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APHRODISIAC ACTIVITY AND ANTI-ALLERGIC ACTIVITY OF *SEMECARPUS ANACARDIUM NUT*: A RESEARCH

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ABSTRACT Spices are considered as sexual invigorators in the Unani System of Medicine. In order to explore the sexual function improving effect of *Semecarpus anacardium* an experimental study was conducted in normal male mice. The chloroform extract of *Semecarpus anacardium* was administered (150mg/kg & 300 mg/kg; p.o.) to different group so female Mice. Mounting behavior & mating performance were determined and compared with the standard drug Penegra (Sildenafil citrate). The extracts of the *Semecarpus anacardium* were found to stimulate the mounting behavior of male mice, and also to significantly increase their mating performance. The extracts *Semecarpus anacardium* enhanced the sexual behavior of male mice. In central India evils eye protection by burning of Semecarpus Anacardium Linn seeds is very common practice. The smoke produced by burning of Semecarpus Anacardium Linn seeds can cause allergic contact dermatitis over a time. This study was designed to diagnose the actual cause of allergic contact dermatitis in patients exposed to smoke of burning of Semecarpus Anacardium Linn seeds.

KEYWORDS : Aphrodisiac, Mounting behavior, mating & *Semecarpus anacardium,* Semecarpus Anacardium Linn, Urushiol, Allergic contact dermatitis.

INTRODUCTION

Aphrodisiac are the substances which are used to increase sexual activity and help infertility. Sexual feelings are as inevitable part of life. The basic and fundamental purpose of sex and sexuality in the "continuation of progeny" and the survival of human race.[1] The sea gents have been used since a pretty long time and there are enough evidence showing the iruse by the ancient Greek and Arab physicians eg. Hippocrat (460B.C.), Dioscorides (70A.D.), Raazi (926A.D.), Ibn-e-Sina (1038A.D.) etc. The availability of the large number of sexual function improving drugs in the traditional Unani System of Medicine is a unique and distinctive feature of this system. Besides having many specific drugs for enhancing sexual functions, there are certain most commonly used spices like *Myristica fragrans* Houtt, (Nutmeg) *Syzygium aromatium* (L) Merr. & Perry (clove) *Pipernigrum*. Linn. (blackpaper), *Semecarpus anacardium* etc. which are empirically used as promising aphrodisiacs intraditional medicine practice in cases of sexual debility or depressed desire.[2]

In the present study we selected a plant namely *Semecarpus anacardium* (Linn.) belonging to the family of Anacardiaceae. It is distributed in the sub-Himalayan tract from the Bias eastwards, ascending in the outer hills upto3,500 ft., Assam, Khasiahills, Chittagong, Central India and the Western Peninsula. The fruit and seed are acridin taste, hot, sweetish. Intraditional system of medicine it is used as a digestible, aphrodisiac, anthelmintic, laxative. It also used treat skin diseases, piles, dysentery, tumors, fevers, loss of appetite, urinarydischarges, healsulcers, and strengthens the teeth, useful in insanity, asthma. The oil istonic, makes hair black, good for leucoderma, coryza, epilepsy and other nervous diseases. It lessens inflammation, useful in paralysis and superficialpain[3]Earlier the plant has been studied for its analgesic and anti-inflammatory[4], antiarthritic[5], antimicrobial[6], antibacterial[7], anthelmintic[8], antimutagenic[9], antidiabetic[10], antitumour[11], antioxident[12], fungistatic[13], hepatocellularcrcinoma[14-16], hypocholesterolemic[17], hypolipidemic[18], immunomodulatory[19]and mammary carcinoma[20]activities.

Contact dermatitis is a condition in which the skin becomes red, sore, or inflamed after direct contact with a substance. There are two kinds of contact dermatitis: irritant or allergic. Most often this occur when something that touches the skin causes irritation (irritant contact dermatitis) or an allergic reaction (allergic contact dermatitis).Contact dermatitis frequently develops on the forearms and face. Repeat exposure to substances that over time irritate the skin.

Contact dermatitis is an inflammatory response of the skin to an exogenous substance. The agent which produces this type of dermatitis is called contact antigen. Although in a particular individual any agent may cause contact hypersensitivity, some substances are known to be more potent contact sensitizers than others. The incidence of contact dermatitis in general population was estimated to be 1.7 to 6.3% [1,2].

