

The Alkaloids of *Rhazya Stricta* and *Rhazya Orientalis*

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(Received 27th September, 1981)

A detailed survey on the plants of *Apocyanaceae* has resulted in the investigations of several genera which are rich sources of indole alkaloids, including *Alstonia*, *Aspidosperma*, *Ervatamia*, *Geissospermum*, *Hunteria*, *Kopsia*, *Picalima*, *Rauwolfia*, *Rhazya*, *Tabernanthe*, *Vinca* and *voacanga*.

The local herbs and plants in Pakistan today are widely used in the treatment of various diseases, and the traditional "Unani system" of medicine is especially reputed in the use of these herbs and medicinal plants for medicinal agents. Some prominent plants of the "Unani system" e.g. *Rauwolfia*, *Swertia* and *Cannabis* species, are internationally known on account of their physiologically active constituents.

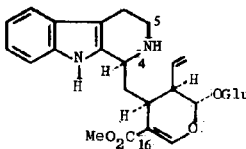
The genus *Rhazya* comprises only two species viz. *R. stricta* Decaisne, and *R. orientalis*. *R. stricta* Decaisne

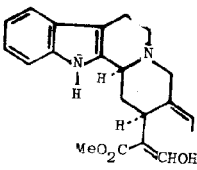
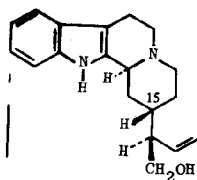
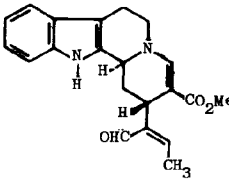
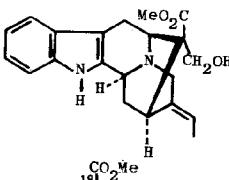
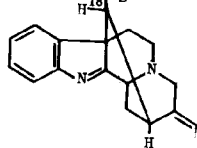
is abundantly distributed in various parts of Pakistan. It is a small glabrous, erect shrub and it also grows profusely in the northwestern regions of the Indian sub-continent.

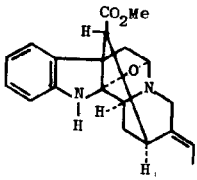
Rhazya stricta Decaisne, (*Apocyanaceae*) is used in the Unani system of medicine for antitumor treatment. It is also used as a bitter tonic for sore throat, in fever, in general debility and as a curative for chronic rheumatism.¹⁻⁴

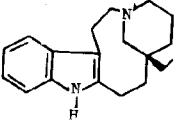
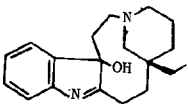
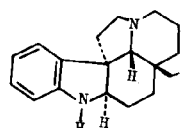
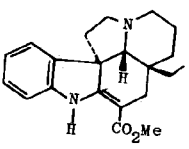
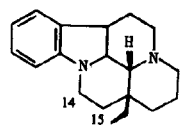
A systematic survey of this plant was first undertaken by A. Chatterjee, in the early 1940's and in 1961 the same author reported the isolation of five alkaloids from *R. stricta* Decaisne. The total alkaloidal content of *R. stricta* Decaisne has been variously reported to be as high as 8-10%. The list of all the alkaloids isolated from *R. stricta* and *R. orientalis* is given in Table 1.

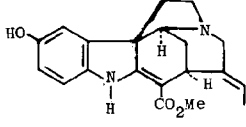
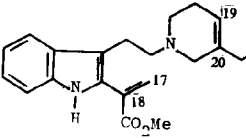
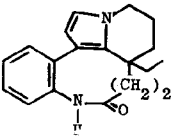
Table 1. Alkaloids obtained from the two *Rhazya* species

S.NO	Name of the Alkaloid Molecular Formula M.P. (°), Solvent	Structure	Source	References
I	II	III	IV	V
	<i>Strictosidine type</i>			
1.	Strictosidine (Sovincoside) $C_{27}H_{34}N_2O_9$		<i>Rhazya stricta</i> (R.s.) <i>Rhazya orientalis</i> (R.o.)	6,7
2.	5- α -Carboxystictosidine $C_{28}H_{34}N_2O_{11}$ 232° - 280° (MeOH)	5 α -Carboxystictosidine	R.o.	8
3.	Demethylstrictosidine $C_{26}H_{32}N_2O_9$	- CO ₂ H instead of - CO ₂ Me at C ₁₆ ,	R.o.	8

