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PELTOPHORUM PTEROCARPUM: CHEMICAL AND PHARMACOLOGICAL ASPECTS

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Keywords:
Peltophorum pterocarpum, Fabaceae, Chemical constituents, Biological activity

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ABSTRACT: The present work offers a review addressing the detailed chemistry and pharmacology of *Peltophorum pterocarpum* (belonging to Fabaceae family) regarded as one of the most significant plant species in traditional system of medicine. The plant is used in different parts of the world for the treatment of several ailments like stomatitis, insomnia, skin troubles, constipation, ringworm, insomnia, dysentery, muscular pains, sores, and skin disorders and is the source of a diverse kind of chemical constituents such as aliphatic alcohols, fatty acids, amino acids, terpenoids, phenolics, flavonoids, alkaloids, steroids etc. The isolated phytochemicals as well as different extracts exhibited numerous biological activities including antimicrobial, antioxidant, cytotoxic, aldose reductase inhibition and antiglycaemic activities. Hence, up to-date information on the chemical and pharmacological knowledge on this plant may be helpful to guide researchers anticipating to undertake further investigations in these directions. The present review covers literature up to middle of 2013 and enlists 42 references.

INTRODUCTION: *Peltophorum pterocarpum* (Copperpod, Golden Flamboyant, Yellow Flamboyant, Yellow Flame Tree, Yellow Poinciana and Radhachura in Bangla; Synonyms: *Peltophorum inermis* and *Peltophorum ferrugineum*) is a family of Fabaceae native to tropical southeastern Asia and a popularly ornamental tree grown around the world.

It is a deciduous tree growing to 15–25 m (rarely up to 50 m) tall, with a trunk diameter of up to 1 m.

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The leaves are bipinnate, 30-60 cm long, with 16-20 pinnae, each pinna with 20-40 oval leaflets 8-25 mm long and 4-10 mm broad. The flowers are yellow, 2.5-4 cm in diameter, produced in large compound racemes up to 20 cm long. The fruit is a pod 5-10 cm long and 2.5 cm broad, red at first, ripening black, and containing one to four seeds. Trees begin to flower after about four years [1, 2].

The plant is native to tropical southeastern Asia and northern Australasia, in Sri Lanka, Thailand, Vietnam, Indonesia, Malaysia, Papua New Guinea, Philippines and the islands of the coast of Northern Territory, Australia [1,3]. The plant is also found in different regions of India including Birbhum District, West Bengal. The wood of the plant is wide variety of uses, including cabinet-making [4] and the foliage is used as a fodder crop [1].

The taxonomical classification of *Peltophorum pterocarpum* is shown below:

Kingdom	Plantae
Division	Magnoliophyta
Class	Magnoliopsida
Sub-class	Rosidae
Order	Fabales
Family	Fabaceae
Sub-family	Caesalpinioideae
Genus	Peltophorum
Species	*P. pterocarpum*
Binomial name	*Peltophorum pterocarpum* (DC.) K. Heyne

Peltophorum pterocarpum (DC.) Baker ex Heyne is a deciduous tree commonly used for ornamental purpose and as an avenue tree. Different parts of this tree are used to treat many diseases like stomatitis, insomnia, skin troubles, constipation, ringworm and its flower extract is known to be a good sleep inducer and used in insomnia treatment [5-7]. Its bark is used as medicine for dysentery, as eye lotion, embrocation for pains and sores. The traditional healers use the leaves in the form of decoction for treating skin disorders. Stem infusion of *Peltophorum pterocarpum* Baker ex K. Heyne used in dysentery, for gargles, tooth powder and muscular pain [8]. Flowers are used as an astringent to cure or relieve intestinal disorders after pain at childbirth, sprains, bruises and swelling or as a lotion for eye troubles, muscular pains and sores [9].

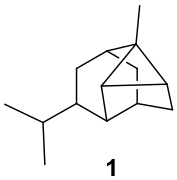
MATERIALS AND METHODS: The chemical constituents isolated and identified from *Peltophorum pterocarpum*, pharmacological activities exhibited by the isolated compounds as well as by the crude plant extracts were searched across the Medline (National Library of Medicine) and Science Direct databases. The data were updated in July 2013, using the search-terms *Peltophorum pterocarpum*, chemical constituents, biological activities, pharmacological activities or properties of *Peltophorum pterocarpum* as keywords. In addition, the reference lists of all papers identified were reviewed.