As human life becomes increasingly complex, our skin is exposed to an ever- increasing spectrum of chemical and biological products. Inevitably, the incidence of allergic sensitization is showing a steady rise. Allergic contact dermatitis (ACD) develops in only a small proportion of sensitized individuals. However, the true incidence of ACD in a society is very difficult to estimate since its diagnosis depends on several factors such as the demographic profile of patients, index of suspicion of the physician, and availability of patch testing. Common sensitizers also vary with place, patient profile and over the passage of time. Since optimal treatment of patients with ACD is predicted on accurate advice about prevention, regular patch testing followed by estimation of relevance is imperative in all suspected cases [3]. The median prevalence of contact allergy to at least 1 allergen was 21.2% (range 12.5-40.6%), and the weighted average prevalence was 19.5%, based on data collected on all age groups and all countries between 1966 and 2007.[3]

Plants are either less common source of contact dermatitis or a less commonly reported source according to a data reported by Halkier-Sørensen [4]. The American Academy of Dermatology estimates that there are up to 50 million cases of urushiol-induced dermatitis annually in the United States alone, accounting for 10% of all lost-time injuries in the United States Forest Service.[5]

SemecarpusAnacardiumLinn, (Family: *Anacardiaceae*), is the nut commonly known as 'marking nut' and in the vernacular as 'Ballataka' or 'Bhilawa', has been used in various traditional system of medicines for various ailments since ancient times. Its nuts contain a variety of biologically active compounds such as biflavonoids, phenolic compounds, bhilawanols, minerals, vitamins and amino acids [6], which show various medicinal properties. The fruit and nut extract shows various activities like anti-atherogenic, anti-inflammatory, antioxidant, antimicrobial, anti-reproductive, CNS stimulant, hypoglycemic, anticarcinogenic and hair growth promoter[7-15]. Tarry oil present in the pericarp of the fruit contain Anacardic Acid that contains urushiols, which cause blisters on contact. So there is every chance of accidental poisoning causing contact dermatitis in children, and also in adults during the time of Bhallataka shodhana (purification of *Semecarpus Anacardium Linn*).

The evil eye is a malevolent look that many cultures believe able to cause injury or misfortune for the person at whom it is directed for reasons of envy or dislike. The burinazar (evil eye) is a big deal in

India. It's commonly believed that, should someone curse you with it, the negative energy will bring about all kinds of illnesses and misfortunes. The threat of this prompts people into taking enthusiastic protective actions ranging from drawing big black dots on babies' foreheads to chanting mantras, and engaging the services of pandits (Hindu priests) and astrologers, to ward it off. [25-30]

Practice of getting rid of evils eye using *Semecarpus Anacardium Linn* seeds is very common in Malwa region. Procedure is commonly done by females in which they use *Semecarpus Anacardium Linn* seeds, they waive seeds from top to bottom of children and then burn these seeds and the smoke produced cause allergic contact dermatitis in susceptible individuals. This practice is mostly observed in case of children in whom affected individuals are mostly females as they are generally doing this as a part of custom in most of the families

The diagnosis is made with the help of history of patient and patch test. Patch testing helps identify which substances may be causing a reaction in a patient [24-25]

Present study therefore attempts to determine the feasibility of diagnosis of allergic contact dermatitis in patients having contact dermatitis using *Semecarpus Ancardium* as evils eye.

Material and Methods:
This study comprised of total of 80 subjects, out of which 40 presented with history of exposure to *SemecarpusAnacardium* using it as evil's eye in Malwa region of India attending the out-patient department of Skin & V.D. at Sri Aurobindo Medical College and Postgraduate Institute, Indore from Nov. 2011 to April 2013 and 40 age, sex matched healthy subjects with no prior exposure were taken as control. Pregnant women, patients suffering from immunosuppressive conditions like HIV, Diabetes Mellitus, and primary immune deficiencies and Patients on long term steroids/ immunosuppressive drugs were excluded from the study.

Patient Evaluation:
A special proforma was prepared to include all the details including age, sex, and occupation. Detailed history was also taken with particular references to the onset, duration and evaluation of symptoms, constitutional and systemic disturbances, pre-existing skin disease, predisposing factors and details of topical and systemic medications. Detailed examination carried out in all the cases to find out the precise distribution and morphology of the lesions and to detect the evidence of any pre-existing skin disorder or any associated dermatitis. The patch test was explained to patient and consent was obtained in every case. After the allergen is identified by the Patch test the patient was advised to avoid those substances which contain the specific allergen.

Patch test was performed using modified finn chambers containing uroshilol as additional allergen besides the standard allergens**.** Prepared patches were applied to the upper back adjacent to the vertebrae. An alternative application site was the outer surface of the upper arm. Patients were asked to refrain from exposing patch tests to excess moisture or sweat and should return for patch test removal in 48-72 hours. [30-38]

Results:
The mean age of patients was 28.1±5.2 years. A female preponderance was observed in our study as 90% were females and only 4(10%) patients were male.

