

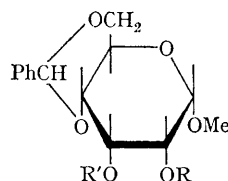
A Synthesis of Javose (6-Deoxy-2-O-methyl-D-allose)

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JAVOSE, a new sugar component of two cardenolide glycosides found in the seeds of *Antiaris toxicaria* Lesch.,^{1,2} has been assigned as 6-deoxy-2-O-methyl-D-allose (IX) on the basis of chemical¹ and other* evidence. The following stereospecific synthesis of javose also confirms this assignment of structure.

Treatment of methyl 4,6-O-benzylidene-2-O-toluene-*p*-sulphonyl- α -D-allopyranoside (I) with benzyl bromide/sodium hydride in *NN*-dimethylformamide⁴ gave the benzylated compound (II), m.p. 135°, $[\alpha]_D^{25} + 7^\circ$ (*c*, 0.5 in CHCl_3), which afforded methyl 3-O-benzyl-4,6-O-benzylidene- α -D-allopyranoside (III) {isolated as a crystalline hydrate, m.p. 58–60°, $[\alpha]_D^{28} + 65^\circ$ (*c*, 0.5 in CHCl_3)} on heating with sodium methoxide in methanol.⁵ Compound (III) gave a crystalline methyl ether (IV), m.p. 82–83°, $[\alpha]_D^{28} + 24.5^\circ$ (*c*, 0.5 in CHCl_3), when treated with methyl iodide/sodium hydride in *NN*-dimethylformamide,⁴ which was smoothly converted into syrupy methyl 3-O-benzyl-2-O-methyl- α -D-allopyranoside (V), $[\alpha]_D^{25} + 132 \pm 3^\circ$ (*c*, 2.25 in CHCl_3), in hot 50% acetic acid. Monotoluene-*p*-sulphonylation and chromatography on silica gel yielded the sulphonate (VI),

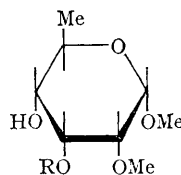


(I) $\text{R}=\text{SO}_2\cdot\text{C}_6\text{H}_4\cdot\text{Me}$; $\text{R}'=\text{H}$

(II) $\text{R}=\text{SO}_2\cdot\text{C}_6\text{H}_4\cdot\text{Me}$;
 $\text{R}'=\text{CH}_2\text{Ph}$

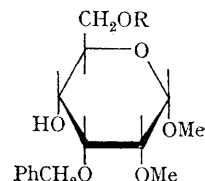
(III) $\text{R}=\text{H}$; $\text{R}'=\text{CH}_2\text{Ph}$

(IV) $\text{R}=\text{Me}$; $\text{R}'=\text{CH}_2\text{Ph}$



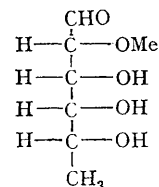
(VII) $\text{R}=\text{CH}_2\text{Ph}$

(VIII) $\text{R}=\text{H}$



(V) $\text{R}=\text{H}$

(VI) $\text{R}=\text{SO}_2\cdot\text{C}_6\text{H}_4\cdot\text{Me}$



(IX)

* We are informed by Prof. T. Reichstein that proof for this structure has been furnished by an independent synthesis.

$[\alpha]_D^{22} + 118 \pm 2^\circ$ (*c*, 0.6 in CHCl_3), and subsequent desulphonyloxylation, with lithium aluminium hydride in benzene-ether,⁵ gave methyl 3-*O*-benzyl-6-deoxy-2-*O*-methyl- α -D-allopyranoside (VII), b.p. 130—135° (bath)/0.5 mm., $[\alpha]_D^{22} + 110^\circ$ (*c*, 0.45 in CHCl_3). Catalytic debenylation⁶ of the latter compound afforded the glycoside (VIII), $[\alpha]_D^{22} + 90 \pm 3^\circ$ (*c*, 1.55 in CHCl_3), which gave 6-deoxy-2-*O*-methyl-D-allose (IX), m.p. 112—114°, $[\alpha]_D^{20} - 54^\circ$ ($\frac{1}{2}$ min.) $\rightarrow -50^\circ$ (1 min.) $\rightarrow -40^\circ$ (*final*, *c*, 1.6 in

H_2O), on hydrolysis with 1*N*-sulphuric acid at 95—100°.

Javose was initially isolated¹ in amorphous form but has since been crystallised.² A synthetic sample (kindly provided by Prof. Reichstein) had m.p. 107—110°, $[\alpha]_D - 42.2 \pm 2^\circ$ (*final*, *c*, 1.3 in H_2O), and was indistinguishable (infrared spectrum and chromatographically) from our preparation.

(Received, August 1st, 1966; Com. 565.)

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² T. Reichstein, personal communication.

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⁵ R. S. Tipson, *Adv. Carbohydrate Chem.*, 1953, **8**, 107.

⁶ R. Mozingo, *Org. Synth.*, 1946, **27**, 77.