

University of Groningen

Eenvoudige disulfocarbозuren

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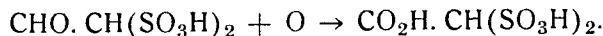
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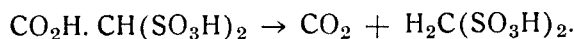
VII. SUMMARY OF RESULTS.

The purpose of this research was to prepare and to study simple aliphatic disulphocarboxylic acids.

The most simple example is *disulphoacetic acid*. It was prepared by oxidation of formylmethionic acid with hydrogen peroxide in acetic solution:

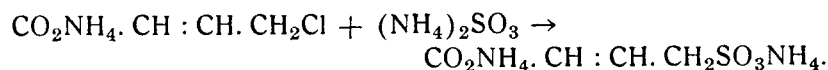


The disulphoacetic acid crystallizes with $2\frac{1}{2}$ mol. of water (m.p. 85—86°). By heating at 130° it decomposes into carbon dioxide and methionic acid:

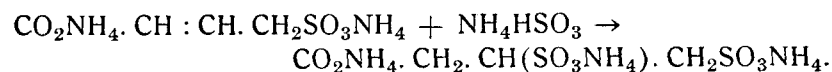


Three disulphobutyric acids are described, viz. β, γ -, α, γ - and α, β -disulphobutyric acid.

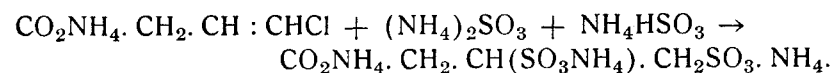
In order to obtain β, γ -disulphobutyric acid, γ -sulphocrotonic acid was prepared. This unsaturated acid is not known in chemical literature. It arises by the action of γ -chlorocrotonic acid with sulphite:



The free acid, several salts, the dimethyl ester and the dichloride are described. By addition of bisulphite to γ -sulphocrotonic acid, β, γ -disulphobutyric acid is formed. The velocity of this reaction at 80° was measured.

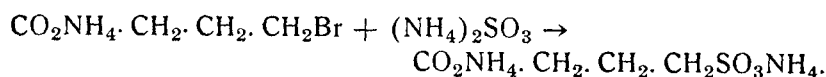


The same disulpho acid is also formed by the action of two molecules sulphite with one molecule γ -chlorovinyl acetic acid:



The free β, γ -disulphobutyric acid gives a dihydrate melting at 95°.

α, γ-Disulphobutyric acid is formed by sulphonation of *γ-sulphobutyric acid*, which can be obtained by the action of sulphite with *γ-bromobutyric acid*:



This monosulphocarboxylic acid contains $\frac{1}{2}$ mol. of water and melts at 93—93.5°.

Our hope to obtain *α-sulpho-γ-bromobutyric acid* by sulphonation of *γ-bromobutyric acid* (for the preparation of *α, γ-disulphobutyric acid*) was not fulfilled, because this reaction gave *α-sulpho-γ-oxybutyric acid*. Neither could *α, γ-disulphobutyric acid* be obtained by addition of bisulphite to *α-sulphovinylacetic acid*.

The sulphonation of *β-sulphobutyric acid* gives a mixture of a saturated and a unsaturated disulphocarboxylic acid with four carbon atoms. Catalytic reduction of this mixture yields the *α, β-disulphobutyric acid*.

The three disulphobutyric acids were separated into their enantiomorphs by means of the strychnine salts. The strychnine salt of the dextrorotating component of *β, γ-* and *α, γ-disulphobutyric acid* is the least soluble. The salts of *α, β-disulphobutyric acid* show a rotation opposite to that of the free acid.

	[M] _{DSalt}	[M] _{Dacid}
<i>α, β-disulphobutyric acid</i>	− 6°	+ 16°
<i>α, γ-</i> " "	7°	9°
<i>β, γ-</i> " "	50°	60°

The racemisation was examined; only for the two acids, which have a sulpho group fixed to the *α*-carbon atom, a decrease of the rotation is noticed.