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PHYTOCHEMICAL AND PHARMACOLOGICAL POTENTIAL OF *YELLOW OLEANDER*: A REVIEW

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ABSTRACT: *Yellow oleander* is an important medicinal material in Mexican traditional medicine. In early times it is assumed that all parts of the oleander plant are poisonous to humans, animals, and certain insects but now a day's numbers of pharmacological activities are determined by different scientists. For containing cardiac glycoside this plant is mostly not non-toxic. However, this plant has many pharmacological properties such as antidiarrhoeal activity, cytotoxic activity, antimicrobial activity, anticancer activity. This paper explains the evidence-based information regarding the phytochemistry and pharmacological activity of this plant.

Keywords: *Yellow oleander*, poisonous, pharmacological activity, cardiac glycoside

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INTRODUCTION: Herbal drugs from medicinal plants are comparatively lower expenses and highly available. It has been proved that drugs that have been obtained from plants are comparatively harmless, nontoxic and even liberated from serious side effects [1]. Horrified properties have been found in some toxic plants which are considered life-threatening. The bark is used as an antipyretic, in Nigeria and Ghana as it is both emetic and poisonous [2]. It has been reported that this plant's leaves and seed oil have insecticidal, molluscicidal and antibacterial properties [3, 4].

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In recent years, secondary plant metabolites, with unknown pharmacological activities, have been extensively investigated as a source of medicinal substances [5]. It is predicted that for the treatment of bacterial infections, phytochemicals with enough antibacterial efficacy will be used [6]. To obtain a variety of new herbal drugs, medicinal plants are the best sources as stated by WHO.

In developing countries near about 80% people use medicinal plants for medicine, which has effective compounds that can cure diseases and those derived from medicinal plants. Therefore, these types of plants should be examined so that we can further understand their properties, safety, and efficacy. The frequency of life risk infections in animal life caused by pathogenic micro-organisms has increased worldwide and is becoming an important cause of morbidity and mortality in immunocompromised animals in both developing

and developed countries. Illogical usage of antimicrobial agents is the major reason behind antibiotic resistance in developing countries such as Bangladesh, Nepal and Nigeria. In recent years, no steps have been taken for the examination of the indigenous drugs to see whether it works against infectious diseases or not. Performing research on indigenous plants is a noteworthy strand of growing a safe antimicrobial principle through isolation, characterization, identification and biological studies. In every part of Bangladesh yellow oleander is broadly distributed. Yellow oleander has been cited with a variety of names as Digoxin, Lucky nut, *Nerium oleander* and *T. peruviana* and it belongs to the family Apocynaceae plant.

Yellow oleander has been used in Mexican traditional medicine for various health complaints, including its use (seed) as a charm against the "evil eye" and fallen fontanel in babies. In Mexican empirical herbalism, a poultice made from the leaves is applied externally to cure hemorrhoids, and the milky latex is applied topically as a skin antiseptic, although this practice is fraught with risks, as the plant's alkaloids can be absorbed through the skin. The seed has been proposed as a cure for obesity, taken "in minute quantities," according to some commercial product labels and ads on the Internet

***Yellow oleander* (*T. peruviana*) Poisoning:** *Yellow oleander's* seeds are highly toxic as its seeds contain toxic cardiac glycosides including the vetins A and B and neriifolin [7]. Consumption of the seeds causes clinical conditions that are very alike to that of digoxin toxication: vomiting, diarrhea, dizziness, bradycardia, sinus and AV node block and other cardiac dysrhythmias [8-10]. In seriously poisoned patients fatal, DC shock-resistant, ventricular fibrillation or refractory cardiogenic shock may develop [11]. This plant is now frequently spread in every part of the tropical and sub-tropical regions but it is native of Central and South America. It grows about 10 to 15 feet high and is a small ornamental tree. The leaves are about 13 to 15 cm in length and they're spirally arranged, linear. To execute a 7.5 kg dog bitch the absorption of the equivalent of two *T. peruviana* leaves may be enough [12]. In the leaves of *T. peruviana*, many cytotoxic substances have been examined such as Thevetin A and B, Thevetoxin, Peruvoside, Ruvoside and Nerifolin [12]. From the leaves of yellow oleander, we can get antimicrobial, antidiarrhoeal and mainly cytotoxic activities.