Chemical constituents: Chemical constituents (structures shown in **Figure 1**) isolated so far from this plant species are included in **Table 1** and found that aliphatic alcohol, fatty acids, amino acids, terpenoids, phenolics, flavonoids, alkaloids, steroids are isolated as phytochemicals from this plant; eighty-three phytochemicals have been reported so far from this plant. Besides, some investigation regarding class of chemical constituents present in different extract of this plant has been studied [10].

TABLE 1: LIST OF PHYTOCHEMICALS ISOLATED FROM *PELTOPHORUM PTEROCARPUM*

Compound (Str. No.)	Plant part	Reference
(+)-Cycloisosativene (1)	Stem	8
(-)-α-Panasinsen (2)	Stem	8
2,5,5-Trimethyl-3-hexyn-2-ol (3)	Stem	8
1-Ethyl-4,4-dimethylcyclohex-2-en-1-ol [Isosativen] (4)	Stem	8
Epiglobulol (5)	Stem	8
Viridiflorol (6)	Stem	8
Bicyclogermacrene/Cordinol (7)	Stem	8
δ-Cedrol (8)	Stem	8
Jatamansone/Valeranone (9)	Stem	8
Valerenal (10)	Stem	8
Valerenic acid (11)	Stem	8
Megastigma-4,6*E*, 8*E* triene (12)	Stem	8
Hexadecanoic acid (13)	Stem	8
9,12-Octadecadienoic acid (14)	Stem	8
9-Octadecenoic acid ethyl ester (15)	Stem	8
1-Docosene (16)	Stem	8
1-Tricosanol (17)	Stem	8
Ethyl docosanoate (18)	Stem	8
Octacosane (19)	Stem	8
***n*-Hentriacontanol-1 (20)**	Stem	8
Linoleic acid (21)	Seed oil	10
Linolenic acid (22)	Seed oil	10
Oleic acid (23)	Seed oil	10
Palmitic acid (24)	Seed oil	10
Stearic acid (25)	Seed oil	10

Compound (Str. No.)	Plant part	Reference
Lignoceric acid (26)	Seed oil	10
1,2-Benzenedicarboxylic acid (27)	Stem	8
Di-*N*-Octyl phthalate (28)	Stem	8
β-Sitosterol (29)	Stem, seed oil, flowers	8, 11-12
β- Sitosterol-3-*O*-β-glucopyranoside (30)	flowers	13
Cholesteryl propanoate (31)	Stem	8
Cholesta-4,6-dien-3-ol, benzoate (32)	Stem	8
Cholest-4-ene-3,6-dione (33)	Stem	8
Stigmast-4-en-3-one (34)	Stem	8
Stigmasterol (35)	Seed oil	11
Stigmasterol-3-*O*-β-D-glucopyranoside (36)	flowers	13
Ergost-5-en, 3-ol (37)	Seed oil	11
Campesterol-3-*O*- β-D- glucopyranoside (38)	flowers	13
Lupeol (39)	Stem, flowers	8,12
Phytol (40)	Seed oil	11
Vitamin E acetate (41)	Stem	8
Bergenin (42)	Flowers, sap wood	8, 14-17
5-Hydroxy-7-methoxy-2-(3,4-dihydroxy)- phenoxychromone (43)	Leaves	18
5-Hydroxy-7-methoxy-2-(3′-*O*-β-glucopyranosyl, 4′-hydroxy) phenoxychromone (44)	Leaves	18
Naringenin (45)	Leaves	18
Naringenin-7-glucoside (46)	Flower	19
Ophioglonin (47)	Leaves	18
7-Methoxy ophioglonin (48)	Leaves	18
Kaempferol (49)	Leaves	18
Isorhamnetin (50)	Leaves	18
Luteolin (51)	Leaves	18
Chrysoeriol (52)	Leaves	18
3,3′-Dimethylquercetin (53)	Leaves	18
3,7-Dimethylquercetin (54)	Leaves	18
Quercetin-3-*O*-β-D-galactopyranoside (55)	Leaves	20
Quercetin (56)	Fruits	18, 21
Pachypodol (57)	Leaves	18
Rhamnetin (58)	Fruits	18, 21
Melanoxetin (59)	Fruits	18, 21
Meratin (60)	Fruits	18, 21
(-)-Epicatechin (61)	Sap wood	8, 16-17
Propelargonidin (62)	Fruits	18, 21
(+)-Leucocyanidin (63)	Bark, sap wood	8, 16-17, 22
Leucocyanidin-3-*O*-α-D-galactopyranoside (64)	Bark	23
(*E*,*E*)-Terrestribisamide (65)	Flowers	24
Lysine (66)	Seeds	25
Aspartic acid (67)	Seeds	25
Glutamic acid (68)	Seeds	25
Serine (69)	Seeds	25
Glycine (70)	Seeds	25
Alanine (71)	Seeds	25
Cystine (72)	Seeds	25
Phenylalanine (73)	Seeds	25
Valine (74)	Seeds	25
Methionine (75)	Seeds	25
Leucine (76)	Seeds	25
Isoleucine (77)	Seeds	25
Arginine (78)	Seeds	25
Histidine (79)	Seeds	25
Proline (80)	Seeds	25
Tyrosine (81)	Seeds	25
Tryptophan (82)	Seeds	25
Peltopterin (a protein)	Seeds	26



