Secondary Metabolites from Some Species of Albizia: A Review

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Abstract
This review covers the secondary metabolites reported from five species of Albizia. A total of fifty chemical constituents have been documented from A. anthelmintica, A. chinensis, A. julibrissin, A. lebbeck and A. myriophyla. Most of the phytoconstituents have been reported from A. julibrissin and A. lebbeck.

Key words: Secondary metabolites, Albizia anthelmintica, Albizia chinensis, Albizia julibrissin, Albizia lebbeck, Albizia myriophyla

Introduction
The genus Albizia belongs to the family Leguminosae consisting of 150 species that are widely distributed all over the world (Ghaly et al., 2010). A. anthelmintica is a thorny medium canopied tree growing to 8m height with smooth bark and open spine-tipped twigs. A. chinensis (Bengali name: Chakua, amlukia) is an evergreen tree with a flat spreading crown, 30m height with dark gray bark (Orwa et al., 2009). A. julibrissin is a small tree growing upto 5-16 m tall with araching branches, dark greenish grey bark for each plant and bipinnate leaves. A. lebbeck (Bengali name: Shirish or kalo koroi) is a tall tree that are 12-21 m high and grows all over Bangladesh. The flowers of this plant are useful in asthma and snake bite. The leaves are used in the treatment of blindness and syphilis. The bark is used in inflammation, toothache and leprosy. Having astringent property, the root is helpful in ophalmia and skin diseases (Hussain et al., 2008; Kirtikar and Basu, 1980; Rashid et al., 2003).

A. myriophyla is also a small tree having 4 m height with dark brown young shoots and bipinnate leaves (Orwa et al., 2009). Previous phytochemical studies on the genus of Albizia revealed the occurrences of various natural products such as alkaloids (Dixit and Mitra, 1997), glycosides (Varshney, 1976), terpenoids, steroids and saponins (Pal et al., 1995), anthraquinines and phenolics (Deshpande and Shastri, 1977), triterpenoids, diterpenoids, lignans, and pyridineglycosides (Ghaly et al., 2010)

Results
Secondary metabolites: A total of 50 secondary metabolites have been reported from five species of Albizia (A. anthelmintica, A. chinensis, A. julibrissin, A. lebbeck and A. myriophyla) as mentioned in table 1 and figure 1.
Table 1. Reported secondary metabolites from *Albizia* species.

<table>
<thead>
<tr>
<th>Species</th>
<th>Secondary metabolites</th>
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<tbody>
<tr>
<td><em>A. anthelmintica</em></td>
<td>3-O-[L-arabinopyranosyl (1→6)]-2-acetamido-2-deoxy-β-D-Glucopyranosyl echinocystic acid (1) (Carpiani et al., 1989).</td>
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<tr>
<td><em>A. chinensis</em></td>
<td>Kaempferol 3-O-α-L-rhamnopyranoside (2), Quercetin 3-O-α-L-rhamnopyranoside (3), Luteolin (4), Kaempferol (5), Quercetin (6) (Ghaly et al., 2010), α-Amyrin (7), β-sitosterol (8), 7,3-dimethoxyluteolin (9) (Rashid et al., 2014; Sharmin et al., 2014).</td>
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<tr>
<td><em>A. julibrissin</em></td>
<td>Quercitrin (10), Isoquercitrin (11) (Kang et al., 2000), (6R)-menthiafolic acid-6-O-β-D-quinivoside (12), (6S)-menthiafolic acid-6-O-β-D-quinivoside (13), Julibroside J28 (14), Julibroside III (15), Julibroside J14 (16) (Liang et al., 2005; Zou et al., 2005), (6S)-menthiafolic acid-6-O-β-D-xyloside (17), Julibroside J29 (18), Julibroside J30 (19), Julibroside J31 (20), Prosapogenin-10 (21), Prosapogenin-8 (22) (Zheng et al., 2006), Julibroside J17 (23), Julibroside J8 (24), Julibroside J12 (25), (Zou et al., 2005), Julibroside J1 (26), Julibroside J2 (27), (6R)-menthiafolic acid-6-O-β-D-quinivoside (28), (6S)-menthiafolic acid-6-O-β-D-quinivoside (29), [(2E, 6R)-2,6-Dimethyl-6-hydroxy-2,7-octadienoic acid-6-O-β-xyloside (30)] (Zou et al., 2000), cis-p-Coumaroylagmatline (31) (Ngano et al., 2003; Ueda et al., 1999; Ueda et al., 1997), Potassium β-D-glucopyranosyl 11-hydroxyjasmonate (32), Potassium β-D-glucopyranosyl tuberonate (33), Jasmonic acid (34) (Ueda et al., 1999).</td>
</tr>
<tr>
<td><em>A. lebbeck</em></td>
<td>Lupeol (35), Stigmasterol (36), 4-Hydroxy-3-methoxycinnamic acid (37), trans-p-coumaric acid (38) (Hussin et al., 2008), 3’,5-Dihydroxy-4’,7-dimethoxy flavones (39), N-benzoyl-L-phenylalaninol (40) (Rashid et al., 2003), Albigenin (41), Lebbekanin A (42), Lebbekanin E (43), Melacacidin (44), (-)-2,3-cis-3,4-cis-3-O-methyl melacacidin (45), Melanoxetin (46), 3’-O-methylmelanoxetin (47) (Une et al., 2001).</td>
</tr>
<tr>
<td><em>A. myriophyla</em></td>
<td>Albizzioside A (48), Albizzioside (49), Albizzioside (50) (Ito et al., 1994).</td>
</tr>
</tbody>
</table>

![Image](https://example.com/image1.png)  

2: \( R = \text{O-α-L-rhamnopyranosyl}, \ R_1 = \text{H} \)  
3: \( R = \text{O-α-L-rhamnopyranosyl}, \ R_1 = \text{OH} \)  
4: \( R = \text{H}, \ R_1 = \text{OH} \)  
5: \( R = \text{OH}, \ R_1 = \text{H} \)  
6: \( R = \text{OH}, \ R_1 = \text{OH} \)  

![Image](https://example.com/image2.png)  

![Image](https://example.com/image3.png)
10: R = Alpha-L-rhamnopyranose
11: R = Beta-D-glucopyranose
18: $R_1 = \text{NHAc}, R_2 = \text{Me}, R_3 = \text{OH}$
19: $R_1 = \text{NHAc}, R_2 = \text{H}, R_3 = \text{OH}$
20: $R_1 = \text{O-gluc}, R_2 = \text{Me}, R_3 = \text{OH}$
21: $R_1 = \text{OH}, R_2 = \text{Me}, R_3 = \text{OH}$
22: $R_1 = \text{O-gluc}, R_2 = \text{Me}, R_3 = \text{H}$
23: \( R = \text{OH}, 6\text{R} \)
24: \( R = \text{OH}, 6\text{S} \)
25: \( R = \text{NHAc}, 6\text{R} \)

26: \( \text{C-6} = R \)
27: \( \text{C-6} = S \)
Conclusion

A total five species of *Albizia* have been studied. Many diversified and structurally unique molecules have been reported from these plants. Our study revealed that *Albizia* species can be a prominent source of secondary metabolites as well as drug candidates.

References


