Total plate count	NMT 5,000cfu/gm	955cfu/gm	USP
Total Yeast and Mold	NMT 100cfu/gm	26 cfu/gm	USP
E. Coli	Negative	Absent	AOAC
Salmonella	Negative	Absent	USP
Staphylococcus	Negative	Absent	USP
Packing and storage			
Packed in HPDE blue drum and two plastic bags inside N.W.25kg. Store in well closed container away from moisture.			
Shelf life			
Three years if sealed and stored away from direct sunlight and heat.			

The material complies with the above-said specification.

This being a product of natural origin, minor colour variations are observed due to geographical and seasonal variations of the raw material.

Analysed by - Laboratory manager
Approved by - Manager QA

Results

Analysis of *Strychnous nuxvomica(Kuchala)* dry powered extract showed that it was reddish brown coloured extract with characteristic odour with astringent taste .Sieve analysis was complying with the 40-mesh screen method. Loss on drying was 3.70%. Heavy metal analysis studies(ICP-MS) showed not more than 10PPM, arsenic(AS) 0.2 PPM, lead(Pb) 0.24PPM, mercury(Hg) 0.1PPM, cadmium(Cd)0.1PPM,hence from heavy metal analysis seed extracts of *Strychnous nuxvomica(Kuchala)* was found to be nontoxic. It has antimicrobial action (Total plate count -955cfu/gm), against yeast, molds (26 cfu/gm), E.coli, Salmonella and Staphylococcus were inhibited or absent. The assay was performed by agar disc diffusion method. R. Mahalingam et al (2011) has proved the exhibition of antibacterial activity of ethyl-acetate and n-butanol root extracts of Strychnos nux vomica in which the zone of inhibition ranged from13 -16mm against tested pathogens[16].

DISCUSSION

Sushrutacharya had explained dissection and dead body preservation methods in *Sharir sankhya vyakaran sharir adhyaya*. Aacharya charaka had stated that the knowledge of *Sthul* and *sukshma Sharir* is necessary for understanding Rachana sharir. This can only be achieved if cadavers were embalmed properly. Now a days a prime chemical, Formalin, is used as a preservative fluid for cadaver embalming. But it has several drawbacks and health hazards also. Due to this herbal drug can be used for embalming having minimal or no health hazards[13].

As we know, the chemicals present in modern embalming fluid are having antimicrobial (antibacterial, antifungal, antiviral etc.) anti putrefactive, anti-inflammatory, antiseptic and blood clot dissolving properties. Similarly, according to *Charakacharya* (in *aatreyabhadrakapiya adhyaya*) *katu* and *tiktarasdravya* are having *putihar* (anti putrefactive), *jantuhar* (antimicrobial), *shonit sanghat bhinnati* (blood clot dissolving) properties[14]. *Katu-tikta and kashay ras dravya* also having antibacterial, anti-inflammatory, antifungal, antioxidant properties as found in various researches[15].

Both modern embalming chemicals and herbal embalming drugs are having antibacterial, antifungal, anti-putrefactive, antiviral, anti-inflammatory, antiseptic and blood clot dissolving Properties. Only difference is that chemical embalming constituents are having benefits with health hazards(Side effects), while herbal drugs are natural and safe. Their properties are Shown in below table[13]-

Sr.No.	Chemical embalming drugs Properties	Herbal embalming drugs Properties
i	Antimicrobial (Antibacterial, Antifungal, Antiviral etc.)	*Jantuhar/Krimighna*

ii	Anti-putrefactive, Anti inflammatory	*Putihar*
iii	Blood clot dissolving	*Shonit sanghat bhinnati*
iv	Poisonous Property	*Vishaghna property(Health benefit)*

Fig. D: Comparison between chemical and herbal drug properties

CONCLUSION

After comparison between herbal drug properties(*Strychnous nuxvomica L*)with chemical embalming drug properties, it can be concluded that kuchala is having katu tikta ras , having *putihar* (anti putrefactive, anti-inflammatory),*jantuhar* (antimicrobial), *shonit sanghat bhinnati* (blood clot dissolving) properties. Hence, *Strychnous nuxvomica L* can be used as one of the embodiments of herbal embalming fluid after conducting various scientific experiments.

