

The ethanolic root extract showed antinociceptive, cytotoxic and antioxidant activity (Rahman et al. 2007). Extracts of leaf, flowers and seeds exhibited potent larvicidal activity against mosquitos (Kamaraj et al. 2009). Isolated diterpenes showed prostaglandin-induced inhibitory activity (Sadhu et al. 2006), isolated flavonoids and lignins possess antioxidant and prostaglandin inhibitory activity (Sadhu et al. 2003). Whole-plant is traditionally used for analgesic, antipyretic, antirheumatic, anti-inflammatory, antibacterial and antifungal treatment and its paste is applied topically to inflamed areas (Gani 2003; Prajapati et al. 2010).

16.1.3 SECONDARY METABOLITES IN *L. ASPERA*

Whole-plant is reported for the presence of ursolic acid, oleanolic acid and 3-sitosterol (Chaudhury and Ghosh 1969). Aerial parts contains nicotine (Mangathayaru et al. 2006), sterols (Khaleque et al. 1970), alkaloids such as α -sitosterol and β -sitosterol, reducing sugars such as galactose and glucoside (Chatterjee and Majumdar 1969), diterpenes, leucasperones A and B, leucasperols A and B and isopimarane glycosides; together with other compounds like asperphenamate, maslinic acid, (-)-isololiolide, linifolioside (Sadhu et al. 2006), nectandrin B, macelignan, meso-dihydroguaiaretic acid, acacetin, chrysoeriol, apigenin and machilin C, (-)-chicanine, (7R,8R) and (7S,8S)-licarin A (Sadhu et al. 2003). Among the 25 compounds identified from its leaves, major constituents are u-farnesene (26.4%), x-thujene (12.6%) and menthol (11.3%) (Sadhu et al. 2003). The flowers contain 10 compounds; among them, amyl propionate (15.2%) and isoamyl propionate (14.4%) are dominant (Kalachaveedu et al. 2006). The seed contains linoleic acid (48.11%), oleic acid (42.07%), palmitic acid (6.25%), stearic acid (2.84%) and linolenic acid (0.65%). The unsaponifiables fraction contains 3-sitosterol and ceryl alcohol (Jam et al. 1968; Badami et al. 1975). The shoots contain novel phenolic compounds (4-(24-hydroxy-1-oxo-5-*n*-propyltetracosanyl-phenol) (Misra et al. 1995), aliphatic ketols (28-hydroxypentatriacontan-7-one, 7-hydroxydotriacontan-2-one), long chain compounds (1-hydroxytetatriacontan-4-one, 32-methyltetatriacontan-8-ol), nonatriacontane, 5-acetoxytriacontane, β -sitosterol and dotriacontanol (Misra et al. 1992). Leucolactone (I) isolated from the root has been characterized as 3,3,16c-dihydroxyoleanan-28-1,3-oliden (Pradhan et al. 1990).

16.2 MATERIALS AND METHODS

16.2.1 CHEMICALS AND REAGENTS

(NH₄)₂NO₃, KNO₃, CaCl₂·2H₂O, MgSO₄·7H₂O, KH₂PO₄, MnSO₄·4H₂O, ZnSO₄·7H₂O, H₃BO₃, Na₂MoO₄·4H₂O, CuSO₄·5H₂O, CoCl₂·6H₂O, Na₂EDTA, KI, FeSO₄·7H₂O, thiamine HCl, pyridoxine HCl, nicotinic acid, meso-inositol, glycine, sucrose, agar, 2,4-dichlorophenoxyacetic acid (2,4-D), indole-3-acetic acid (IAA), indole-3-butyric acid (IBA), naphthalene acetic acid (NAA), benzyl amino purine (BAP), kinetin (KIN), gibberellic acid GA₃, dimethyl sulfoxide (DMSO), phosphate buffer saline (PBS) hexane, ethyl acetate, acetone, chloroform and carbinol were all present. Analytical grade chemicals were supplied by Hi-Media, SRL, Merck and Sigma chemicals.