

CHAPTER IV

DISCUSSION

The present work has led to the isolation of four major alkaloids from Uncaria quadrangularis Geddes growing in Chumpawn, Southern Thailand. No previous work on the alkaloidal content of the leaves and stem bark of this plant has been reported.

All of these four alkaloids are oxindoles, two of them which constitute in the leaves of Uncaria quadrangularis Geddes are closed E ring, normal alkaloids with C (9) - R = H, viz : mitraphylline and isomitraphylline. The other two oxindoles isolated from the stem bark of the same plant belong to the closed E ring, allo series, also with C (9) - R = H, viz : pteropodine and isopteropodine. No alkaloid was found in the wood of this plant. More interesting point is that no indole alkaloid was observed in both parts of the plant examined. The conversions in vitro of normal indole ajmalicine to the corresponding normal oxindole mitraphylline by Finch and Taylor⁽⁸⁶⁾ and by Shavel and Zinnes⁽¹⁰⁴⁾ and the conversion of tetrahydroalstonine to the four uncarine isomers, i.e. pteropodine, isopteropodine, speciophylline and uncarine F by Hart, Johns, and Lambertson⁽¹¹²⁾ are interesting, since it suggests that the plant may also be able to transform indole alkaloids into oxindole alkaloids having the same configurations, though the pathway would not be the same.⁽³⁵⁾

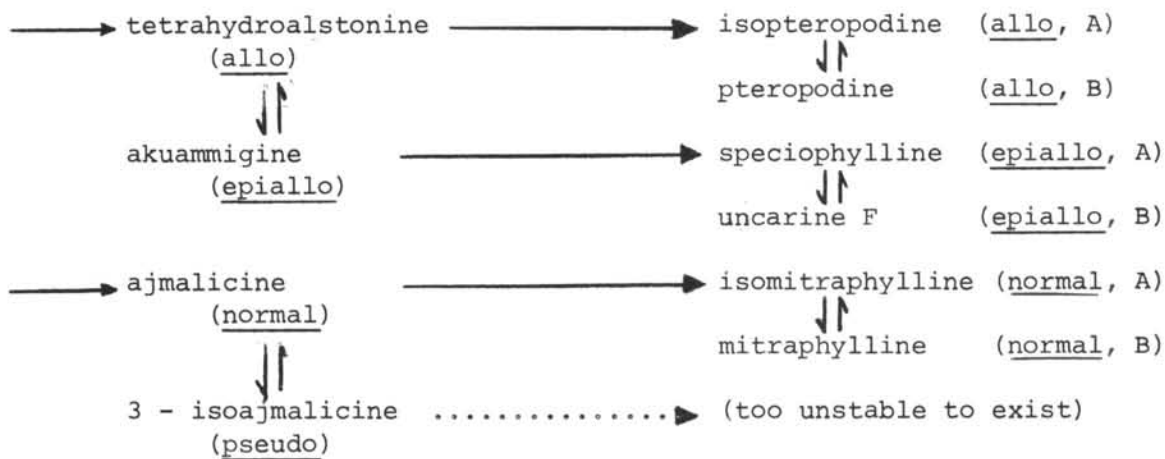
The indole alkaloids can also be isomerised in the plant.⁽³⁵⁾
There is thus the possibility that the plant synthesises the thermodyna-

mically more stable indoles along the route suggested by Battersby and others^(108, 109) and that these alkaloids.

a) isomerise to give the thermodynamically less stable isomers and

b) both indole isomers are converted to the corresponding oxindoles

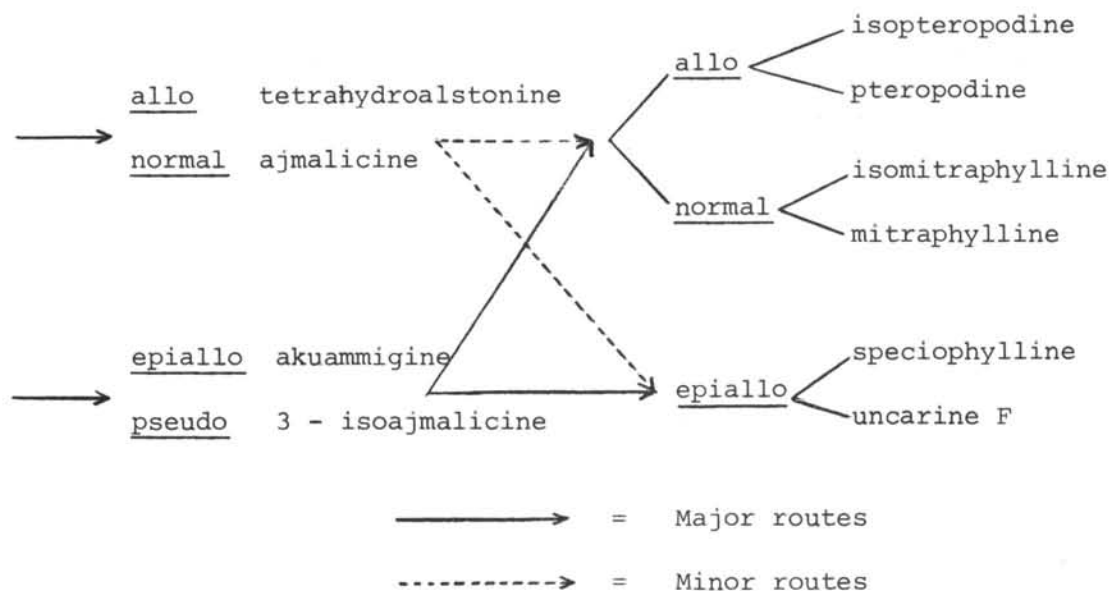
where this is possible, as follows :-⁽³⁵⁾



In accordance with the hypothesis of Shellard, Phillipson and Gupta⁽³⁵⁾, it was expected that indole alkaloids ajmalicine and 3-iso-ajmalicine might be present in the leaves of Uncaria quadrangularis Geddes whereas the oxindole analogues (mitraphylline and isomitraphylline) of this indole alkaloids were present. Tetrahydroalstonine and akuammigine might also be present in the stem bark of this plant whereas the corresponding oxindoles (pteropodine and isopteropodine) were present.⁽³⁵⁾ Moreover, the other two epiallo oxindole alkaloids (speciophylline and uncarine F) might also be present because of the isomerisation.

Following the modified hypothesis of Shellard and Houghton,⁽³⁹⁾ the alkaloidal scheme in the leaves of Uncaria quadrangularis Geddes

would be :-



The absence of certain indole alkaloids still needs explanation; and the fact that indole alkaloids have not been detected might be due to three possibilities :-⁽³⁵⁾

(i) nearly all the indole alkaloids in question are isomerised to the corresponding oxindoles, so that at the most only traces of these alkaloids, too small to be detected in the quantities of material examined, may be present.

(ii) a seasonal variation in the amount of isomerisation and conversion takes place so that leaves collected at different times of the year may show changes in the relative amounts of alkaloids present.

(iii) biogenesis does not take place in the leaf but in the root and only certain alkaloids are transferred to the aerial parts and the amounts transferred vary from time to time.