A REVIEW ON: THEVETIA PERUVIANA
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ABSTRACT
Thevetia peruviana are potentially lethal plants after ingestion. The plants is common toxicological emergency in tropical and subtropical parts of the world and international self-harm, using T peruviana is prevalent in south Asian countries, especially in India and Sri Lanka. All parts of these plants are toxic, and contain a variety of cardiac glycosides including nerifolin, thevetin A, Thevetin B and oleandrin. Ingestion of oleander results in nausea, vomiting, abdominal pain, diarrhoea, disrhythmias and hyperkaliemia, in most cases; clinical management of poisoning by either N.oleander or T.peruviana involves administration of activated charcoal and supportive care. This article compiles all the information related to Thevetia peruviana.

Keywords: oleander poisoning, arrhythmias, cardiac glycosides, cannogenin, Pharmacological

INTRODUCTION
Medicinal plants as a group comprise approximately 8000 species and around 50% of all the flowering plant species of India. Millions of rural households use medicinal plants in a self-help mode. Half million practitioners of the Indian system of medicine in the oral and codified streams use medicinal plants in preventive, promotive and curative application. There are estimated to be over 7800 manufacturing units in India, in recent years, the growing demand for herbal product has led to a quantum jump in manufacturing units in India. in recent years, the growing demand for herbal product has led to a quantum jump in manufacturing units in India. Thevetia peruviana is an evergreen tropical shrub or small tree that is prevalent in south Asian countries, especially in India and Sri Lanka.

Distribution
This plant is native of Central & South America, but now frequently grown throughout the tropical and sub- tropical regions. It is an evergreen tropical shrub or small tree that bears yellow or orange-yellow, trumpet like flowers and its fruit is deep red/black in color encasing a large seed that bears some resemblance to a Chinese “lucky nut.” It contains a milky sap containing a compound called Thvetin that is used as a heart stimulant but in its natural form is extremely poisonous, as are all parts of the plants, especially the seeds. Its leaves are long, lance shaped and green in colour. Leaves are covered in waxy coating to reduce water loss (typical of oleanders). Its stem is green turning silver/gray as it ages.

CULTIVATION AND PROPAGATION

Propagated
Propagate by seed in spring (clean seed coat in a glass containing 10% bleach 90% warm water for 2-3min; after wash seed and soak in warm water for 24h). Can also propagate from cuttings in spring-early summer with hardwood cuttings. For both use seed cutting compost that contains perlite.

PARTS USED
Thevetia peruviana is an ornamental plant, and mostly all parts of plants are medicinal use. these are Flowers and leaves, seed and root.

Table 1 Chemical Constituent
These are the chemical constituent which is present in the various parts of plants.

Structure of Chemical Constituent

[Diagram of chemical structure]
Thevetia peruviana plants are toxic to most vertebrates as they contain cardiac glycosides. Many cases of intentional and accidental poisoning of humans are known. The toxins are cardenolides called Thevetin A and Thevetin B (Cerebroside), others include Peruvoside, Neriifolin, Thevetoxin and Ruvoside. These cardenolides are not destroyed by drying or heating and they are very similar to digoxin from Digitalis purpurea. They produce gastric and cardio toxic effects. Antidotes for treatment include atropine and Digoxin antibodies and treatment may include oral administration of activated charcoal. These toxins have occurred because of thevetins A and B (Cerebroside), others include peruvoside, neriifolin, thevetoxin and ruvoside. These compounds are very similar to digoxin from Digitalis purpurea. They produce gastric and cardio toxic effects. Antidotes for treatment include atropine and Digoxin antibodies and treatment may include oral administration of activated charcoal. These toxins have also been experimented for use in pest control. Entire Thevetin plant is very poisonous and the seeds are most poisonous. Tincture is cathartic emetic and febuge seeds are used as abortifacient and purgative in rheumatism and dropsy. Peruvoside is used in treatment of mild cardiac insufficiency and week heart. This drug shows relatively high degree of therapeutic index compared to digoxin.

**PHARMACOLOGICAL ACTIVITY**

**Antimicrobial activity**

The antimicrobial activity of ethanol extract obtained from *Thevetia peruviana* was tested against bacterial species of *Escherichia coli*, *Streptococcus lactis*, *Enterobacter aerogenes*, *Alcaligenes faecalis* *Pseudomonas aeruginosa*, *Proteus vulgaris* and fungal species of *Fusarium oxysporum*, *Alternaria helianthi*, *Cuvularia lunata*, *Aspergillus niger* and *Penicillium spp*. Better antimicrobial activity was observed with the extracts showed maximum activity against *E. coli*.

