



Alkaloids of Processed Green Areca Nut as An Antidote of Venom

KEYWORDS

Areca catechu, Chikni Supari, Venom, Antidote, Biotransferase

S. K. Gupta

Ankita Gupta

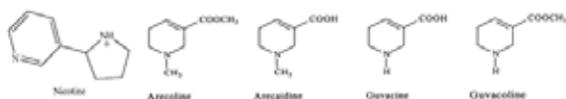
Department of Fisheries Govt. of M.P. Ujjain (MP), India and Ex Project Officer & District Project Manager Zila panchayat, Vidisha, Rewa & Sidhi (MP)

Govt. Dental College Indore (MP), India

ABSTRACT Processed Green Areca nut (*Areca catechu*) is commonly known as Chikni Supari in India. A very little investigation has been done to correlate the facts between its clinical effective constituents and the neutralization effect of venom. When it is placed on the injured place, it sticks to it, sucks the poison and the color of nut is changed accordingly. After absorbing the poison it falls its own. Areca Catechu, which is pink in color, contains Tannin and Pyridine group of alkaloids (Emde, 1915, Marion et al. 1995). Arecoline is the main principle constituent (Marion et al. 1995). Arecoline C₈H₁₃NO₂ (1,2 dihydro 3,4 di methoxy-1-methyl Pyridine) is hygroscopic and basic in nature, it may act as a good antidote against the venom which is absorbed by the nut across the membrane by biotransferase chemical process (Gupta and Varsney, 1997).

1. INTRODUCTION

Chikni Supari is a processed green *Areca* nut (*Areca catechu*). It occurs in Malaysia, Maldives and in India main production centers are North Kannada districts, Kavuar and Sorav Taluka in Karnataka and Assam state (Dutia, 1893). Its color varies from reddish-pink to pink. Its nut contains several alkaloids which belong to Pyridine group. Physiologically, most important of them is arecolidine (Marionin et al. 1995), other alkaloids are arecaidine, arecoline, guvacine, guvacoline and isoguvacine (Emde, 1915, Marion et al. 1995). Arecoline is also known to cause depression of antioxidants (Chang et al, 2009). The green kernis yield an extract containing about 67% of tannin (Toxicol, 1945). These gradients produce an antidote properties in contrast to venom through biotransferase biochemical process (Leslie, et al. 1991). The chemical constituents of *Areca catechu* have been investigated to have antivenom, antioxidant properties (Jaiswal, et al. 2011). Both plant and animal poison are known as irritant poison whereas animal poison is known as movable poison. Arecoline has shown 'Nicotine' like properties (Baens, 1941). The idiom fits here, "Iron cuts Iron". The extract of *Areca catechu* has been shown to have antidepressant properties in rodents (Dar, et al. 1997).



Structural Formula of some alkaloids of *Areca* nut

2. EXPERIMENTAL DETAILS, METHODS AND MATERIALS

Green nuts of *Areca catechu* are completely boiled and dried. Its nut is used clinically at biting place on human body, in case the person is bitten by Scorpion, lizard or snake. After venom absorption, the Chikni supari falls out the injured place itself. Venom is absorbed through lipid barrier across the membrane. Experimental measures show that nut contains arecolidine alkaloids which were isolated by JAHNS (1891) method.

3. OBSERVATION AND RESULTS

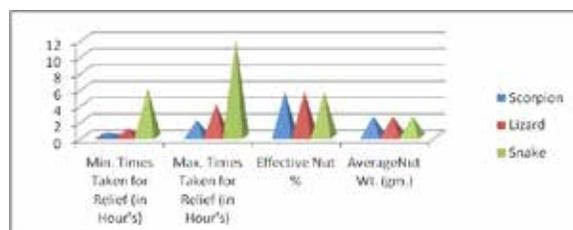
The relation among average nut wt., effective nut % and time taken for relief is shown in table 1. Similarly, results obtained on using 5.5% effective nut and 2.5 gm average nut on biting of different animals are shown graphically in graph 1. It was

seen that nut sticks only to bitten skin and not to normal skin. After absorbing venom nut falls out its own and has shown to have antidote properties. On absorption, its color gets changed as shown in table 1. Tanin was also observed as adhesive substance in this investigation. An *Areca* nut contains several alkaloids which belong to the Pyridine group [Arecolidine C₈H₁₃O₂N (1, 2 Dihydro 3,4 dimethoxy -1- methyl pyridine) m.p. 110° C]. These nuts have shown following properties- hygroscopic nature, venom absorbent, weak basic and biotransferase activity which produce its characteristic effect.

