Aegiceras corniculatum Linn (Myrsinaceae)

Karnati Rajeswari and T. Bhaskara Rao

Department of Chemistry, K. L. University, Vaddeswaram, Guntur

ABSTRACT

In this review, the literature data on photochemical and biological investigations of the Aegiceras are compiled. The Aegiceras species are mangroves plants widely distributed along the sea coasts of Africa, South east Asia to South china, New Gunea and Australia. To date 16 Terpenoids, 17 Terpenes, 9 Alkaloids, 1 Flavonoid, 3 Saponnins, 7 Tannins, 23 Acids, 9 polyketides, 7 Macrolides. From the Fruits, stems and Twigs, Bark, Leaves of Aegiceras. The isolated compounds shown an enorms structural diversity and bacterial and In Vitro blocking activity Cytotoxicity.

Key words: Aegiceras, Isolated Compounds, Biological Activity studies.

INTRODUCTION

The Aegiceras Commonaly known as Black Mangrove, river Mangrove or Khalsi, is a species of shrub or tree Mangrove in the Myrsine family with a distribution in costal and esturine areas rangings from India through southeastasia to southeren china, New Genea and Australia.
2. Chemical Constituents

To date Terpenoids 1-16 including Monoterpenoids 1-12 and Triterpenoids 13-33 including Triterpenes and Alkaloids 34-43 and Flavonoids 43-44 and Saponins 45-48 and Tannins 49-55 and Acids 56-78 and Polyketides 79-87 and Macrolides 88-94 have been reported from Fruits, Bark, Stems and Twigs, Leaves and Aerial parts of Aegiceras Corniculatum. Names of compounds and their corresponding plant sources are compiled in the Table.

2.1 Terpenoids

2.1.1 Mono Terpenoids


2.2 Terpenes

2.2.1 Triterpenes

Science 2012 17-33 Terpenes including Triterpenes its new indol triterpenes named Sharinines D-K [18-25] along with Shearinine A [26], Paspalitrem A [27], Paspaline E [28] was established in 2007 [9]. A new Oleane Triterpene from the stem of the Aegiceras Corniculatum 16a-hydroxy-13,28-epoxy oleane 3-one [29] and it has been identified from the stem of the plant in 2013[11]. From the stems and twigs of the Aegiceras Corniculatum four new compounds 2,7-dihydroxy-8-methoxy-3,6-diundecyl dibenzofuran-1,4-dione [30], 2,8-dihydroxy-7-methoxy-3,9-di undecyl di benzofuran-1,4-dione [31], 10-hydroxy-4,0-methyl-2,11-di undecyl gomphilactone [32], 5-o-methyl embelin [33]. In 2004[12].

2.3 Alkaloids

Several unusual alkaloids N-2-methylpropyl-2-methylbutenamide [34], 2-acetyl-1,2,3,4-tetrahydro-β-carboline [35], Fusarine [36], 3-(1-amo ethylidine)-6-methyl-2H-pyran-2,4(3H)-dione [37], Fusamine [38] were isolated from the Fruits of Aegiceras Corniculatum in 2012 [4]. And then new pyrrole alkaloids N-[4-(2-formyl-5-hydroxy methyl pyrrole-1-yl) butyl]-acetamide [39], N-[5-(2-formyl-5-hydroxy methyl pyrrole-1-yl)-pentyl]-acetamide [40] and a new indole derivative (3aR,8aR)-3a-acetoxy-1,2,3,3a,8a-hexahydro pyrrolo-(2,3-b) indol [41] and derivatives of indol (3aR,8aS)-1-acetyl-1,3,3a,8a-hexahydro pyrrolo-(2,3-b) indol-3a-oil [42]. N-acetyl tryptamine A [43] was identified from the leaves of the Aegiceras Corniculatum in 2008 [7].

2.4 Flavonoids

Science 2013 Isorhamnetin [44] was identified from the bark of the Aegiceras Corniculatum [11].

2.5 Saponins:

From the stems and twigs of the Aegiceras Corniculatum four new saponin type compounds namely 2-methoxy-3-nonyl resorcinol [45], 5-o-ethylembelin [46], 2-o-acetyl-5-o-methylembelin [47], 3,7-dihydroxy 2,5-di undecyl napthaquinone [48] have been established in 2004 [12].

2.6 Tannins

From the Aerial parts of the Aegiceras Corniculatum seven new condensed Tannins type compounds namely gallolocatechin [49], epi-gallolocatechin, 3-o-gallate [51], epi catechin 3-o-gallate [52], epi-gallolocatechi benzylthioether [53], epi catechin benzylthioether [54], benzyl mercaptan [55] have been established in 2012[6].

2.7 Acids

Six new tetramic acids derivatives, Pencillenols A1, A2, B1, B2, C1, C2, [56-61] was identified by the bark of the Aegiceras Corniculatum in 2008 [3]. And four new P-aminoacetophenonic acids named (2E)-11-(4’-aminophenyl)-5,9-dihydroxy-4,6,8-trimethyl-11-oxo-undec-2-eniocacid [62], (2E)-9-(4’-aminophenyl)-3,7-dihydroxy-2,4,6-trimethyl-9-oxo-nonic acid [63], (2E)-11-(4’-amino phenyl)-5,9-o-cyclo-4,6,8-trimethyl-11-oxo-undec-2-enio acid [64],(9-(4’-aminophenyl)-3,7-o-cyclo-2,4,6-trimethyl-9-oxo-nonic acid [65] was identified from the leaves of Aegiceras Corniculatum in 2010[8]. And then it is found that in leaves and stems of the species the fatty acids in Arachidic acid [66], Henicosanoic acid [67], myristoleic acid [68], linoleaiacid [69], linoleic acid [70], Cis-4,7,11,14,17-eicosapentaenoic acid [71], myristic acid [72], palmitic acid [73], linolenic acid [74], Cis-11,14,17-eicosatrienoic acid [75], arachidonic acid [76], have been established in 2012 [10]. And then bark of the Aegiceras Corniculatum in gallic acid [77] and syringic acid [78] in 2013[11].
2.8 Others

2.8.1 Polyketides

Four polyketides was identified from the bark of Aegiceras Corniculatum in Leptosphaerone C [79], Penicillenone [80], Arugosin II [81], 9-demethyl FR-901235 [82] and Oxa phenalenone dimmers in Bacillosporin A [83], Bacillosporin C [84], Sequoiamonascin D [85]. Sequoia tone A [86]. Sequoia tone B [87] have been identified in 2008 [2].

