IRIDOIDS OF Orthantha lutea

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By paper chromatography and qualitative reactions we have detected seven substances of iridoid nature (I-VII) in the epigeal part of Orthantha lutea L., family Scrophulariaceae.

From the characteristic coloration of the spots and the different fluorescences in filtered UV light, these substances have been divided into two groups [3-5]: aucubin (IV) and its derivatives (V-VII), and catalpol (II) and its derivatives (I, III).

The iridoids were extracted with hot 50% ethanol with subsequent purification of an aqueous extract with petroleum ether and filtration through a column of polyamide sorbent and alumina. The combined iridoids purified in this way were fractionated with ethyl acetate.

From an aqueous fraction containing substances I-IV, the individual compounds II and IV were obtained in the crystalline state, and from the ethyl acetate fraction containing substances V-VII compound VI was obtained. Catalpol (II), $C_{15}H_{22}O_{10}$, has mp 205-207°C (from methanol, $[\alpha]_D^{20} - 102°$ (c 0.1; ethanol), $\lambda_{max}^{C_2H_5OH}$ 262 nm, R_f 0.30 [system 1) butan-1-ol–acetic acid–water (4 : 1 : 5)] and 0.28 [system 2) butan-1-ol–methanol–water (4 : 1 : 5)].

The IR spectrum of II and that of catalpol, which is given in the literature [4], are identical. A mixture of II with the catalpol that we isolated for the purpose from Catalpa bignoides Wal., gave no depression of the melting point.

For aucubin (IV), $C_{15}H_{22}O_9$, mp 180-181°C (from a mixture of acetone and ethanol, 1 : 3), $[\alpha]_D^{20} - 117°$ (c 0.1; ethanol), $\lambda_{max}^{C_2H_5OH}$ 270 nm, R_f 0.36 (1), 0.42 (2).

The IR spectrum of IV and that of aucubin, which is given in the literature [6], were identical. A mixture of IV with the aucubin which we isolated from Odontites serotina (Lam.) Dum. [2] showed no depression of the melting point.

The composition of compound (VI) is $C_{24}H_{33}O_{11}$, mp 145-147°C (from water), $[\alpha]_D^{20} - 92°$ (c 0, 1; ethanol), $\lambda_{max}^{C_2H_5OH}$ 232, 273, and 282 nm, R_f 0.70 (1), 0.76 (2).

The constants and IR spectrum of VI were identical with those of odontoside (aucubin 5-p-coumarate) from Odontites serotina (Lam.) Dum. [2]. A mixture of VI with odontoside gave no depression of the melting point. After saponification with 25% aqueous ammonia in the boiling water bath, the products from I and III were catalpol and those from substances V-VII aucubin. On alkaline saponification (1% aqueous ammonia, 50°C), V formed aucubin and VII odontoside.

The products of the hydroxylaminolysis of V and VII were shown by paper chromatography to contain acethydroxamic acid with R_f 0.90 (15% acetic acid) and 0.49 [ethyl acetate–acetic acid–water (10 : 2 : 3)], which agrees with literature data [1].

Consequently, it may be assumed that V is aucubin acetate and VII odontoside acetate.

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