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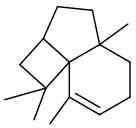

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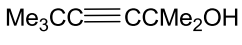

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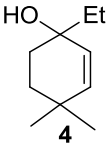

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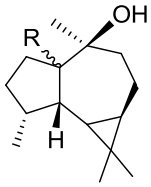
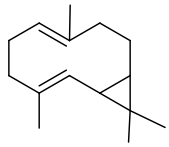


5: R=H (β)
6: R=H (α)



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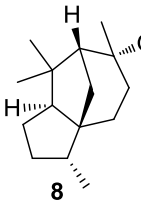

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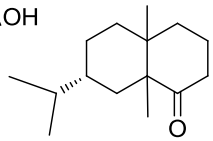

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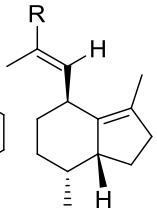
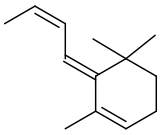
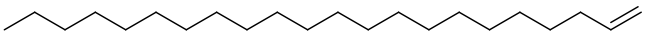


10: R=CHO
11: R=COOH



12

$Me(CH_2)_nCOOR$
13: n=14, R=H
14: n=16 (9,12-diene), R=H
15: n=16 (9-ene), R=Et



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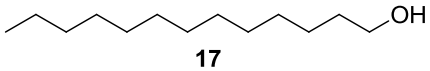

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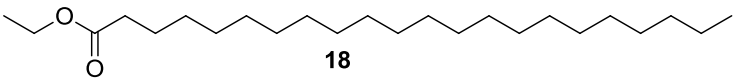
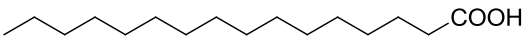


18

$Me(CH_2)_nMe$
19: n=26

$Me(CH_2)_nCOOH$
21: n=16 (9Z,12Z-diene)
22: n=16 (9Z,12Z,15Z-triene)
23: n=16 (9Z-ene)



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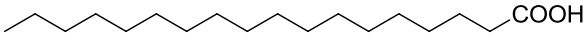

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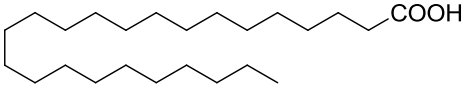

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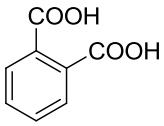

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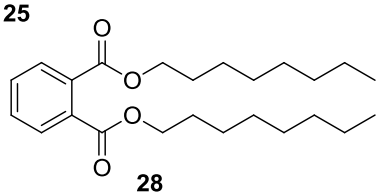

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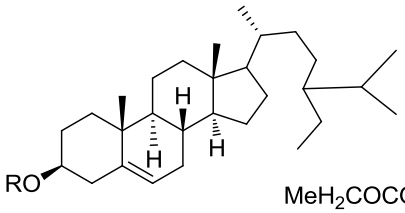
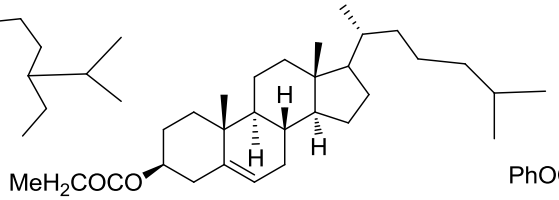
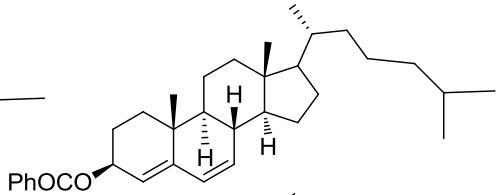




29: R=H
30: R=β-D-glucopyranosyl

31



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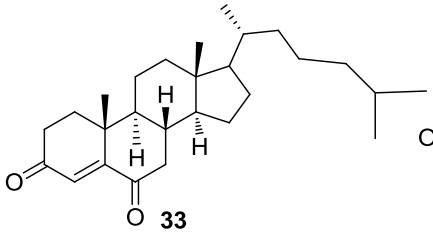

