

Thiouracil			Methyl thiouracil		
No. of rats	Daily dose (mgm./gm.)	Average wt. of thyroid (mgm./100 gm. body wt.)	No. of rats	Daily dose (mgm./gm.)	Average wt. of thyroid (mgm./100 gm. body wt.)
11(6♂5♀)	0.10	12.68	10(5♂5♀)	0.05	15.70
9(4♂5♀)	0.025	8.67	8(5♂3♀)	0.0125	8.37
10(5♂5♀)	0.00625	6.77	9(4♂5♀)	0.003125	6.37
10(5♂5♀)	Nil	4.45		Nil	4.45

n-Propyl thiouracil		
No. of rats	Daily dose (mgm./gm.)	Average wt. of thyroid (mgm./100 gm. body wt.)
7(3♂4♀)	0.10	28.57
7(3♂4♀)	0.025	17.65
7(3♂4♀)	0.00625	18.92
7(3♂4♀)	0.00156	12.22
7(3♂4♀)	Nil	6.30

Histological examination of the thyroids of rats treated with n-propyl thiouracil revealed the usual marked hyperplasia with absence of 'colloid' material and increased height of epithelial cells. In some instances, with the lower doses, the degree of hyperplasia was not so marked as would have been expected in view of the large increase in the weight of the thyroid.

The acute oral toxicity of the series of compounds is also being determined. The L.D. 50 by oral administration to rats of n-propyl thiouracil is approximately 1.25 mgm./gm. compared with 1.5 mgm./gm. for methyl thiouracil. The interpretation of these figures is rendered difficult by the relative insolubility of the substances and the consequent uncertainty regarding the proportion of the drug absorbed from the gastro-intestinal tract. This uncertainty probably does not apply to the doses used to test the therapeutic action of the drugs, since these amounts were sufficiently small to be given in aqueous solution.

Chronic toxicity tests on n-propyl thiouracil, during which oral doses were given daily for four months, showed that, under these conditions, a daily dose of 0.1 mgm./gm. produced a 50 per cent mortality in a group of 10 rats and a dose of 0.05 mgm./gm. a mortality of 10 per cent, the latter rate being identical with that in the control group animals. A comparison of the rate of growth of the animals in these last two groups shows that, whereas the control rats grew steadily throughout the period of the experiment, the rats receiving 0.05 mgm./gm. per day of n-propyl thiouracil ceased to grow after the twentieth day and thereafter suffered a slight but steady loss of weight.

We are indebted to Dr. J. F. Martin for supplies of the thiouracil derivatives, and to the Directors of Genatosan Ltd. for permission to publish this note.

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Anderson *et al.*, *J. Amer. Chem. Soc.*, **67**, 2197 (1945).

### Sugar of Human Semen

In a note added in proof to a recent paper<sup>1</sup>, and in a later communication<sup>2</sup>, Dr. T. Mann states that the sugar present in seminal plasma—that of the bull, ram and boar were under investigation—has been identified as *D*-fructose. I can offer independent corroboration of this interesting finding in a hitherto unpublished observation made on human semen. In 1942 I had the opportunity of applying to three fresh specimens of human seminal plasma from three separate donors the highly specific skatole colour test for fructose described by Jordan and Fryde<sup>3</sup>. The results were strongly positive, indicating that fructose comprised the bulk of the sugar present in each of the human specimens examined. Thus, the total 'reducing substance' present in the three specimens as determined by the Shaffer-Hartman procedure was 406, 392 and 325 mgm./100 ml. A quantitative application of the skatole test<sup>4</sup> gave corresponding fructose figures of 400, 365 and 290 mgm./100 ml. respectively.

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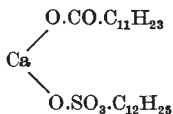
<sup>1</sup> *Biochem. J.*, **39**, 458 (1945).

<sup>2</sup> *Nature*, **157**, 79 (1946).

<sup>3</sup> *Biochem. J.*, **32**, 279 (1938).

### A Surface Interaction between Sodium Soaps and certain Sodium Alkyl Sulphates

In the course of study of foaming characteristics of solutions of sulphated detergents in the presence of soap and hard water, Miles and Ross<sup>1</sup> found that the behaviour of sodium lauryl sulphate foams in the presence of calcium chloride, and sodium laurate was accountable on the basis of the formation of the insoluble complex



We find that in hard water and even in distilled water relatively very small quantities of soap (for example, sodium stearate) exert a strong foam-breaking influence on neutral or alkaline solutions of certain sodium alkyl sulphates.