2.8.2 Macrolides:


Biological Activities

3.1 Antibacterial activity

This study was conducted to investigate the bioactive potential of mangrove plants to develop alternative drug development for the treatment of bacterial urinary tract infections (UTIS) which are frequent infections in the outpatient as well as in the nosocomial setting. Parts were investigated to evaluate the antibacterial activity against bacterial UTIS pathogens. The plant Aegiceras Corniculatum exhibited excellent antibacterial activity in 2012 [14].

3.2 Analgesic activity

The leaves of Aegiceras Corniculatum were extracted in absolute methonal to determine their analgesic activity. This study was showed better analgesic effect than the reference drug and at the dose level of 1000 mg /kg the duration and intensity of analgesia was also greater than acetylsalicylicacid. In 2010 [15].

3.3 Antidiabetic activity

Earlier ethnopharmacological records divulged the traditional usages of Mangrove Aegiceras Corniculatum (Linn) Blanco distributed in costal and estuarine areas of southeast India. Excluding scientific knowledge of Aegiceras Corniculatum against diabetes an including liver of control and alloxan-diabetic rats. As a result, Aegiceras Corniculatum leaf suspension showed moderate reduction in blood glucose (from 382±34 to 105±35), glycosylated haemoglobin, a decrease in the activities of glucose-6-phosphatase and fructose 1, 6-disphosphatase, and an increase activity of extract on 100 mg/kg. The present finding support promising results in terms of anti diabetic activities establishing its candidacy for further purification of individual compound in order to understand their mechanism of action. In [2012] [16].

3.4 Anti-inflammatory activity

This plant part tested in MeOH extract of stem stimulated with Ca (2+)-ionophore A23,87 leading to the production of various proinflammatory metabolites, that is 12-HTT, 12-HETE and LTB(4) and 5-HETE. And then formalin-induced paw licking and hot plate test in mice. And then n-Hexane, EtoAc of stem was Acetic-acid-induced [Antinociceptive activity] 2012 [17].

3.5 Antiproliferation and Cytotoxicity Assay

Compounds were assayed against human umbilical vein endothelial cells (HUVEC) and K562 human chronic myeloid leukemia cells (DSM ACC 10) for their antiproliferative effect (GI50) and against Hela human cervix carcinoma cells (DMS ACC 57) for their cytotoxic (CC50) effect as previously described. The hibitory concentration needed to reduce the growth (GI50; the concentration needed to reduce the growth of treated cells to half that of untreated cells) or 50% cytotoxic concentration (CC50 the concentration that kills 50% of treated cells). Compounds [35], [37], [38] are exhibit weak Antiproliferative and Cytotoxic activities. In 2012 [4].

3.6 Antioxidant activity

The quality of the antioxidants about the Condensed Tannins [49-55] from different parts of Aegiceras Corniculatum was determined by the IC50 values. These values of Aerial parts (Leaf, Stem bark, Root bark, Ascorbic acid, BHA) compared with leaf and stem bark were significantly lower than those of root bark, ascorbic acid and BHA, indicating the condensed tannins from leaf and stem bark exhibited a higher radical scavenging effect than the remainder. The scavenging effect on the DPPH radical followed the order. Leaf > Stem bark > Ascorbic acid > Root bark > BHA. 2011 [6].
4. In vitro blocking activity, Cytotoxicity

Our results indicated that few Flavan-3-ol polymers reacted with proteins in hypocotyls of Aegiceras Cornuculatum associated with the deteriorating reactions during the dry storage. In 2010[13]. Compound [33] showed in vitro cytotoxicity. (Against the HL-60) 2004 [12]. And then these compounds are [18], [19], [21] exhibit significant in vitro blocking activity. 2007 [9]. Compounds [56], [58] showed cytotoxicities against HL-60 cell line with IC$_{50}$ values of 0.76 µm and 3.20 µm respectively. Laptosphaerae [79] showed cytotoxicity against A-549 cells with an IC$_{50}$ value of 1.45µm, while [80] Compound showed cytotoxicity against P 388 cells with an IC$_{50}$ value of 1.38µm. 2008 [2]. The anti-influenza A viral (H$_3$N$_1$) activities of eight [1-8] compounds were also evaluated using the cytopathic effect (CPE) inhibition assay. 2011 [1]. And then compound [65] showed no inhibitory on HCV protease and Sec A ATPase and wasn’t active against VSVG/HIV –Luc pseudo typing Virus. 2010 [8].
31 R₁=H, R₂=OCH₃, R₃=OH, R₄=n-C₃H₇
32 R₁=n-C₇H₁₅, R₂=OH, R₃=OCH₃, R₄=H

n=1:40
n=2:41

46 R₁=OH, R₂=OCH₂CH₃
47 R₁=COCH₃, R₂=OCH₃
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CONCLUSION

Natural products may be useful as a source of novel chemical structures for Anti-inflammatory, Analgesic, Antidiabetic, and Antioxidant.

Acknowledgement

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