**Antifungal properties**

Seeds of *Thevetia peruviana* were screened for their antifungal photo activity. Extracts obtained either with n-hexane or dichloromethane were fractionated by column chromatography or further analysed by thin-layer chromatography. All seed extracts and fractions were tested for inhibition of the fungus *Cladosporium cucumerinum* for the evaluation of photoactive inhibitory effects. Antifungal light-dependent activity was observed for some of the fractions and both crude extracts. The most photoactive fraction was analysed by capillary gas chromatography with mass spectrometry in order to identify its constituents.

**Piscicidal activity**

The leaf and bark of *Thevetia peruviana* plant was administered for 24 h to the freshwater fish *Catla catla* (Hamilton) to evaluate their piscicidal activity in laboratory and cemented pond condition. The values of leaf and bark extracts of different solvents (i.e., acetone, diethyl ether, ethyl alcohol, chloroform and carbon tetrachloride) of this plant to fish *Catla catla* were determined. The LC50 values of acetone leaf extract of *Thevetia peruviana* plant is 88.80 mg/L (24h) in laboratory condition and 529.38 mg/L (24h) in cemented pond condition; acetone bark extract of this plant is 99.43 mg/L (24h) in laboratory condition and 591.78 mg/L (24h) in cemented pond condition against freshwater fish *Catla catla*. Similar trend was also observed in case of other solvent (i.e., diethyl ether, ethyl alcohol, chloroform and carbon tetrachloride) of leaf and bark extracts of *Thevetia peruviana* plant against freshwater fish *Catla catla* in laboratory and cemented pond conditions. The acetone leaf and bark extract of this plant was very effective in comparison to other solvent extract in both the conditions. So, the biochemical analysis is taken only acetone leaf and bark extract of *Thevetia peruviana* plant in laboratory condition.

**Antispermatogenic activity**

This study was conducted to evaluate the antifertility potential of *Thevetia peruviana* in male albino rats with their phytochemical evaluations. Phytochemical examination showed that plant is rich in active constituents, i.e. *α*-amyrin acetate, lupeol acetate, *α*-amyrin, *β*-amyrin, lupeol and thevetigenin. *T. peruviana* stem bark methanol extract (TPMte) administered orally to male rats at the dose level of 100 mg/rat/day did not cause any significant reduction in body weight, while the weight of reproductive organs...
reduced significantly. A significant fall in the total protein and sialic acid content of the testes, epididymides, seminal vesicle and ventral prostate, as well as in the glycogen content of testes was also observed; however, cholesterol was increased significantly. TPMEl also caused a decline in spermatogenetic elements, i.e. preleptotene and pachytene spermatocytes, secondary spermatocytes, round spermatids and mature Leydig cells. At this dose level Leydig cell nuclear diameter, seminiferous tubular diameter and Sertoli area were significantly reduced (p<0.001). The reduction in sperm density and motility resulted in 18% residual fertility. In conclusion, T. peruviana inhibited spermatogenesis in rats, indicating the possibility of developing a herbal male contraceptive.18

Effect of *Thevetia peruviana* seeds extract on in vitro growth of four strains of Phytophthora megakarya

A study was carried out in Yaounde (Cameroon) to test the antifungal activity of extracts of *Thevetia peruviana* seeds. Crude extracts were obtained after successive maceration with hexane, ethyl acetate and methanol. Seed extracts were tested for inhibition of P. megakarya, a causal agent of black pod disease of *Theobroma cacao*. Four strains of P. megakarya were used. Antifungal tests were performed by using three concentrations (12.5, 25 and 50 μl ml-1) of crude extracts. Seven days after incubation on pea agar medium, the results showed that the use of 50, 25 and 12.5 μl ml-1 of crude extracts with ethyl acetate resulted in 100, 70 and 50% inhibition rates respectively on P. megakarya. Methanol extract on the BOYO, TA121 and TA123 strains led to total inhibition, while 37.5, 43.2 and 63.9% inhibition rates were in the case of the BOY0 strain at 12.5, 25 and 50 μl ml-1 concentrations of the extract respectively. These results suggest that crude extracts from *T. peruviana* seeds are efficient biocide substances with antifungal activity 19

Anti-Inflammatory

*Thevetia peruviana* seeds contain glucosides of neriifolin, acetylneriifolin and therein. Seed oil distillates of *Thevetia peruviana* have been found to contain anti-bacterial activity. In the present work, the fresh flowers of *Thevetia peruviana* were subjected to phytochemical studies. The results of the study showed that the flowers contain quercetine, kaempferol and quercetin-7-o-galactoside. The structure of the isolated compound was characterized by UV, 1H NMR and 13C NMR spectra. The anti-inflammatory character of the isolated compound was tested by in vitro method and the results of the study revealed that the isolated compound showed a biphasic property 20

