

## MICRO-REVIEW

Recent Advances in the Chemistry of Genus *Ficus*

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*Ficus linn* (Moraceae) is a large genus of trees or shrubs, often climbers, with milky juice, widely distributed throughout the tropics of both hemisphere, but particularly abundant in Southeast Asia. About 65 species occur in India. The more important among them are *F. bengalensis* (banyan), *F. caria* (fig) and *F. elastica* (India rubber tree)<sup>1-3</sup>.

## Medicinal Uses

*F. hispida* is used as an emetic, laxative and cooling astringent. In powder or decoction form, it is given in hepatic obstruction<sup>4</sup>. The bark of *F. hispida* is a component of a mixture used as cancer cure in Thailand<sup>5</sup>. The latex of *F. glomerata* has proteolytic activity.<sup>16</sup> *F. septica* is found to contain antimicrobial activity.<sup>33</sup>

## Chemical Investigations

The *genus ficus* is found to contain a wide variety of compounds as shown below.

COMPOUNDS ISOLATED FROM GENUS *FICUS*

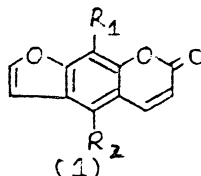
Name of species along with parts investigated	Compounds isolated	References
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1. *Ficus hispida*:

## (a) Leaves

- (i) Bergapten (1),  $R_1=H, R_2=OCH_3$   
 (ii) Psoralene (1),  $R_1=R_2=H$

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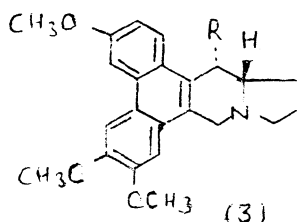
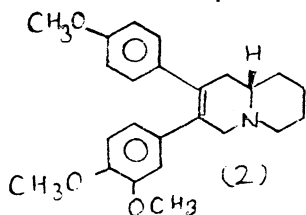


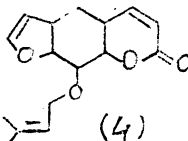
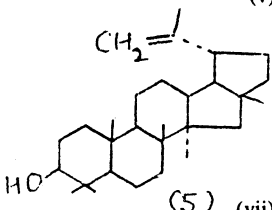
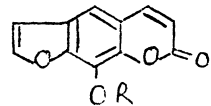
- (iii)  $\beta$ -Amyrin  
 (iv)  $\beta$ -Sitosterol

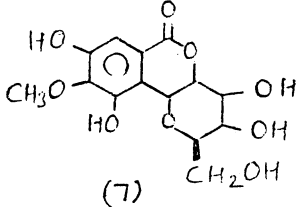
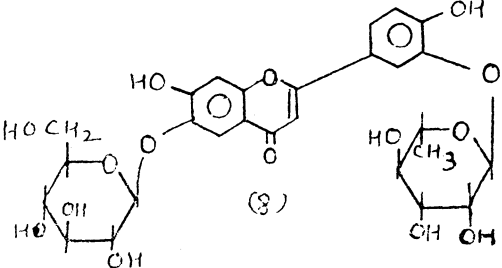
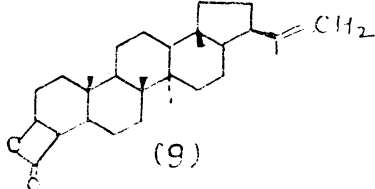
## (b) Whole plant

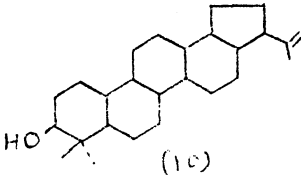

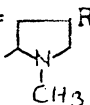
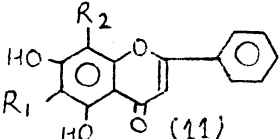
- (i) Hispidine (2)  
 (ii) 3,6,7-Trimethoxyphenanthroindolizidine (3),  $R=H$   
 (iii) 3,6,7-Trimethoxy-4-hydroxy phenanthroindolizidine (3),  $R=OH$

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Name of species along with parts investigated	Compounds isolated	References
(c) Bark	(i) Tricontanyl acetate (ii) $\beta$ -Amyrin acetate (iii) Guanol acetate (iv) 10-ketotetracosyl arachidate (v) Lupeol acetate (vi) $\beta$ -sitosterol	5, 8
2. <i>F. Asprima</i> leaves	(i) Bergapten (1), $R_1=H, R_2=OCH_3$ (ii) Bergaptol (iii) $\beta$ -amyrin (iv) $\beta$ -Sitosterol	9
3. <i>F. benjamina</i> latex	(i) Bergapten (1), $R_1=H, R_2=OCH_3$ (ii) $\alpha$ -Amyrin (iii) Imperatorin (4)	10
	 (4)	
4. <i>F. carica</i> leaves	(i) Bourenol (ii) 2,4-Methylene cycloartenol (iii) $\beta$ -Amyrin (iv) Lupeol (5) (iv) Xanthotoxin (6), $R=CH_3$ (v) Xanthotoxol (6), $R=H$	7, 11
	 (5)	
	 (6)	
	(vii) Marmessin (viii) Psoralene (1), $R_1=R_2=H$ (ix) Bergapten (1), $R_1=H, R_2=OCH_3$ (x) $\beta$ -Sitosterol	
5. <i>F. cunia</i> seeds	(i) <i>n</i> -Decyltetracosanoate (ii) 13-Nonacosanone (iii) Fridelin (iv) $\beta$ -Sitosterol (v) Unsaturated hydrocarbon (unidentified)	12
6. <i>F. cuninghamii</i> leaves	(i) Herniarin (ii) Sopimpinellin (iii) Marmessin (iv) Umbelliferone (v) Taraxarterol (vi) $\beta$ -Sitosterol	13
7. <i>F. elastica</i> latex	(i) $\alpha$ -Amyrin (ii) Bergapten (1), $R_1=H, R_2=OCH_3$	10