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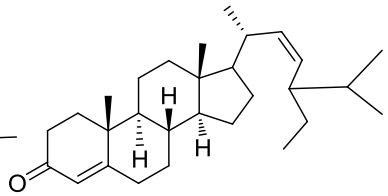

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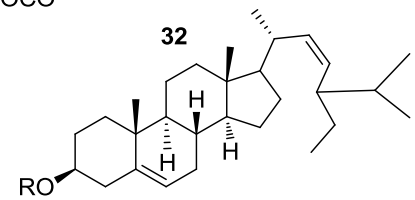
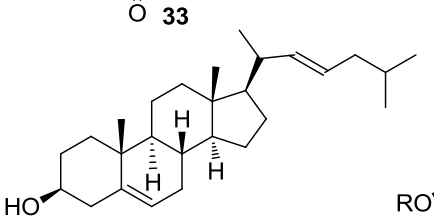


35: R=H
36: R=β-D-glucopyranosyl



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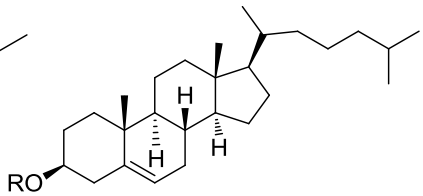
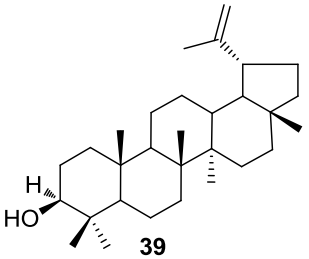


38: R=β-D-glucopyranosyl



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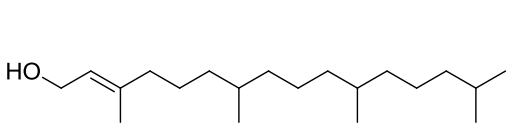

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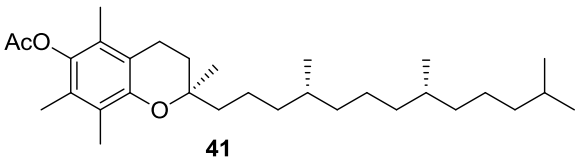

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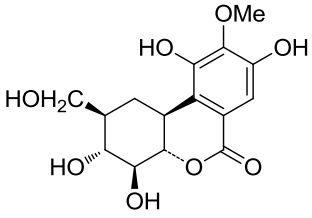

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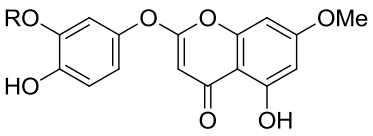
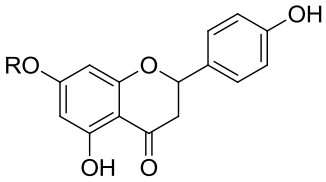
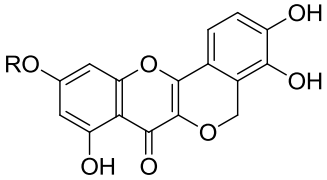


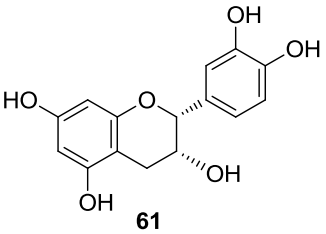
43: R=H
44: R=β-D-Glc



45: R=H
46: R= β-D-Glc



47: R=H
48: R=Me



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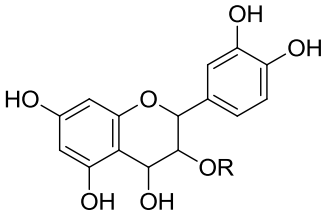
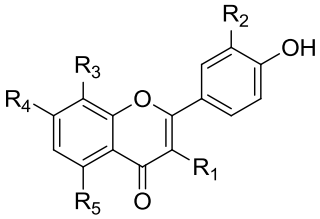
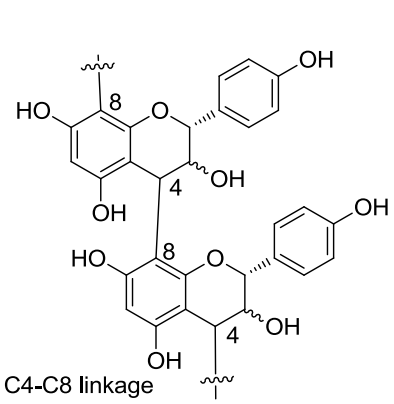