- | | | | |
|---|---|------|--------------|
| 4. 5- α -Carboxy-demethylstictosidine
$C_{27}H_{32}N_2O_{11}$ | — CO_2H instead of
— CO_2Me at C_{16} ,
5 α - CO_2H | R.o. | 8 |
| <i>Corynantheine type</i> | | | |
| 5. Geissoschizine
$C_{21}H_{24}N_2O_3$
187 ⁰
+72 ⁰ ($CHCl_3$) |  | R.s. | 9-12 |
| <i>Hunterburnine type</i> | | | |
| 6. Rhazinine (Antirrhine)
$C_{19}H_{24}N_2O$
118 ⁰
+9 ⁰ ($CHCl_3$) |  | R.s. | 9-11, 13-18 |
| 7. Vallesiachotamine
$C_{21}H_{22}N_2O_3$
253-55 ⁰
+160 ⁰ ($CHCl_3$) |  | R.o. | 19-21 |
| <i>Sarpagine type</i> | | | |
| 8. Rhazine (Akuammidine)
$C_{21}H_{24}N_2O_3$
234-36 ⁰
+21 ⁰ (EtOH) |  | R.S. | 15, 22-24 |
| <i>Pricaline type</i> | | | |
| 9. Strictamine (Vincamidine)
$C_{20}H_{22}N_2O_2$
110-112 ⁰
+103 ⁰ |  | R.s. | 13, 25, 26 |
| 10. Rhazinaline
$C_{21}H_{22}N_2O_3$
137 ⁰
+61 ⁰ (EtOH) | 16-Formyl-16-epistrictamine | R.s. | 9-11, 27, 28 |
| 11. 16-Formylstrictamine
$C_{21}H_{22}N_2O_3$

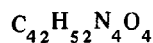
----- | 16-Formylstrictamine | R.s. | 27 |
| 12. Picrinine
$C_{20}H_{22}N_2O_3$
223-25 ⁰
- 47 ⁰ ($CHCl_3$) |  | R.o. | 29-34 |

13. Picralinal $C_{21}H_{22}N_2O_4$ 179-180° ² 180° (CHCl ₃)	16-Formylpicrinine	R.o.	19
<i>Aspidosperma alkaloids</i>			
14. (-)-Quebrachamine $C_{19}H_{26}N_2$ 183-85° - 37° (EtOH)		R.s.	15, 24, 35
15. Rhazidine base (Rhazidigenine) $C_{19}H_{26}N_2O$ 183-85° - 37° (EtOH) Amorph. 134-125° + 540° (EtOH) 0°		R.s.	13, 15, 36-40
16. (+)-Aspidospermidine $C_{19}H_{26}N_2$ 120-21° + 24° (EtOH)		R.s.	35, 41
17. (+)-1,2-Dehydroaspidospermidine $C_{19}H_{24}N_2$ Amorph. + 227° (CHCl ₃)	(+)-1,2-Dehydroaspidospermidine	R.s.	13, 20, 21, 35, 41
18. (+)-Vicadiformine $C_{21}H_{26}N_2O_2$ Amorph. + 540° (EtOH) (+)-Vicadiformine $C_{21}H_{26}N_2O_2$ 124-25° 0°		R.s.	20, 21, 41
19. Tabersonine $C_{21}H_{24}N_2O_2$ 196° (HCl) - 130° (HCl, MeOH)	6, 7-Dehydrovinca-	R.o.	42
<i>Eburnamine type</i>			
20. Eburnamine $C_{19}H_{24}N_2O$ 181° - 93° (CHCl ₃)		R.s.	35