Name of species along with parts investigated	Compounds isolated	References
8. <i>F. eribotryoides</i> leaves	(i) Bergapten (1), $R_1=H$ , $R_2=OCH_3$ (ii) Marmessin (iii) $\beta$ -Amyrin (iv) $\beta$ -Sitosterol	
9. <i>F. glomerata</i> (a) Fruit	(i) Hentricontane (ii) Tiglic acid ester of taraxasterol (iii) $\beta$ -sitosterol (iv) Guanol acetate (v) Glucose	14
(b) Trunk bark	(i) Lupeol (5) (ii) $\beta$ -Sitosterol (iii) Stigmasterol	
10. <i>F. infectoria</i>		
(a) Stem bark	(i) Mercinolate (ii) $\beta$ -Sitosterol (iii) Lanosterol (iv) Caffeic acid (v) Bergenin (7)	17
	 <p>(7)</p>	
(b) Leaves	(i) Infecterin (8) (ii) Sorbifolin-6-O-( $\alpha$ -L-arabinopyranosyl-(1 $\rightarrow$ 2) $\beta$ -D-glucopyranoside) (iii) Scutellarein 6-O- $\beta$ -glucoside	18, 19
	 <p>(8)</p>	
11. <i>Ficus insipida</i> leaves	(i) Moretenolactone (9)	20
	 <p>(9)</p>	

Name of species along with parts investigated	Compounds isolated	References
12. <i>F. kirshane</i> leaves	(i) Altanoflavone (8,8-Dimethyl 5-hydroxy-2-(4'-hydroxyphenyl)-4H,8H, benzo(1,2-b,3,4-b')pyran-4-one (ii) $\beta$ -Sitosterol	21
13. <i>F. lacor</i> leaves	(i) $\alpha$ -Amyrin (ii) $\beta$ -Amyrin (iii) Lupeol (5)	22
14. <i>F. macrophylla</i> (a) Leaves	(i) Nonacasane (ii) Tricontane (iii) Henritricontane (iv) Moretenol (10)	23
		
	(b) Bark exudate	
	(i) Cycloartenol (ii) Butyrospermol	23
15. <i>F. microcarpa</i> leaves	(i) Lupenyl acetate (ii) Friedelin (iii) Glutinol (iv) Epifriedelinol (v) Taraxenol (vi) Oleanolic acid	24
16. <i>F. nitida</i> leaves	(i) Angelicin (ii) Friedelin (iii) Epifriedelanol (iv) Nitidol	25
17. <i>F. pantoniana</i> whole plant	(i) Ficine (11), $R_1 = H, R_2 =$  (ii) Isoficine (11), $R_1 =$  $R_2 = H$	26
18. <i>F. roxburghii</i> leaves	(i) $\beta$ -Sitosterol (ii) Friedelin (iii) Epifriedelanol	9
		

Name of species along with parts investigated	Compounds isolated	References
19. <i>F. rumphii</i> Trunk bark	(i) $\beta$ -Sitosterol (ii) 3-Hydroxy-3'-methoxy favone glycoside	27
20. <i>F. racemosa</i>		
(a) Root bark	(i) $\beta$ -Sitosterol (ii) Lupeol (5)	28
(b) Bark	(i) Leucocyanidin-3-O- $\beta$ -D-glucopyranoside (ii) Leucopelargonidin-3-O- $\alpha$ -L-rhamnopyranoside	29
(c) Bark and heart wood shavings	(i) Gluanol acetate (ii) $\beta$ -Sitosterol	30
21. <i>F. salicifolia</i>		
(a) Leaves	(i) Bergapten (1), $R_1=H, R_2=OCH_3$ (ii) Psoralone (1), $R_1=R_2=H$ (iii) $\beta$ -Sitosterol	31
(b) Fruits	(i) Psoralene (1), $R_1=R_2=H$ (ii) Bergapten (1), $R_1=H, R_2=OCH_3$	32
22. <i>F. septica</i>		
(a) Leaves	(i) Ficuseptine (12)	33, 34
(b) Leaves and root	(i) Antofine (ii) Minor alkaloids of phenanthroindolizidine type	5, 33, 34
(c) Whole plant	(i) Tylophorine (ii) Tylocrebrine (iii) Septicine	
23. <i>F. sparaguena</i> leaves	Same as <i>F. rumphii</i>	9
24. <i>F. sycomorus</i>	(i) $\alpha$ -Amyrin (ii) Bergapten (1), $R_1=H, R_2=OCH_3$ (iii) Xanthotoxin (6), $R=CH_3$ (iv) Imperatorin (4)	10
25. <i>F. thunbergii</i> fresh leaves and stem	(i) Rhoiptelenol (ii) 3 $\alpha$ -Hydroxy isoh-22(29)-ene-24-oic acid (iii) Lupenyl acetate (iv) $\beta$ -Amyrin acetate (v) $\alpha$ -Amyrin acetate (vi) Taraxerol (vii) Glutinol (viii) Ursolic acid (ix) Betulinic acid	36

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