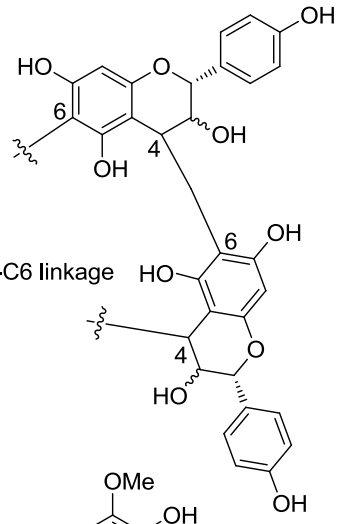
63: R=OH
64: R=α-D-Gal



49: R_1=R_4=R_5=OH, R_2=R_3=H
50: R_1=R_4=R_5=OH, R_2=OMe, R_3=H
51: R_1=R_3=H, R_2=R_4=R_5=OH
52: R_1=R_3=H, R_2=OMe, R_4=R_5=OH
53: R_1=R_2=OMe, R_3=R_4=R_5=OH
54: R_1=R_4=OMe, R_2=R_5=OH, R_3=H
55: R_1=β-D-Gal, R_2=R_4=OH, R_3=R_5=H
56: R_1=R_2=R_4=OH, R_3=R_5=H
57: R_1=R_2=R_4=OMe, R_3=H, R_5=OH
58: R_1=R_2=R_5=OH,R_3=H, R_4=OMe
59: R_1=R_2=R_3=R_4=OH, R_5=H
60: R_1=diGlc, R_2=R_4=OH, R_3=R_5=H

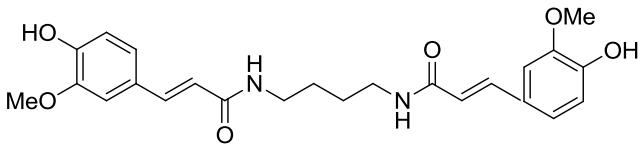


C4-C8 linkage

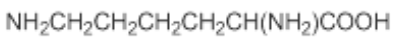


C4-C6 linkage

62



65



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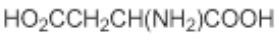
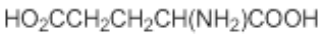
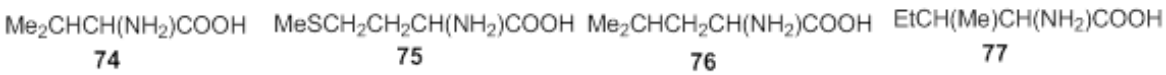


67

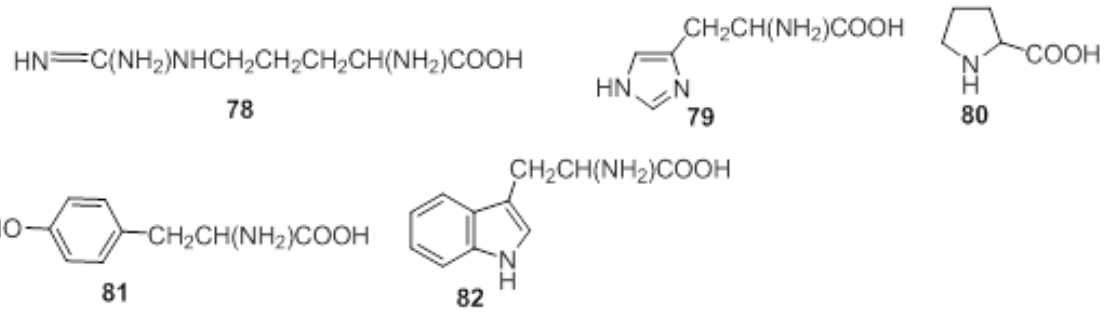


68

69 **70** **71** **72** **73**



74 **75** **76** **77**



Biological activities exhibited by the plant and plant constituents: Various biological activities exhibited by both the crude plant extracts and isolated chemical constituents are described categorically under the following sub-sections:

1. **Anti-microbial activity:** Preliminary phytochemical screening of methanol extract of *P. pterocarpum* flower as investigated by Sukumaran *et al* [27] showed the presence of phenolic compounds, flavonoids, saponins, steroids, tannins, xanthoproteins, carboxylic acids, coumarins and carbohydrates. The investigators also reported that flower extract of this plant exhibited significant activity against four Gram-positive (*Staphylococcus aureus, Bacillus cereus, Enterococcus faecalis* and *Streptococcus pyogenes*) and three Gram-negative bacteria (*Proteus mirabilis, Acinetobacter baumannii* and *Serratia marsecens*), out of 12 pathogenic bacteria studied [27].

