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 nucleus has been investigated and biomimetic syntheses of fumitremorgin B (FTB) 12 and deoxybrevianamide E 13 were attempted.

The reaction of N-b-methoxycarbonyltryptamine 1 with an excess 3,3-dimethylallyl bromide 2 in an acetate buffer (pH 2.7) provided 3a which rearranged to 4a by CF₃CO₂H in CH₂Cl₂. 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 CF₃CO₂H. 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 CF₃CO₂H-CH₂Cl₂, 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 12b. The reduction product 13c was rearranged to 14c and 14d by CF₃CO₂H in 13% and 24% yields, respectively, whereas in AcOH 14d (53%) and 14c (10%) were obtained. Analogous reaction of 7a with 11 followed by hydrogenation and acid-catalyzed rearrangement to deoxybrevianamide E was investigated.