In particular, we have synthesized and studied the sodium n-tetradecan-sulphates, and find that the sensitivity of the reaction with soap in distilled water is greatly influenced by the point of attachment of the —SO<sub>3</sub>Na group to the tetradecane chain. Thus the foam stability of 1/4 per cent solutions of sodium tetradecan-1- and 2-sulphates is little affected by moderate amounts of soap. With the 3-sulphate interaction becomes evident, and with the 6- and 7-sulphates is extremely marked. For example, when 50 ml. of a 1/4 per cent aqueous solution of sodium tetradecan-6- or -7-sulphate is shaken in a stoppered 100 ml. measuring cylinder, a foam which breaks to half its initial bulk (to top of cylinder) in about 15 minutes is obtained. Addition of 0.25 ml. 1/4 per cent sodium stearate to the tetradecan-sulphate solution just before shaking caused the foam to break completely in a matter of seconds. In a similar experiment with sodium tetradecan-3-sulphate, 1 ml. of 1/4 per cent sodium stearate was required to produce a similar reduction in foam stability.

Smaller or larger amounts of sodium stearate give more stable foams. Those with less sodium stearate approximate in visual characteristics to tetradecan-sulphate foams, and those with more sodium stearate (for example, with 2 ml. 1/4 per cent stearate in the case of the 7-sulphate or with 4 ml. for the 3-sulphate) approximate in visual characteristics and stability to sodium stearate foams. It appears as if the sodium stearate displaces the sodium tetradecan-sulphate from the bubble surfaces in the foam.

A surface-active species so easily displaced from a surface might itself be expected to have poor detergent properties. In this connexion, we have confirmed the results of Miles *et al.*<sup>2</sup> that the detergent properties of isomeric sodium alkyl sulphates diminish markedly as the sodium sulphate group recedes from the end of the hydrocarbon chain. Thus while in detergency sodium tetradecan-1-sulphate is roughly the equal of sodium oleate, sodium tetradecan-7-sulphate is markedly inferior. Also the sodium sulphonate 'Aerozol OT' (sodium sulpho di-octyl succinate), a commercial wetting agent, shows the foam depression effect with soap very strongly and has only poor detergent properties.

The defoaming effect of soap is greatest on its initial addition to the sodium secondary alkyl sulphate solution and gradually diminishes somewhat on standing (half an hour). Thus it appears that besides surface interaction there is some action in bulk. It is hoped to publish further details of this and related work later elsewhere.

I am indebted to the N. V. de Bataafsche Petroleum Maatschappij for permission to publish this note.

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<sup>1</sup> *Ind. Eng. Chem.*, **35**, 1298 (1943).

<sup>2</sup> *Ind. Eng. Chem.*, **36**, 610 (1944).

### X-Ray Diffraction Pattern of Bone: Evidence of Reflexions due to the Organic Constituent

In the course of a recent study of rachitic rat bone, it has been found that bone specimens of low mineral content give a collagen type of diffraction pattern superimposed on the pattern given by the inorganic constituent. This supports a claim first put forward by Strauman<sup>1</sup> who, however, based his conclusions on incomplete experimental evidence. The conclusions of later workers that the organic constituent of bone is entirely amorphous<sup>2</sup> or that its diffraction pattern is completely masked by that of the inorganic constituent<sup>3</sup> have not been confirmed.

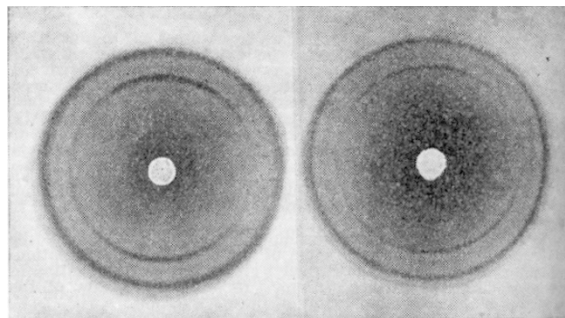


Fig. 1. RACHITIC BONE Fig. 2. TRYPSIN-DIGESTED BONE

In a recent review of the literature on bone structure, Fankuchen<sup>4</sup> has shown that considerable controversy still exists regarding the exact composition of bone inorganic material, but that the unit cell dimensions have been accurately determined. In the present investigation, all indices have been assigned on the basis of the hexagonal unit cell given by Bale<sup>5</sup>:

$$a = 9.37 \pm 0.02 \text{ A.} \quad c = 6.88 \pm 0.02 \text{ A.}$$

A comparison was made of the diffraction patterns given by intact rachitic bone, trypsin-digested bone and decalcified bone. Figs. 1