   Bergenin (**42**), isolated from methanol fraction of *P. pterocarpum* flowers, is found to show antifungal activity against *Trichophyton mentagrophytes*, *Epidermophyton floccosum*, *Trichophyton rubrum*, *Aspergillus niger* and *Botrytis cinerea* having MIC value of 250, 500, 500 & 250 µg/mL, respectively. However, this compound (**42**) was unable to show any antibacterial activity [14].

   Chew *et al* [28] reported that aqueous methanol and dichloromethane extract of flowers and leaves of *P. pterocarpum* exhibited antibacterial activity against two strains of methicillin resistant *S. aureus* with MID (Minimum inhibitory dose) values ranging between 100 µg/disc and 500 µg/disc. Nathan *et al* [10] investigated antibacterial activity of *P. pterocarpum* methanolic flower extract against the bacteria isolated from human infections like *Salmonella typhi*, *Staphylococcus aureus*, *Proteus mirabilis*, *Bacillus subtilis* and *Escherichia coli* following well diffusion method and found that the extract showed higher potency against *P. mirabilis* followed by *Salmonella typhi*. The methanolic extract of the plant showed promising antibacterial study against *B. subtilis*, *P. vulgaris* and *K. pneumonia* among the nine bacterial strains tested at concentrations 1.25, 2.5 and 5 mg/disc respectively [29]. The extract was also found to show significant antifungal activity against the fungal strain, *Candida albicans*. Organic extracts (Petroleum ether, dichloromethane, ethylacetate and methanol) of stems of the plant exhibited antibacterial activity a number of Gram-positive and Gram-negative bacteria [8].

   Maximum antimicrobial inhibition was demonstrated by ethyl acetate extract against *B. subtilis*, *Pseudomonas aeruginosa* and *S. aureus* having MIC of 31.25, 31.25 and 125 µg/mL, respectively [8]. Flower extract at a dose of 200 µg/disc of the plant was found to show antimicrobial activity against a number of *Gram*-positive and *Gram*-negative bacteria [13]. The highest zone of inhibition was found against *E. coli* and *B. subtilis* (18 ± 0.02 and 18 ± 0.11 mm, respectively), followed by *Bacillus megatherium* and *Shigella boydii* (zone of inhibition of both 15 and 17 mm, respectively) whereas the moderate activity was shown against *Pseudomonas aeruginosa, Shigella flexneri, Bacillus cereus* and *Bacillus anthracis* [13].

   Ethanolic extract of the plant shows high bactereostatic and bactericidal activities as investigated by a research group [30]. Vadlapudi reported [31] that methanol extract of the plant (whole plants) at a concentration of 100 mg/mL

exhibited promising antimicrobial activity against a number of plant pathogens such as *A. alternate*, *A. flavus*, *R. solani* and *X. compestries* with zone of inhibition value 22, 15, 15 and 20 mm, respectively measured in agar well disc diffusion technique [31].

Organic extracts of *P. pterocarpum* flowers were found to show antibacterial as well as antifungal activity against a number of pathogens [32]. The ethylacetate extract exhibited maximum antibacterial activity against *S. aureus* and *E. aerogens* with zone of inhabitation value 16.00 ± 0.57 and 15.33 ± 0.32 mm, respectively, while dichloromethane extract was active against *R. planticola* and *E. aerogens* with zone of inhabitation value 15.66 ± 1.19 and 14.66 ± 0.66 mm, respectively.

On the other hand, ethyl acetate extract was found to show appreciable antifungal activity against *T. rubrum* and *P. crysogenum* having equal zone of inhabitation value of 15 mm [32]. A research group [33] suggested that ethanol and ethyl acetate extracts of *P. pterocarpum* can be used as herbal medicines in the control of *E. coli* and *S. aureus* induced medical diseases based on their investigation on antibacterial activity of organic extracts of the plant against such bacteria. The investigators also reported that organic extracts are also effective against the fungus, *C. albicans* [33].

Organic extracts of *P. pterocarpum* flowers and shoots in the concentration range of 1.25 to 2.5 mg/mL were reported to exhibit antibacterial activity against a number of Gram-positive and Gram-negative bacteria [34]. The investigators also pointed out that flower part showed greater efficacy than shoot part and ethyl alcohol extract exhibited highest activity than the other extracts.

Terrestribisamide (**65**), isolated from methanol extract of flower part of the plant, showed moderate antimicrobial activity against a number of tested strains including fungi, Gram-positive and Gram-negative bacteria [24]; the compound showed MIC value of 200 µg/mL for *B. subtilis*, *S. epidermidis*, *M. luteus*, *E. coli* (ESBL-3904), *E. coli* (ESBL-3984), *M. pachydermatis*, and *C. albicans*.

