p-Hydroxybenzenesulphonamides

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The announcement [1] that 2-*p*-hydroxybenzenesulphonamidothiazole (»Darvisul») has an effect on poliomyelitis virus has suggested to us the preparation of some related compounds (Table 1).

These were prepared by diazotation of the corresponding amino derivatives: The sulphanilamide (0.005—0.01 mole) was dissolved in 100 ml of dilute hydrochloric acid (4 *N*) and cooled at 0—5°; the hydrochloride often separated, but regardless of this the calculated amount of sodium nitrite was added gradually with stirring. The diazonium chlorides separate as beautiful, yellow crystalline precipitates. The suspension of the diazonium salt was added gradually to 150 ml of boiling water; when all had been added, the solution was boiled for half an hour, activated carbon was added, and the hot solution was filtered and chilled. In most cases the hydroxyl compound separated directly, but in some cases the solution had to be neutralized (nos. 5, 8 and 9). The quinoline derivative (no. 5) separates in neutral solution as hydrochloride. The sulphone, no. 9 (analogue of Promizole), separates in acid solution as hydrochloride, but as free amine by addition of excess of ammonia. The precipitates were filtered off and recrystallized from water under addition of activated carbon.

Table 1.

No.	Name	Formula	M. p. °C	% N calc.	% N found
1.	2-(*p*-Hydroxybenzenesulphonamido)-thiazole	$C_9H_8O_3N_2S_2$	221—22	10.93	11.06
2.	2-(*p*-Hydroxybenzenesulphonamido)-benzthiazole	$C_{13}H_{10}O_3N_2S_2$	292	9.15	9.10
3.	2-(*p*-Hydroxybenzenesulphonamido)-5-methyl-thiazole	$C_{10}H_{10}O_3N_2S_2$	231	10.37	10.35
4.	2-(*p*-Hydroxybenzenesulphonamido)-5-methyl-1,3,4-thiadiazole	$C_9H_9O_3N_3S_2$	217—18	15.49	15.05
5.	6-Methoxy-8-(*p*-hydroxybenzenesulphonamido)-quinoline-hydrochloride	$C_{16}H_{15}O_4N_2SCl$	268	7.64	7.53
6.	N-(3,4-Dimethylbenzoyl)-*p*-hydroxybenzenesulphonamide	$C_{15}H_{15}O_4NS$	187	4.59	4.84
7.	6-(*p*-Hydroxybenzenesulphonamido)-coumarin	$C_{15}H_{11}O_5NS$	230—31	4.41	4.72
8.	*p*-Hydroxybenzenesulphonyl-guanidine	$C_7H_9O_3N_3S$	160—62	19.52	19.48
9a.	*p*-Hydroxyphenyl-2-aminothiazolyl(5)-sulphone	$C_9H_8O_3N_2S_2$	260	10.93	10.76
9b.	do. -hydrochloride	$C_9H_9O_3N_2S_2Cl$	247	9.58	9.33

The compounds were tested for bacteriostatic activity on *Diplococcus pneumoniae* (type I), *Eberthella typhosa*, *Staphylococcus aureus* and *Escherichia coli*, but were found to be inactive in the concentration 1 : 5000. Jensen and Schmith [2] have previously found *p*-hydroxybenzenesulphonamide to be inactive on pneumococci even in the

The Steric Connections of β-*iso*-Propyladipic Acid

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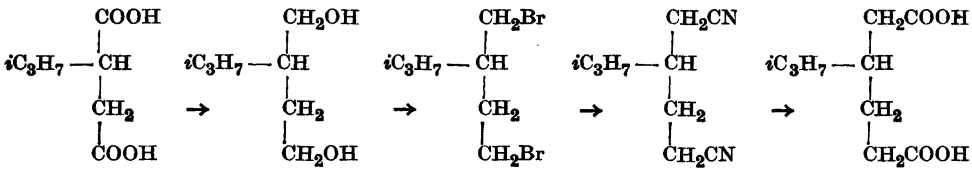
Optically active β-*iso*-propyladipic acid is in several cases obtained on degradation of terpenoid compounds, *e. g.* limonene [1] and phellandral [2], and its steric connections are therefore of special interest for the stereochemistry of the terpene group. Von Braun and coworkers have resolved the racemic acid into the optical antipodes [1] and made several attempts to relate it to the *iso*-propylsuccinic acid [3]. It had previously been found, that (+)-β-methyladipic acid could be degraded to (+)-methylsuccinic acid [4], but corresponding experiments with the *iso*-propyl derivative were unsuccessful. They also tried to go the opposite way:



The initial reduction could be accomplished either by sodium in alcohol or catalytically with copper chromium oxide catalyst at high temperature and pressure. Both methods are, however, known to cause racemisation of an asymmetric carbon atom in α-position and the products obtained were completely inactive.

Reduction of carboxylic acids to primary alcohols can now be performed very smoothly with *lithium aluminium hydride* in ethereal solution [5]. This reaction could be expected to proceed without loss of activity. Racemic and dextro-rotatory *iso*-propylsuccinic acid were therefore treated with lithium aluminium hydride according to Nystrom and Brown [5]. The resulting diols were, without further purification, successively converted to dibromides, dicyanides and dicarboxylic acids using familiar methods. The ultimate yields were rather poor, but the acids obtained could be identified as racemic and dextro-rotatory β-*iso*-propyladipic acid. A closer investigation of the different steps might lead to a better yield.

16 g of racemic *iso*-propylsuccinic acid yielded 1.85 g of crude β-*iso*-propyladipic acid. After recrystallisations from water, benzene and hydrochloric acid, there remained 1.52 g with m. p. 82.5—83.5°.

0.1207 g: 12.11 ml 0.1060 *N* NaOH. — 27.63 mg: 58.25 mg CO_2 and 21.14 mg H_2O.
$C_9H_{16}O_4$ (188.2)
Calc. Equiv. wt 94.1 C 57.43 H 8.57
Found » » 94.0 » 57.49 » 8.56

8 g of pure (+)-*iso*-propylsuccinic acid having $[\alpha]_D^{25} = +22.9°$ in aqueous solution [6] gave 0.91 g of crude β-*iso*-propyladipic acid. After recrystallisations from water and hydrochloric acid, there remained 0.55 g having m. p. 71—73°.

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concentration 1 : 200 and *p,p'*-dihydroxydiphenylsulphone to possess only a slight bacteriostatic activity (1 : 4000).

1. *Lancet* (1948) II, 614.
2. Jensen, K. A., and Schmith, K. *Z. Immunitätsforsch.* **102** (1942) 276.

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