FIG. 1: LEAVES OF YELLOW OLEANDER

FIG. 2: FLOWER OF YELLOW OLEANDER

Synonyms: *Cascabela peruviana, Cerbera linearifolia* Stokes, *Cerbera peruviana, Cerbera thevetia, Thevetia linearis, Thevetia neriifolia, Thevetia peruviana, Thevetia thevetia*.

Vernacular Names: Be-still Tree in Hawaii, Lucky nut in West Indies, *Yellow oleander* in Australia [13], Kaneir or Kaner in Hindi language in India, Captain Cook tree in Queensland [14].

Distribution: This species instigated from tropical America and is broadly farmed in every part of the tropics as an ornamental, also in tropical Africa.

In Asia, Malaysia and the Pacific Islands it was in a wild region as it is not indigenous. Because of containing cardiac glycosides all parts of this plant are extremely toxic [15].

Taxonomical Classification:

Kingdom	:	Plantae
Sub kingdom	:	Tracheobionta
Division	:	Magnoliophyta
Class	:	Magnoliopsida
Subclass	:	Asteridae
Order	:	Gentianales
Family	:	Apocynaceae
Tribe	:	Rauvolfioideae
Rauvolfioideae	:	Cascabela
Species	:	*C. thevetia*

Botanical Description: The leaves have a hard texture like leather and narrow long of about 16 cm and 1-1.5 cm broad and the flowers are generally yellow and bell-shaped, about 7 cm long. Flowering occurs all round the year [15].

Pharmacological Properties: From *Yellow oleander's* methanol extract cytotoxic property has been determined on breast, colorectal, prostate and lung cancer cell lines. The methanol extract of *Yellow oleander's* fruit has shown strong influence against breast, colorectal, prostate and lung cancer cell lines. So, fruit extraction of *T. peruviana* is cytotoxic to human cancer cell lines [16]. *Yellow oleander's* leaves the extraction of ethanol noticeably decreased castor oil-influenced diarrhea in albino rats. In the case of castor oil-influenced albino rats, 66.7% of ethanol extract-treated group and 75% of loperamide (positive control) group had shown a reaction to the relevant treatment and all control group reacted. The signifying latent period of ethanol extract-treated group (2.4 ± 1.66) and of the positive control (1.8 ± 1.11) reduced diarrhea noticeably ($P<0.01$) compared to the control group. Reaction to ethanol extract of leaves of *Yellow oleander* was 57.7% against diarrhea, which is lower than the present study it has been stated by Zakaria and Mohd (1994) [15, 17].

Extract of *Yellow oleander* leaves for determining antibacterial activity was experimented on five gram-positive and five gram-negative bacteria by disc diffusion procedure and compared with the standard antibiotic disc. At 100 µg/disc concentration antibacterial property of *Yellow oleander* leaves extract was studied. Against gram-positive and gram-negative bacteria it has shown poor activity.

More precisely, *Yellow oleander* leaves extract exhibited 2.7, 1.5, 2.5, 3.6 and 4.2 mm diameter of zone of inhibition against *Staphylococcus aureus, Shigella sonnei, Klebsiella sp, Salmonella typhi* and *Shigella flexineri* respectively and no activity against the four Bacillus sp and Proteus sp. tested. This experiment result of antibacterial test against *Proteus vulgaris* culture is in partial agreement with Ravikumar and his colleagues (2007) [18]. *Yellow oleander's* (leaves), methanolic extract showed noteworthy inhibitory activities against the growths of *Salmonella, Shigella* sp; *Shigella flexneri, Shigella virchow* and *Shigella dysenteriae* [17]. Standard antibiotic tetracycline (30 µg/disc) exhibited noteworthy antibacterial property versus all gram-positive and gram-negative bacteria which has been tested except Proteus sp. Manna [19] suggested that *Yellow oleander* may have used for different kinds of diseases including arthritis, but all require further examination [15]. As a natural anti-cancer product *Yellow oleander* extract has possibilities of disapproving the proliferation, motility, and adhesion of human breast and colorectal cancer cells, and apoptosis initiation in human prostate and lung cancer cell lines, with minimal effects on non-tumorigenic cell lines [16].