These experimental results get nice correlation with a previous investigation [30] where antimicrobial activity of methanol extract of *P. pterocarpum* flowers was found against *B. subtilis*, *S. aureus*, *S. epidermidis*, *E. faecalis*, *E. coli*, *P. aeruginosa*, *K. pneumoniae*, *P. vulgaris*, and *C. albicans* at the concentration of 5 mg/mL. Lam & Ng [26] isolated an amidase, peltopterin, from *P. pterocarpum* seeds and found its antifungal activity against *Rhizotonia solani* in the pH range 0–14 and temperature range of 25–100°C [26]. This amidase impeded mycelial growth of this fungus with an IC_{50} of 0.65 µM.

2. **Anti-oxidant activity:** Leave and flower extracts of *P. pterocarpum* are found to exhibit antioxidant activity against DPPH radical; leaf extract being more active than flower extract [28]. Ethanolic and aqueous extracts of different parts of the plant are assessed for their antioxidant efficacies against DPPH, galvinoxyl and ABTS radicals and found that among the four plant parts investigated (leaf, bark, flower and pod), the free radical scavenging activity was the highest in the bark (EC_{50} value of 0.1 ± 0.04, 0.01 ± 0.02, 0.11 ± 0.04 mg/mL, respectively), whereas ethanolic extract being more active than aqueous extract [20].

   Ethanolic and aqueous extracts of both bark and leaf were found to exhibit antioxidant activity against DPPH radical [35]; ethanolic extract of leaf exhibited IC_{50} value of 0.17 ± 0.12 mg/mL. Methanolic extract of *P. pterocarpum* bark containing carbohydrates, proteins, amino acids, glycosides, triterpinoids, flavonoids and phenolics, is found to prevent significantly D-galactose induced oxidative stress and scopolamine induced memory impairment in rats [36].

   The extract is also found to reduce AChE activity, serum biochemical parameter glucose, total cholesterol and reverse in the degenerative changes in the histopathological study of the rat brain and the increased activity of lipid peroxidation. Furthermore, the extract is found to increase activity of brain antioxidant enzymes such as catalase, super oxide dismutase, glutathione of the tested animal [36].

It was reported [20] that both the leaf and bark extract (ethanol and aqueous) exhibited lipid peroxidation inhibition activity; the ethanolic extract displayed 1.5-fold and aqueous extract 1.8-fold higher inhibition activity compared to the commercial grape seed extract. The presence of flavonoids in these plant parts may be responsible for exhibiting this activity [20].

Terrestribisamide (**65**), isolated from methanol extract of flower part of the plant, exhibited potent antioxidant activity at 1 mg/mL concentration against DPPH, cupric ion reducing antioxidant capacity (CUPRAC) assay, and ferric reducing antioxidant power (FRAP) assay [24].

3. **Cytotoxic activity:** The alkaloid, Terrestribisamibe (**65**), showed prominent *in vitro* cytotoxic activity against COLO320 colorectal adenocarcinoma cell line. It showed 83.22 % activity at the dose of 200 µg/mL with an IC_{50} value of 50 µg/mL [24].

4. **Antiglycemic activity:** It was reported [20] that the *P. pterocarpum* plant parts (leaf, bark, flower and pod) exhibited significant α-glucosidase inhibition activity in both the aqueous and ethanolic extracts compared to acarbose used as the positive control; ethanolic and aqueous extracts of leaf and bark showed the highest inhibition activities while the ethanolic extracts of flower and pod were more effective than aqueous extracts. All plant parts exhibited a far higher α-glucosidase inhibition activity compared to acarbose.

   The investigators also reported that leaf and bark extracts exhibited higher α-amylase inhibitory activity compared to acarbose and the ethanolic extracts of the plant parts displayed both these activities higher compared to its aqueous extracts. The authors also found that the ethanolic extracts of bark exhibited both these activities greater compared to the other plant parts investigated in their study.

   They are in opinion that the high content of tannins in bark may be responsible for this activity due to its non-specific absorption of proteins [20].

   A research group [37] reported that methanol: ethyl acetate (1:9) of root extract of *P. pterocarpum* which includes different types of compounds including flavonoids and steroids has significant activity in lowering fasting blood glucose level in alloxan and glucose induced diabetic mice.

5. **Aldose reductase (AR) inhibition activity:** Inhibition of the aldose reductase activity has been reported to reduce the complication of diabetes such as retinopathy, neuropathy, nephropathy, and cataracts [38].