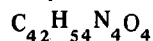
21. Eburnamenine $C_{19}H_{22}N_2$ Amorph. + 183° (CHCl ₃)	14, 15-Dehydro	R.s.	35
22. (+) -Ebrnamonine $C_{19}H_{22}N_2O$ 183° + 89° (CHCl ₃)	14-One	R.s.	35
<i>Strychnos type</i>			
23. Sewarine $C_{20}H_{22}N_2O_3$ 245° (dec.) - 724° (EtOH)		R.s.	43-45
<i>Secodine type</i>			
24. Tetrahydrosecodine C_{21}		R.s.	46
24. Tetrahydrosecodine $C_{21}H_{30}N_2O_2$ ----- - 6.5° (CHCl ₃)	16, 17, 15, 20-Tetrahydro-secodine	R.s.	46,47
25. Dihyd secodine $C_{21}H_{28}N_2O_2$	16, 17-Dihydrosecodine	R.s.	46
26. Tetrahydrosecodinol $C_{21}H_{30}N_2O_3$	16, 17, 15, 20-Tetrahydro-secodine-17-ol	R.o.	46
27. Dihydrosecodinol $C_{21}H_{28}N_2O_3$ ----- -----	16, 17-Dihydrosecodine-17-ol	R.o.	48
<i>Rhazinilam type</i>			
28. Rhazinilam $C_{19}H_{22}N_2O$ 208-10° - 246° (CHCl ₃)		R.s.	49, 50

Dimeric alkaloids

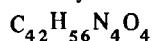
29. Secamine



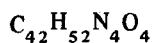
30. Dihydrosecamine



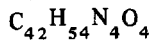
31. Tetrahydrosecamine



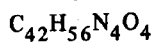
32. Presecamine



33. Dihydropresecamine

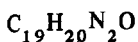


34. Tetrahydropresecamine



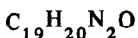
- 1.9 (EtOH)

35. Strictalamine



152-154°

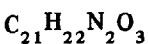
36. Norfluorocurarine

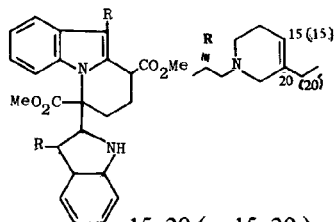
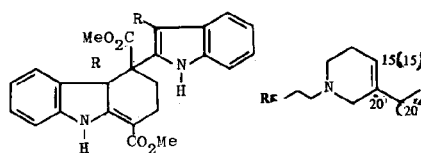
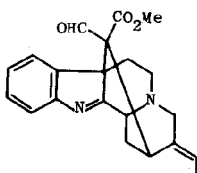
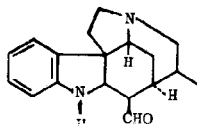
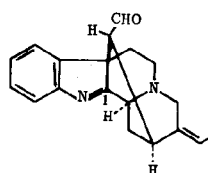


186-187°C

1018° (CHCl₃)

37. Rhazimal



15, 20-(or 15, 20-) -
Dihydrosecamine15, 20, 15, 20-
Tetrahydrosecamine15, 20-(or 15, 10)
Dihydropresecamine15, 20, 15, 20-
Tetrahydropresecamine

R.s.

51, 52

R.s.

51-52

R.s.

51, 52

R.o.

19

R.s.

53

R.s.

53

R.s.

53

R.o.

53

R.s.

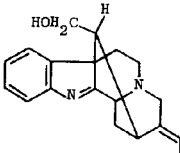
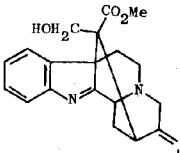
54

R.s.

54

R.s.

55, 56

38. Rhazinol $C_{19}H_{22}N_2O$ ----- -----		R.s.	55, 56
39. Rhazimol $C_{21}H_{24}N_2O$ ----- -----		R.s.	55, 56
40. Stricticine ----- ----- -----	(Under investigation)	R.s.	56
41. Strictine ----- ----- -----	-do-	R.s.	56
42. Strictidine ----- ----- -----	-do-	R.s.	56
43. Rhazimaline 90-92°C -----	-do-	R.s.	56

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