CONCLUSION: It is the best classical approach in the search of new molecules for the management of various diseases. Thorough screening of literature available on *Yellow oleander* depicted the fact that it is a popular remedy among the various ethnic groups, Ayurvedic and traditional practitioners for the treatment of ailments. Researchers are exploring the therapeutic potential of this plant as it has more therapeutic properties that are not known.

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REFERENCES:

1. Momin A: Role of Indigenous Medicine in Primary Health Care, 1st International Seminar on Unani Medicine, New Delhi, India 1987.

2. Oliver-Bever, B: Medicinal Plants in Tropical West Africa, Cambridge University Press. Cambridge 1986; 366.
3. Obasi NB and Igboechi AC: Seed oil distillates of *Thevetia peruviana* (Syn. *T. neriifolia*): Analysis and Antibacterial activity. Fitoterapia 1991; 62(2): 159-62.
4. Panigrahi A and Raut SK: *Thevetia peruviana* (Family: Apocynaceae) in the control of slug and snail pests. Mem. Inst. Oswaldo Cruz, Rio de Janeiro 1994; 89(2): 247-50.
5. Krishnaraju BGV and Nigam SS: The *in-vitro* antimicrobial efficiency of essential oils. Indian J Med Res1970; 58: 627-33.
6. Balandrin B, Mert T and Tansel H: Antimicrobial and cytotoxic activities of *Caratonia siliqua* L. extracts. Turk J Biol 2006; 26: 197-00.
7. Langford SD and Boor PJ: Oleander toxicity: an examination of the human and animal toxic exposures. Toxicology 1996; 109: 1-13.
8. Sreeharan N, Putharasingam S, Ranjadayalan K, Satkurunathan K and Ganeshamoorthy J: *Yellow oleander* poisoning – clinical manifestations and prognostic criteria. Jaffna Medical Journal 1985; 20: 100-01.
9. Saravanapavananthan N and Ganeshamoorthy J: *Yellow oleander* poisoning – a study of 170 cases. Forensic Science International 1988; 36: 247-50.
10. Micromedex: (1995) Plants – Thevetia. In: Poisindex. CCISMicromedex CDROM, Vol. 85 Micromedex, Inc., Englewood, CO.
11. Eddleston M: Tropical Medicine and International Health, 1999; 4(4): 266-73.
12. Arnold and Ayuso MJ: Cytotoxic activity of *Retama spaerocarpa*. Fitoterapia 1935; XVI: 495-98.
13. Smith NM: 'Weeds of Northern Australia: a Field Guide.'(Environment Centre: Darwin, NT.) 2011.
14. Department of Agriculture, Fisheries and Forestry (2013). 'Fact Sheet–Captain Cook Tree.' (The State of Queensland, Department of Agriculture, Fisheries and Forestry, Queensland Government: Brisbane,Qld).
15. KM. Sowjanya, K. Narendra, J. Swathi and A. Krishna Satya, Department of Biotechnology, Acharya Nagarjuna University, Nagarjuna Nagar, Guntur-522510, Andhra Pradesh,India. International Journal of Research in Pharmaceutical and Biomedical Sciences.
16. Ramos-Silvaet: BMC Complementary and Alternative Medicine 2017; 17: 241.
17. Zakaria MB and Mohd MA: Traditional Malay Medicinal Plants. Penerbit Fajar Bakti Sdn. Bhd. Kuala Lumpur, Malaysia 1994; 967-65-2.
18. Patil HSR, Makari HK and Gurumurthy H: *In-vitro* antimicrobial activity of ethanol extract of *Thevetia peruviana*. Electron. J Environ Agri Food Chem 2007; 6(9): 2318-22.
19. Manna SK, Sah NK, Newman RA, Cisneros A and Aggarwal BB: Oleandrin suppresses activation of nuclear transcription factor-KB, activator protein-1, and c-Jun NH_2-terminal kinase. Cancer Res 2000; 60: 3838-47.

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