   Ethanolic extracts of *P. pterocarpum* leaf and bark were found to be 28-fold and 56-fold more effective, respectively, in inhibiting aldose reductase activity compared to quercetin. Therefore, the plant may be used effectively in hyperglycemia management [20].

6. **Miscellaneous activity:** A research group [18], using different model cell systems, revealed that ophioglonin (**47**) has estrogenic activity. They also reported that, although, 7-methoxy ophioglonin (**48**) is unable to stimulate the proliferation of breast and endometrial cancer cells but exhibited substantial estrogen receptor α-mediated activation of gene expression. This observation predicts the prospects of 48 as future anticancer drug [18].

   Petroleum ether and ethanol extracts of *P. pterocarpum* flowers were found to exhibit cardiotonic activity on frog heart [39]; Petroleum ether extract produced significant positive inotropic and positive chronotropic actions (as adrenaline) by increasing force of contraction and the heart rate whereas, ethanol extract produced significant positive inotropic but slightly negative chronotropic effect (as digoxin) increasing force of contraction and decreasing in the heart rate. The investigators are in opinion that this cardiotonic activity may be due to the presence of mixture of steroidal glycosides such as β-sitosterol-3-*O*-β-D-glucopyranoside (**30**), stigmasterol-3-*O*-β-D-glucopyranoside (**36**) and campesterol-3-*O*-β-D-glucopyranoside (**38**), reported to be present in the flower parts of the plant [39].

Taiwo *et al* [40] investigated cholinesterase inhibitory activity of methanolic extract of the leaves, root bark and stem bark of *P. pterocarpum* using eserin as reference and found that stem-bark gave the highest activity (68.85±3.53%) and better selectivity towards acetylcholinesterase (AChE) at a dose of 42.5 µg/mL followed by the root bark which inhibited both AChE and butyrylcholinesterase (BuChE) with inhibition percentage of 48.46 ± 4.47 and 51.77 ± 2.20, respectively and then the leaves (inhibition values of 47.50 ± 2.41 and 48.91 ± 0.71%, respectively).

The investigators also concluded that the plant may be used for the treatment of memory dysfunctions and neurodegenerative disorders such as Alzheimer's disease [40]. A research group [41] investigated anti-proliferative activity on HeLa cancer cell line of the aqueous extract of the plant by SRB assay and found significant activity compared to standard anticancer drug cis-platin.

Biswas *et al* [42] reported that 70% ethanolic extract of *P. pterocarpum* leaves may have the potential therapeutic value in the treatment of paracetamol induced hepatic damage and some liver diseases of Wistar albino rats. They found that this extract at 100 mg/Kg and 200 mg/Kg doses significantly reduced the elevated levels (after administration of Paracetamol) of biochemical markers like SGPT, SGOT, ALP, bilirubin (total and direct), total cholesterol, triglycerides and depleted tissue GSH [42].

CONCLUDING REMARKS: The present article deals with an up-to-date review on the chemistry and pharmacology of *Peltophorum pterocarpum*, a useful medicinal plant from Fabaceae family finding applications in indigenous systems of medicine. The plant is used in different parts of the world for the treatment of stomatitis, insomnia, constipation, ringworm, dysentery, muscular pains, sores, and skin disorders. Different class of chemical constituents including aliphatic alcohol, fatty acids, amino acids, terpenoids, phenolics, flavonoids, alkaloids, steroids are reported to be present in this plant. The isolated phytochemicals as well as different extracts of the plant exhibited numerous biological activities. Hence, up-to-date information on the chemical and pharmacological knowledge on this plant may be helpful to guide researchers anticipating to undertake further investigations on this plant and we do anticipate that the present overview would boost the on-going development in this direction.

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ABBREVIATIONS:

ABTS : 2, 2-Azobis-(3-ethylbenzothiozoline-6-sulphonic acid)
AChE : Acetylcholinesterase
ALP : Alkaline phosphatase
AR : Aldose Reductase
BuChE : Butyrylcholinesterase
COLO320: Colorectal Adenocarcinoma Cell Line
CUPRAC: Cupric Ion Reducing Antioxidant Capacity
DPPH : Diphenylpicrylhydrazyl
FRAP : Fluorescence Recovery after Photo bleaching
GSH : Glutathione
MIC : Minimum Inhibitory Concentration
MID : Minimum Inhibitory Dose
SGOT : Serum Glutamic Oxalo acetic Transaminase
SGPT : Serum Glutamic-Pyruvic Transaminase
SRB : Sulforhodamine B

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