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SYNTHESIS OF AN ISOFLAVONE DERIVATIVE BY MEERWEIN'S DIAZO REACTION.

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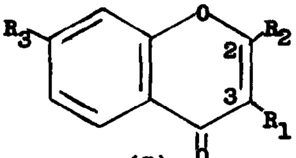
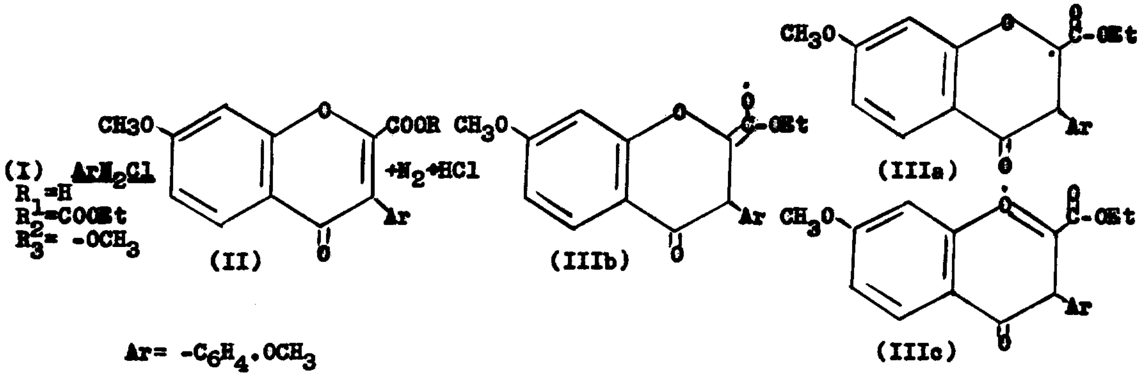
We wish to report here the successful arylation of 2-Carbethoxy-7-Methoxy Chromone(I, R_1= H, R_2 = COOEt, R_3 = OCH_3) by the Meerwein's Reaction[1a,b]. Diazotised para anisidine in solution (ca 25 ml.)(from the base 0.01 mole; HCl, 0.03 mole; $NaNO_2$, 0.01 mole) was coupled (35-40°) with the ester (I)(0.01 mole) in acetone(50 ml.). The catalyst($CuCl_2.2H_2O$, 0.4 g.) and hydrated sodium acetate (0.36 g.) were also present[1c]. After 2 hours, the solution was left for 2 days at room temperature and the steam volatile products removed. The residual liquor yielded a brown mass (3 g.) whose separation was effected by employing ' Inverted Dry Column Chromatography'[2]. An aliquot of 500 mg. was worked (SiO_2 gel; EtOAc-C_6H_{12}) giving, *inter alia*, two slow moving zones. The substance recovered(acetone) from the lower of the two zones was the unchanged (I)(150 mg.), whereas that from the other was a solid(170 mg; 12% based on I) identified to be *2-Carbethoxy 7:4'-Dimethoxy Isoflavone*(II; R = Et, Ar= $-C_6H_4.OCH_3$), crystals(from alcohol) m.p. 117-18°(Found: C, 67.4, H, 5.4, $C_{20}H_{18}O_6$ requires C, 67.79, H, 5.0 percent; ν_{max}^{KBr} 1750(ester), 1655(chromone C=O), 1600 ($Ar_{C=C}$), 685(C-H, a disubstituted benzene), and beyond 3600(overtones)cm^{-1}. It gave hydroxamic test for esters. The free acid (II, R=H) was also obtained[3] and esterified (EtOH-HCl) to its ester (II)(Found: C, 67.7, H, 5.3 percent). The ester (II) from the diazo reaction was identical with the authentic sample in mixed m.p., IR spectra and spots in TLC.



(I)

The results of the coupling reaction can therefore be represented as (I) ⟶ (II). The orientation of the aryl radical at the 3-position can be explained



by the greater resonance facility[1b] available for the lone electron at the 2-position (IIIa ⟷ IIIb ⟷ IIIc) - a possibility which seems enhanced by the participation of the pyrone oxygen (e.g., in IIIc) also. This would be absent in the alternative intermediate free radical were the Ar.radical to add to the 2-position and where resonance stabilisation would be acquired from the chromone $C=O$ only.

The preparation of an Isoflavone 2-Carboxylic Ester through the Diazo Reaction will be feasable on account of the ready availability of (i) a chromone-2-Carboxylic ester as compared to a deoxybenzoin and (ii) the diazotised base. The lesser number of steps involved and milder and simpler experimental procedures used would be the added attractive features of the method.

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