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ISOLATION OF β-TRANS-BERGAMOTENE FROM ASPERGILLUS FUMIGATUS, A FUMAGILLIN PRODUCING FUNGI[1]

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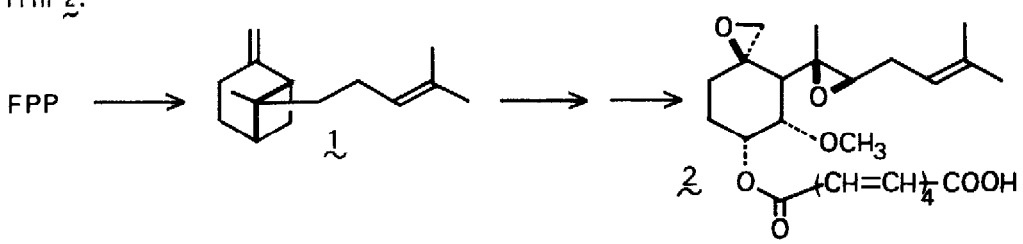
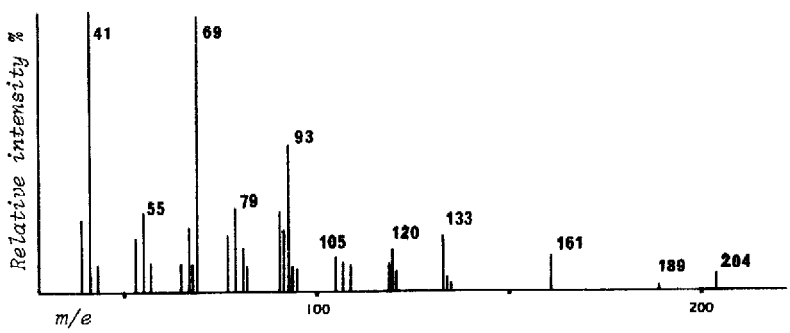
During the course of our investigations on the biosynthesis of physiologically active sesquiterpenoids of fungal origin, we isolated trichodiene[2] and hirsutene[3] which are the hydrocarbon precursors of trichothecin and coriolin antibiotics respectively. Present paper describe the isolation and identification of β-trans-bergamotene 1 from Aspergillus fumigatus, a fungus which produces an antibiotic fumagillin 2[4]. Biogenetical pathway of 2 involving bergamotene intermediate was suggested by Birch[5], and this hypothesis has recently been supported by CMR studies on the biosynthesis of ovalicin, a substance closely related to fumagillin 2.[6,7]





Cultures of Aspergillus fumigatus[8] were grown in a Sakaguchi flask containing a CSL-Dextrin medium for two days at 27°C. The mycelium was extracted with acetone and the crude extracts were saponified with methanolic K_2CO_3. The non-saponifeable fraction was then passed through silica gel column eluting with n-hexane to afford a hydrocarbon mixture which contain

squalene and saturated hydrocarbons along with minor amount of sesquiterpene hydrocarbon, the latter was then separated by preparative glc (1.5% OV-17 on Chromosorb-W, at 100°C). Gc-ms analysis[9] of the sesquiterpene fraction revealed that the major component (r.t.13.9min; R_f=0.58 : Silica gel/pentane) showed the molecular ion peak at m/e 204 ($C_{15}H_{24}$). The fragmentation pattern illustrated above was explainable by the structure 1. Hydrogenation of the major component with Pt catalyst in MeOH gave tetrahydro derivative (r.t. 9.0 min.)[9], ms; m/e 208 ($C_{15}H_{28}$), indicating the hydrocarbon is bicyclic with two double bonds. That the hydrocarbon is β-trans-bergamotene[10] was confirmed by direct comparison with authentic sample which has recently been isolated from Pseudorotium ovalis by Cane and King[11].

REFERENCES AND NOTES

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8. We are grateful to Dr. F.W.Denison, Jr., Abbott Laboratories for providing us with a strain of Aspergillus fumigatus.
9. Gc-ms analysis was performed on an LKB-Shimadzu 9000 fitted with glass column(1.5m) packed with 1.5 % OV-17 on Chromosorb-W, at 120°C ; He 30 ml/min.; 70 eV.
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