XLVIII. NOTE ON DIHYDROXYACETONE.

By HARRY GORDON REEVES AND EDWARD TOBIAS RENBOM.

From the Department of Physiology and Biochemistry, St Bartholomew's Medical College, London.

(Received January 31st, 1931.)

THE fact that dihydroxyacetone spontaneously polymerises [Levene and Walti, 1928] and also exists in two distinct crystalline modifications which are readily interconvertible [Abderhalden, 1911] makes it a matter of difficulty to prepare a consistently pure specimen. The commercial product as supplied by Meister, Lucius, Brüning and Co. under the name of "oxantin" which has been extensively used, gave variable results when tested physiologically, and we have shown [Reeves and Renbom, 1929] that on standing it becomes sticky and gives rise to appreciable quantities of lactic acid. The following typical treatment of the impure material gives a pure and stable compound.

EXPERIMENTAL.

Fifty grams of the commercial product were suspended in either 100 cc. of absolute alcohol, or better, pure acetone and shaken continuously for 24 hours at room temperature. After filtering and washing with the solvent, the precipitate was dried in a vacuum over CaCl_2 for 2 days. The filtrate was bright yellow in colour and strongly acid (p_{H} 5-5.5) and after removal of the solvent gave a clear yellow sticky mass which contained, in addition to lactic acid, traces of methylglyoxal as reported by Bernhauer and Wolf [1929]. 25.65 g. (51.3 % yield) of precipitate were thus obtained. Recrystallised from hot absolute alcohol it gave long colourless prismatic plates, soluble in H_2O , sparingly soluble in organic media and melting indefinitely at 82-83.5° to a colourless liquid. At the melting point a turbidity developed and re-solidification was difficult owing possibly to the occurrence of dissociation.

Analysis C 39.96 %, H 6.65 % (theoretical C 40 %, H 6.66 %); a cryoscopic determination of the molecular weight in aqueous solution gave $M = 130$ (theoretical for the bimolecular compound $M = 180$) similar to that obtained by Wohl [1898].

The crystals were further identified by preparing the phenylosazone, m.p. 132°. Hence the dihydroxyacetone obtained was the bimolecular α -modification. When distilled under reduced pressure (5-8 mm.) it gives a distillate which crystallises in colourless needles m.p. 68-71.5° and is unimolecular as determined cryoscopically in aqueous solution, $M = 86$ (theoretical $M = 90$)¹. This

¹ Dr F. Dickens informs us that he has obtained a similar result from both the crude and the purified oxantin.

latter compound corresponds to that obtained by Fischer and Mildbrand [1924] and is evidently the β -modification.

The authors wish to express their thanks to the Royal Society for a personal grant to one of them (H.G.R.) which has defrayed the cost of this work.

REFERENCES.

- Abderhalden (1911). *Biochem. Lexikon*, **2**, 270.
Bernhauer and Wolf (1929). *Biochem. Z.* **212**, 443.
Fischer and Mildbrand (1924). *Ber. deutsch. chem. Ges.* **57**, 707.
Levene and Walti (1928). *J. Biol. Chem.* **78**, 23.
Reeves and Renbom (1929). *Chem. Ind.* **48**; *Proc. Biochem. Soc.* Dec. 13th.
Wohl (1898). *Ber. deutsch. chem. Ges.* **31**, 2394.