Tab. 1 Animal wise restoration time, effective nut % and nut weight

Name of Animal	Min. Time Taken for Relief (in Hour's)	Max. Times Taken for Relief (in Hour's)	Effective Nut %	Average Nut Wt.(gm.)	Change in color
Scorpion	0.5	2	5.5	2.5	Grayish Red
Lizard	1	4	5.5	2.5	Pinkish red
Snake	6	12	5.5	2.5	Black Brown

Graph 1 Animal wise restoration time, effective nut % and nut weight



4. DISCUSSIONS

Physicochemical factors are involved in transfer of *Areca* nut across membrane through the biting sites. The physicochemical properties of molecule and membrane influence this transfer which is important characteristics of an *Areca* nut and is seen physically as change in color of nuts. The venom absorption depends on degree of ionization and relative lipid solubility. The venom molecule is usually absorbed by passive diffusion along a concentration gradient by virtue of its solubility in the lipid. Increased blood flow is seen at circulation site which is caused by venom absorption through

skin. Physicochemical factors in transfer of nut drug across membrane are shown in figure I.

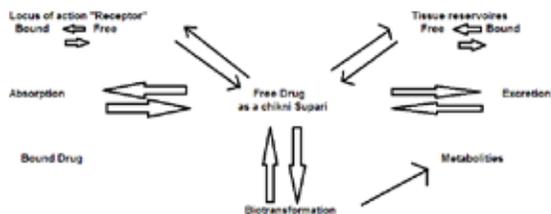


Fig I :- Schematic representation showing inter relationship of absorption, distribution, biotransformation and excretion

5. Conclusion

Arecolidine has M-methyl Pyridine which is a weak base and gives the trans – membrane distribution of a weak electrolyte, is usually determined by its pka and the pH gradient

across the membrane to illustrate the lipid soluble non ionized form of the acid. Chemical process is shown in figure II.

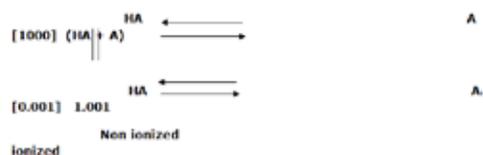


Fig II :- Influence of pH on the distribution at a weak base between venom enzyme through lipid barrier to Areca nut

6. Future Scope

This research looks forward to use of gradients of Areca nut (Chikni supari) as a venom serum. The research is still going on.

REFERENCE

- Baens ,(1941) Chem. abstr. 194 : 35, 6143, | 2. Chang, L.Y.,Wan, H. C. , Lai,Y.L.,Kuo, Y.F., Liu,T.Y., Chen, Y.T. and Hung, S.L. (2009). Areca nut extracts increased expression of inflammatory cytokines, tumor necrosis factor- interleukin-1 interleukin-6 and interleukin-8, in peripheral blood mononuclear cells. J. Periodontal Res., 44:175-183, | 3. Dar,Ahsana, Khatoon,Shagufta,(1997). "Antidepressant Effects of Ethanol Extract of Areca catechu in Rodents" Phytotherapy Research 11(2) 174-176, | 4. Dutia,J.F. (1893). Records Of The Botanical Survey Of India (I) 68:219, | 5. Emde,H.(1915). Chem. Zentralol, 161 (I) 1381 (isol), | 6. Gupta,S. K. and Varshney, R.P. (1997). Processed green Areca nut as an antidote of venom. J. Faseb.11(9) : 1342. | 7. Jaiswal, Preetee., Kumar, Pradeep., Singh V. K. and Singh D. K. (2011). Areca catechu L. : A Valuable Herbal Medicine Against Different Health Problem, Research Journal of Medicinal Plant, 5 : 145-152 | 8. Leslie,JerryL.,Lewis R. (1991). Physico-chemical Factor In Transfer Of Drugs Across Membrane, Good Man & Gil Man's. The Pharmacological Basis Of Therapeutics (I) , | 9. Marionin, manske and Holmes,(1995). The American Chemical Society Abstr. (123) 39162, 1381 -2, | 10. Toxicol,(1945). Acta Pharma, 263, |