SUMMARY

Pachaimalai hills are a part of Eastern Ghats which are situated at the central region of Tamil Nadu, India. An ethnobotanical survey was carried out in Pachaimalai hills to document indigenous knowledge management at Pachaimalai, rich in both cultural and biodiversity contents. The triabal women and men of this area are well known for their knowledge of the medicinal properties of the entire flora. In the present study, 92 species of plants included 86 genera and 45 families were recorded which are being exploited by the Malayali tribal group for different human ailments.

The ethno floristic composition of the study area is dominated by angiosperms. Among the 45 families, 92 plant species, 43 families belonging to dicotyledons having 89 plant species, 2 families of monocotyledons with 3 plant species. The family wise analysis of the ethnic species revealed that 92 species belonging to 45 families. The maximum number of 13 species reported in families Leguminaceae. The shrubs are rated for higher medicinal value (36.36%) than the herbs, trees, and climbers. Leaf is the most useful part when compared to other parts like root, stem, and seed. Frequent field survey and regular personal interviews revealed more than hundred diseases could be treated with 92 medicinal plants in the study area. More prevalent diseases are wound, skin diseases, jaundice, fever, rheumatism, dysentery, piles, diabetes, asthma, head ache ulcer, etc.

Swietenia mahagoni is widely used among the malayali tribes of Pachaimalai hills to treat various ailments. The various parts of Swietenia are medicinally valuable. In the present study, the air dried and powdered leaves, stembark and fruits of Swietenia mahagoni were successively extracted with acetone, methanol and water. The acetone extraction recorded the high amounts of solids recovered. The preliminary phytochemical screening of the extracts reveals the presence of alkaloids, flavonoids, steroids and sterols, saponin, tannins, phenolic compounds, glycosides, carbohydrate, protein and amino acids. The methanol extraction was more efficient where most of the said phytochemicals were present. The total phenolic and tannin contents were maximum in methanol extract of stem bark (543.53 ± 3.46 mg TAE/g extract and 525.79 ± 7.48 mg TAE/g extract respectively).
The highest concentration of flavonoids was present in the methanol and water extract of fruit powder (22.27 ± 3.41 mg RE/g extract & 22.27 ± 1.75 mg RE/g extract respectively).

The different solvent extracts of S. mahagoni leaf, stem bark and fruits were evaluated for antioxidant and free radical scavenging capacities using various chemical assays. In all the free radical scavenging models (DPPH*, OH*, NO*, O₂*) the extracts exhibited dose dependent increase in activity. The methanol extract of the stem bark showed the higher DPPH* (IC₅₀ of 24.76 ± 0.09 µg/ml) and OH* (IC₅₀ of 18.87 ± 0.05 µg/ml) scavenging activities. The acetone and methanol extracts of stem bark exhibited maximum superoxide (IC₅₀ 22.09 ± 0.04 µg/ml and 32.70 ± 0.03 µg/ml respectively) and nitric oxide (26.47 ± 0.02 µg/ml and 26.49 ± 0.03 µg/ml respectively) radical scavenging abilities and metal chelating ability (681.27 ± 8.77 mg EDTA/g extract and 664.30 ± 12.83 mg EDTA/g extract) compared to other samples tested. The results revealed that all extracts exhibited reducing power at a dose of 20 µg/ml.

The acute toxicity study of the ethanolic extract of S. mahagoni stem bark was carried out in mice model. The oral administration of the ethanolic extract did not produce mortality or any signs of toxicity at any of the doses tested (up to 4000 mg/kg p.o.), indicating fairly high margin of safety. Antiinocceptive activity of the ethanolic extract of S. mahagoni leaves was evaluated against acetic acid induced writhing in mice. Ethanol extract of S. mahagoni (200 and 400 mg/kg, i.p.) leaf in a dose-dependent manner, significantly reduced the number of acetic acid-induced writhes. Further, the anti-inflammatory activity of the ethanolic extract of S. mahagoni leaf (at dose levels of 200 and 400 mg/kg bw) were evaluated for anti-inflammatory activity against carrageenan induced paw edema and cotton pellet-induced granuloma pouch model. The oral administration of ethanolic extract (200 and 400 mg/kg) significantly inhibited edema formation in rats in a dose dependant manner. At the dose of 400 mg/kg, it inhibited edema formation to an extent of 47.39% (at 240 min). Carrageenan induction significantly elevated lipid peroxidation level with concomitant decreases in the activities of the antioxidant marker enzymes such as superoxide dismutase (SOD), catalase (CAT), glutathione peroxidase (GPx) and glutathione-S-transferase (GST). On the other hand, treatment
with the ethanolic extract significantly restored the antioxidant enzyme levels in a
dose dependant manner. The higher dose of 400 mg/kg of extracts showed a
comparable activity to that of the standard drug indomethacin (10 mg/kg).

The hepatoprotective efficacy of the ethanol extract of S. mahagoni leaves
was evaluated against paracetamol induced hepatic damage in Wistar albino rats.
Paracetamol at 750 mg/kg (p.o) significantly enhanced the activity of the serum
marker enzymes viz., SGOT, SGPT and ALP. Besides, the level of bilirubin was
also increased while the serum protein decreased, indicating hepatic injury.
However, co-administration of the crude drug significantly restored the enzyme
levels on a par with the control group in a dose dependant manner. To elucidate its
possible mode of action, the antioxidant activity of the test drug was also
investigated in vivo. Oral administration of paracetamol caused significant elevation
of lipid peroxidase level with concominant decrease in the activities of antioxidant
enzymes such as SOD, CAT, GPx and GST. On the other hand, S. mahagoni
extracts significantly restored the antioxidant enzyme levels. The hepatoprotective
and antioxidant effects of S. mahagoni were statistically comparable with that of
standard drug, silymarin.

These findings could justify, at least partially, the ethnomedicinal use of this
plant in the management of pain, inflammation and liver disorders. Further studies
are warranted for the isolation and identification of bioactive compounds and their
mechanism of action as a phytodrug.