The primary site of lesion was hands which further progressed to forearms and then arms and face[figure 1]. Very few patients showed back, feet and lower limbs involvement.

A positive family history of atrophy and allergic conditions do exists like few patients have shown correlation with allergic rhinitis, allergic conjunctivitis, urticaria, asthma and atopic dermatitis. Most common associated allergic condition was Allergic Rhinitis (10%) i.e. in 4 patients.

All the 40 patients of contact dermatitis have a symptom of erythema. Other than erythema, 39 patients have papular eruptions out of which 4 patients had oozing and 2 have vesiculation and 2 had both oozing and vesiculations.

Time of presentation after exposure is 2-3 days (48-72hrs) in majority of cases but in cases of the patients who had history of recurrence presented within 4-5 hrs.

All the 40 patients were found sensitive to urushiol in the patch test[Figure 2] and none of the control were found sensitive to urushiol.

Out of 40 patients, 1 patient shows positive results to 4 allergens (balsam of peru, mercaptobenzothiazole, nickel sulphate, fragrance mix), 1 patient shows positive results to nickel sulphate and 1 shows positive results to parthenium.

Anithistamines and topical steroids were given as first line of treatment in patients. In 2 severely affected patients systemic steroids were given.

Discussion:
It is estimates that 5-10% of cases of contact dermatitis were determined by plants [16]. Compositae family contains over 13,000 species, some of them are food, for consumption, other are cultivated as ornamental plants (chrysanthemums) and other (arnica, marigold) are medicinal plants. Schimdt in 1986 showed that repeated exposure causes often acute contact dermatitis, with frequent relapses and subsequently it becomes chronic, with lichenification. When it is located at the level of the elbow or knee it can simulate an atopic dermatitis. Originally localized lesions at the level of the face, hands and genitals may disseminate and have a bad prognosis, evolving to erythroderma. [17] Also, the remaining dust from these plants may induce air borne dermatitis, frequently encountered situations in the regions of desert in the US and Australia.

Semecarpus Anacardium in used for various medicinal properties. The fruit and nut extract shows various activities like antiatherogenic, antiinflammatory, antioxidant, antimicrobial, anti-reproductive, CNS stimulant, hypoglycemic, anticarcinogenic and hair growth promoter. More efforts are needed to study the traditional uses of the plant and the subsequent validation of activity and the mechanism of action.

When the tarry oil comes in contact with skin, it produces dermatitis.[13] Medically it is named as urushiol-induced contact dermatitis. The symptoms include itching, redness, burning sensation, swelling, papules, vesicles, blisters, and streaking. Sometimes it may result in an allergic eczematous contact dermatitis. The rash takes 1–2 weeks to run its course and normally does not leave scars. Severe cases have small (1–2 mm) clear fluid-filled blisters on the skin. Pus-filled vesicles, containing a whitish fluid, may indicate a secondary infection. Excessive scratching may result in secondary infection, commonly by staphylococcal and streptococcal species. In our series of patients the erythema was the main clinical symptom. Recently llanchezhian et al also reported the cases series of five patients with urushiol induced allergic contact dramatis. All the five patients were working on purification of *Semecarpus Anacardium Linn* seeds. However they have not performed any patch test that shows the allergic contact dermatitis was due to urushiol. In our study we confirm that person exposed to smoke of Semecarpus Anacardium Linn were sensitive to urushiol in patch test.

MATERIALAND METHODS
Plant Material Collection
Seeds of plant were collected from local regions of Uttar Pradesh and the plant was authenticated as *Semecarpus anacardium* by the Dr. A.K.S. Rawat, National Botanical Research Institute (NBRI), Lucknow Campus. A voucher specimen (Specimen No: NBRI/CIF/328/2012) is preserved in NBRI, Lucknow, India. A total of 40 patients of allergic contact dermatitis and exposed to smoke of Semecarpus Anacardium Linn seeds and 40 healthy controls were recruited for the study. A patch test was performed contacting urushiol as an additional allergen in finn chamber. Urushiol is an active ingredient of smoke of Semecarpus Anacardium Linn seeds all the patients were found sensitive to urushiol and none of the healthy control was found sensitive to urushiol in the patch test.

Urushiol is an active allergen found in Semecarpus Anacardium Linn seeds and responsible of allergic contact dermatitis in patients exposed to smoke of Semecarpus Anacardium Linn seeds.

Preparation of Chloroform Extract [21]
The air dried nuts were extracted successively with the following solvents of their increasing polarity in a Soxhlet extractor.

1) Pet. Ether (60-80%),
2) Chloroform,
3) Alcohol After alcoholic extraction macerated the mark with chloroform water for 24h to obtain the aqueous extract. Concentrate the each extract solvent by using flash evaporator to dryness on the water bath in low heat. Weighed the residue obtained with each solvent and determine its % in terms of air dried weight to the nut material (%w/w) to obtained successive solvent extractive values. On the basis of % yield highest percentage of the extract was selected for the study.

