PRENYLATION OF TRYPTOPHAN DERIVATIVES

SYNTHETIC APPROACH TO FUMITREMORGIN B AND BREVIANAMIDE E

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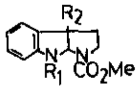
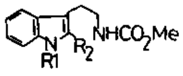
The introduction of a prenyl group into 2-position of the indole nucleous has been investigated and biomimetic syntheses of fumitremorgin B (FTB) 12 and deoxybrevianamide E 13 were attempted.

The reaction of Nb-methoxycarbonyltryptamine 1 *with an excess 3,3-dimethylallyl bromide 2 in an acetate* buffer (pH 2.7) provided 3a which rearranged to 4a by CF_3CO_2H in CH_2Cl_2. Dye-sensitized photooxygenation of 4b, obtained by catalytic hydrogenation of 4a, followed by reduction with dimethyl sulfide gave 5 which was further converted to 6 by heating in CF_3CO_2H. The similar reaction of cyclo-L-prolyl-L-tryptophanyl 7a with 2 provided 8a as a mixture of two diastereoisomers in about 1 : 1 ratio. On treatment with CF_3CO_2H-CH_2Cl_2, the more polar isomer of 8a rearranged to the 1,2-di-prenylated derivative 9a. Likewise, 8b was transformed to the corresponding methoxy derivative 9b. Catalytic hydrogenation of the double bonds of 9b and subsequent photooxygenation followed by reduction with dimethyl sulfide afforded 10b.

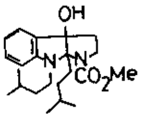
On the other hand, the reaction of 1 with 3-chloro-3-methyl-1-butyne 11 in the presence of NaH in DMF gave 3b. The reduction product 3c *was rearranged to 4c and 4d by CF_3CO_2H in 13% and 24% yields, respectively,* whereas in AcOH 4d (53%) and 4c (10%) were obtained. Analogous reaction of 7a with 11 followed by hydrogenation and acid-catalyzed rearrangement to deoxybrevianamide E was investigated.



3 a, $R_1=R_2=CH_2CH=CMe_2$
b, $R_1=H, R_2=CMe_2C\equiv CH$
c, $R_1=H, R_2=CMe_2CH=CH_2$



4 a, $R_1=R_2=CH_2CH=CMe_2$
b, $R_1=R_2=CH_2CH_2CHMe_2$
c, $R_1=H, R_2=CMe_2CH=CH_2$
d, $R_1=CH_2CH=CMe_2, R_2=H$



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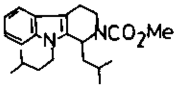

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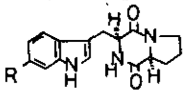
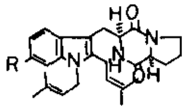


7a, R=H, b, R=OMe



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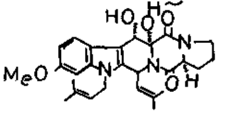

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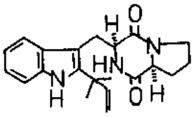

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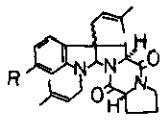

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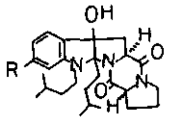

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