REFERENCES

1. Mohd Afsahul Kalam, Azaraqi (*Strychnos nuxvomica* l.): a novel drug of unani system of medicine for the management of nerve and phlegmatic diseases, available from - https://www.researchgate.net/publication/344076229 (Accessed on -13 March 2023).
2. Schmelzer, G.H. and Gurib-Fakim A., Plant resources of tropical africa (PROTA), medicinal Plants-1, backhuys Publishers, wageningen, Netherlands, 2008 (Ed.) ,11(1),pg. 575-577.
3. Walter, T.M., Priya, T.S., Paargavi, A.S., Priya Devi, N.S. and Thanalakshmi, S., A review of herbs to treat skin disorders in traditional siddha medicine, research and reviews: journal of pharmacology and toxicological studies, 2013, 2(1),pg.07-14.
4. Subbaiah, K.P.V. and Savithramma, N., validation and characterization of silver nanoparticles from strychnous nux-vomica– an important ethnomedicinal plant of kurnool district, andhra pradesh, india. International Journal of Pharmacy and biological sciences, 2014 , 4(1),pg. 45-53.
5. Mohesh, M.I.G., Joy, M.A.L., Ratchagan, K. and Sundaramurthy A., antibacterial and antioxidant activity of strychnos nux vomica flower extract. Journal of chemical and pharmaceutical research, 2015, 7(7),pg.748-752.
6. Rita Kumari, kuchala (*strychnos nuxvomica linn*) – known as toxic and less known as an effective medicinal herb, ayushdhara, 2021,8(3),pg.3371-3376.
7. Kuchala tree, fruit, available from -www.google.com (Accessed on -13 august2023)
8. DR Mansi Bhoir, Dr Ankur Agrawal, a literary study on kuchala (*Strychnos nuxvomica linn)*- an important poisonous medicinal plant, journal of emerging technologies and innovative research (jetir), september 2022, volume 9, issue 9, pg.no. - a107-113
9. Prof. P.V. Sharma, dravyaguna –Vijnana Vol. II, varanasi, chaukhambha bharati academy, fourteenth edition 1993,Page no.86
10. Abubakar AR, Haque M., preparation of medicinal plants: basic extraction and fractionation procedures for experimental purposes. j pharms bioall sci., 2020, 12, pg.1-10.
11. Monagas et al., understanding plant to extract ratios in botanical extracts, front pharmacol,2022,sec.ethanopharmacology, available from - https:// doi.org /10.3389/ fphar. 2022. 981978 (Accessed on - 8th jun, 2023).
12. Redfern et al., using soxhlet ethanol extraction to produce and test plant material (essential oils) for their antimicrobial properties, journal of microbiology & biology education, May 2014, pg.45- 46. Also available from - DOI: http://dx.doi.org/10.1128/jmbe.v15i1.656 [Pubmed]
13. Dobade D, Suryavanshi R, Dobade P, conceptual study of herbal drugs in embalming, IRJAY. [Online] 2021;4(7): 128-131. Available from: http://irjay.com DOI: https:// doi.org /10.47223/ IRJAY.2021.4718
14. Sharma P, charak samhita of maharsi- charak, chaukambha orientalia, varanasi; 2017, Volume-1, sutra sthana 26/43 ,.pp.182
15. Antibacterial efficacy of neem (azadirachta indica) extract against enterococcus faecalis: an in vitro study, available from- https://pubmed.ncbi.nlm.nih.gov/27794147/ (Accessed on-25 july 2021)
16. R Mahalingam, R Bharathidasan, V Ambikapathy, A. Panneerselvam, asian journal of plant science and Research, 2011,1(3), Pg.no. 86-90.

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