Experimental Animals

Male Wistar mice about 30-35g were used for study. All animals were housed in a group of 6 in polyethylene cages under standard housing conditions (12:12h light and dark cycle, temperature 22±2°C and humidity 50±10%) with standard feed pellet and free access to water *adlibitum*. Standard hygiene conditions were maintained. The animal experiments were performed in accordance with our Institutional Animal Ethics Committee (IAEC/APPC/01/12) and by the animal regulatory body of the government. After two weeks of acclimatization, animals were used for the following studies.

Experimental design Mounting behavior test[22,23]

Mount is operationally defined as the male assuming the copulatory position but failing to achieve intromission. To quantify mounting behavior, non-estrous female mice were paired with males treated with single dose of the drugs (150mg/kg;p.o.). Animals were observed for 3hrs and their behaviours were scored as described [25] .Males were placed individually in a glass cage. After 15 minutes of acclimatization, anon-estrous female was introduced into the arena. The numbers of mounts were recorded duringa 15 minutes observation period at the start of 1st hr. Then the female was separated for 105minutes. Again the female was introduced and the number of mounts was observed for 15 minutes as before at 3rd hr. All the experiments were performed between 09.00 to 12.00 hrs during day time at room temperature 26–27°C. To determine the effect of *Semecarpus anacardium* and Penegraon mounting four groups of six animals each were taken for the study. All drugs were dissolved in distilled water just before the administration. The first group received distilled water (10ml/kg; p.o.) and served as control. Groups II received Penegra (5mg/kg; p.o.) and served as standard. III and IV were given the extracts of *Semecarpus anacardium* (150mg/kg & 300mg/kg;p.o.).

Assessment of mating performance[22,23]

Male mice divided into 4 groups of six each were used in the study. The first group received distilled water (10ml/kg; p.o.) and served as control. Groups II received Penegra (5mg/kg; p.o.) and served as standard. III and IV were given the extracts of *Semecarpus anacardium* (150mg/kg&300mg/kg;p.o.). The drugs were administered in the morning (10AM) and each male was placed in a separate cage. After 1hr, five estrous female were admitted into each cage and they were cohabitated overnight. The stage of the estrous cycle was determined.[22] The vaginal smear of each female mouse was examined under a microscope for the presence of sperm. The number of sperm positive female was recorded in each group.

RESULT & DISCUSSION

Table1: Effect of chloroform extracts of Semecarpus *anacardium* on mounting behavior of Male mice

Groups (N=6)	Number of mounts/15 minutes	
	Ist Hour	3rd Hour
Control	3.25±4.479	2.25±0.250
Penegra (Sildenafil citrate) (5mg/kg;p.o.)	12.5±0.645	10.2±0.479
*Semicarpus anacardium (150*mg/kg;p.o.)	6.75±0.629	5.25±0.75
*Semicarpus anacardium (300*mg/kg;p.o.)	8.75±0.793	6±0.408

Values are mean ± S.E.M; n=number of animals in each group; Significant difference from control and standard. P*=<0.01, P**=<0.001.

In ethno medical practices, several formulations containing these spicy drugs are used for sexual function improvement. The present study revealed that the chloroform extracts of *Semicarpus anacardium* can significantly enhance male sexual activity in normal mice. In the present study, It was observed that the sexual behavior of male mice with *Semicarpus anacardium* (300mg/kg) was greater than *Semicarpus anacardium* (150mg/kg). Whereas, it was found highly significant in the animals treated with Penegra. However, since these drugs are clinically used in the Unani System of Medicine without any recorded toxicity, there by suggesting that the short term use of these drugs for this purpose is apparently safe.

Generally elevated testosterone level also enhanced the sexual behavior in humans. Moreover, drugs induced changes in neurotransmitter levels or their action at cellular level could also change sexual behavior [27]. The enhanced effect of *Semicarpus anacardium*, as observed in sexual behavior of animals, may be owing to this property in conjunction with the nervous stimulating activity of the drug. *Semicarpus anacardium* exhibited more increament of mating performance in mice in comparison with the increased sexual lmotivation. The standard drug Sildenafil citrate was used as a referent only for quantitative comparison and not for mechanistic purpose. For conducting the study the parallel experimental design is used. However, for more corroborative evidence of the drug's activity the twin cross over method may be used. The results are statistically significant.

CONCLUSION

Our study suggested that the systemic use of chloroform extracts of *Semicarpus anacardium* has sexual behavior enhancing effect in male mice.

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