Antidiarrhoeal And Antimicrobial

This study screened the antidiarrhoal, antimicrobial and a cytotoxic effect of ethanol-extracted leaves of yellow oleander (*Thevetia peruviana*). The extract was tested against castor oil-induced diarrhoea in a model of albino rats and showed significant antidiarrhoeal activity (P<0.01). Disc diffusion technique was used to test the in vitro antibacterial activities of the extract and exhibited poor antibacterial activities against both Gram positive and Gram negative bacteria (mainly Bacillus sp). Ethanol-extracted leaves of yellow oleander showed narrow zone of inhibition in the bacterial lawns of *Shigella flexneri*, *Salmonella typhi*, *Klebsiella sp.*, *Staphylococcus aureus* and *Shigella sonnei*. Cytotoxicity was determined against brine shrimp nauplii and LC50 of the plant extract was determined as 627.21μg/ml. The wide range of LC50 value denotes the safety effect of the extract21

Anti-termitic

*Thevetia peruviana* (Pers.) K. Schum. seed oil was used to make a surface coating with antifungal, antibacterial and anti-termite properties. The paint exhibited inhibitory activity against *Escherichia coli*, *Staphylococcus aureus*, *Bacillus subtilis* and *Candida albicans* in a concentration dependent manner. The antibacterial activities were statistically significant (p = 0.05). The repellent action of paint against subterranean termites (Microtermes spp.) was significant (p = 0.03). From these results, it was concluded that the *Thevetia peruviana*-based oil paint was self-preserving against microbes and substantially protected wood from subterranean termite attack.22

Flavonane and Flavanol Glycosides / Reverse Transcriptase Inhibition

Flavanone and flavonol glycosides from the leaves of *Thevetia peruviana* and their HIV-1 reverse transcriptase and HIV-1 integrase inhibitory activities: Two new flavonone glycosides and a new flavonol glycoside were isolated from the leaves of *T. peruviana* and were investigated for their inhibitory effects against HIV-1 reverse transcriptase and HIV-1 integrase.

Cardenolide Glycosides

Study isolated four cardenolide glycosides and four triterpenoid saponins. Cardenolide glycosides 1 and 2 showed significant reversal effect on TRAIL resistance in human gastricadeno carcinooma cells.

Properties and constituents

Seeds contain a toxic glucoside, thevetin. Seeds yield a fixed oil containing triloein 63%, tripalmitin and stearin, 37%. Thevetin has been classified with the digitalein group so activity on the heart muscle, blood pressure elevation, heart irregularities. It also causes increased intestinal peristalsis, increased salivation, and pupil contraction.

Properties

Bark isismic, febrifuge, and antiperiodic. Leaves are cathartic. Milky juice is poisonous and vesicant.23

CONCLUSION

It is quite evident from this review that *Thevetia peruviana* contains a number of phytoconstituents which reveals its uses for various therapeutic purposes. Looking upon wide prospects and potential of Peruvian a for various purposes, This will help in financial upliftment of the poor and landless farmers besides providing base for the Research and Development. The Plant or its individual parts can be used for the treatment of various disorders in human being such as, diabetes, liver toxicity, fungal infection, microbial infection, inflammation, pyrexia and to relieve pain. Still, so much work is required with the thevetia to investigate the mechanism of actions with other therapeutic activities.

ACKNOWLEDGMENT

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**Table 1 CHEMICAL CONSTITUENT**

<table>
<thead>
<tr>
<th>Glycoside</th>
<th>Aglycone</th>
<th>Sugars</th>
</tr>
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<tbody>
<tr>
<td>Cerebroside</td>
<td>Digitoxigenin</td>
<td>L-thevetose+2mol.D-glucose</td>
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<tr>
<td>(Thevetin B)</td>
<td></td>
<td></td>
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<tr>
<td>Thevetin A</td>
<td>Cannogenin</td>
<td>L-thevetose+2mol.D-glucose</td>
</tr>
<tr>
<td>Peruvoside</td>
<td>Cannogenol</td>
<td>L-thevetose</td>
</tr>
<tr>
<td>Nennifolin</td>
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<tr>
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</tr>
<tr>
<td>Peruvosic acid</td>
<td>Cannogenic acid</td>
<td>L-thevetose</td>
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Fig 1

Fig 2