

Pharmacognostical, Phytochemical and Biological Studies of Leaves and Stems of Hippophae Salicifolia

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Abstract : Background: *H. salicifolia* is a dense, branched, multipurpose, deciduous, nitrogen fixing, thorny willow-like small to moderate tree, restricted to the Himalaya. Among the two species of Nepal (*Hippophae salicifolia* and *H. tibetana*), it has been traditionally used as food additive, anticancer (bark), and treating toothache, tooth inflammation (anti-inflammatory) and radiation injury; while people of Western Nepal have largely undermined its veiled treasure by using it for fuel, wood and soil stabilization only. Therefore, the main objective of this study was to explore biological properties (analgesic, antidiabetic, cytotoxic and anti-inflammatory properties) of this plant. Methodology: The transverse section of leaves and stems were viewed under microscope. Extracts obtained from soxhlation subjected to tests for phytochemical and biological studies. Rats (used to study antidiabetic and anti-inflammatory properties) and mice (used to study analgesic, CNS depressant, muscle relaxant and locomotor properties) were assumed to be normally distributed; then ANOVA and post hoc tukey test was used to find significance. The data obtained were analyzed by SPSS 17 and Excel 2007. Results and Conclusion: Pharmacognostical analysis revealed the presence of long stellate trichomes, double layered vascular bundle 5-6 in number and double layered compact sclerenchyma. The preliminary phytochemical screening of the extracts was found to exhibit the positive reaction tests for glycoside, steroid, tannin, flavonoid, saponin, coumarin and reducing sugar. The brine shrimp lethality bioassay tested in 1000, 100 and 10 ppm revealed cytotoxic activity inherent in methanol, water, chloroform and ethyl acetate extracts with LC50 ($\mu\text{g/ml}$) values of 61.42, 99.77, 292.72 and 277.84 respectively. The cytotoxic activity may be due to presence of tannins in the constituents. Antimicrobial screening of the extracts by cup diffusion method using *Staphylococcus aureus*, *Escherichia coli* and *Pseudomonas aeruginosa* against standard antibiotics (oxacillin, gentamycin and amikacin respectively) portrayed no activity against the microorganisms tested. The methanol extract of the stems and leaves showed various pharmacological properties: and antidiabetic, anti-inflammatory, analgesic [chemical writhing method], CNS depressant, muscle relaxant and locomotor activities in a dose-dependent fashion, indicating the possibility of the presence of different constituents in the stems and leaves responsible for these biological activities. All the effects when analyzed by post hoc tukey test were found to be significant at 95% confidence level. The antidiabetic activity was presumed to be due to flavonoids present in extract. Therefore, it can be concluded that this plant's secondary metabolites possessed strong antidiabetic, anti-inflammatory and cytotoxic activity which could be isolated for further investigation.

Keywords : Hippophae salicifolia, constituents, antidiabetic, inflammatory, brine shrimp

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