

Venkataraman, *ibid.*, 1934, 513; Mahal, Rai and Venkataraman, *ibid.*, 1120, 1769. 5. Späth and Lederer, *Ber.*, 1930, 63, 745. 6. Shriner and Hull, *J. Org. Chem.*, 1945, 10, 228, 288.

MANUFACTURE OF TAURINE

ALTHOUGH several processes exist for synthesising taurine, the method by which it could be made cheaply on a commercial scale was published recently by Goldberg¹ who reacted β -amino ethyl sulphuric acid with sodium sulphite with or without pressure to obtain a 70 per cent. yield of pure taurine. β -Amino ethyl sulphuric acid can be made in quantitative yields by sulphonation of ethanolamine after the method of Rollins and Calderwood².

The commercial process³ for the manufacture of taurine as worked by Messrs. I. G. Farben Industries, Germany, consists in the reaction of hydroxyethane sodium sulphonate with NH_3 at 200 atmosphere pressure and a temperature of 280°C . under nitrogen cushion. The hydroxy ethane sodium sulphonate is obtained by them by reacting a solution of sodium bisulphite with ethylene oxide also under inert atmosphere. These methods, as can be seen, are very difficult under present conditions in India.

The difficulty in Goldgerg's method is the separation of pure taurine from the reaction mass. The method employed is not only expensive but involves severe corrosive conditions.

This method is now modified by us with a view to making it attractive for commercial production.* β -Amino ethyl sulphuric acid (1 mol.) is boiled with sodium sulphite (1.1 mol.) for about 48 hours when the reaction is complete. The solution contains taurine together with sodium sulphate which is formed as a by-product. The boiling solution is then treated with a solution of calcium chloride (25% solution) taking care that no excess is added. Calcium sulphate which is formed settles rapidly. It is filtered and the resulting solution is concentrated to remove sodium chloride. Due to low solubility of sodium chloride, most of it is precipitated. The solution is filtered and then cooled in ice when crystal taurine crystallises, yield 80 per cent. of theory. The resulting solution contains probably di-taurine as a yellow waxy mass. Igepons as marketed by I. G. Farben Industry contains

sodium sulphate and sodium chloride as diluents.

For β -amino ethyl sulphuric acid we used a product marketed by B. F. Goodrich Co., Inc. Cleveland, Ohio, U.S.A., under the name of Goodrite β -amino ethyl sulphuric acid. It is available as white crystalline solid of 98 per cent. purity at a price ranging around 45 cents f.o.b.

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1. Goldberg, *J.C.S.*, 1943, 4. 2. Calderwood, *J.A.C.S.*, 1938, 60, 2312. 3. Hoechst, *B.I.O.S. Final Report*, 418, 9.

* Between 2000-3000 tons of Igepons are imported at present annually and used in India in the making of paper, textiles, etc.

EFFECT OF STREPTOMYCIN ON GLYCERINE VACCINE LYMPH (CALF LYMPH)

CONTRARY to the views held by some workers,^{1,2} penicillin is ineffective³ in reducing microbiological contaminants of vaccine lymph.

Preliminary sterility tests on streptomycin-treated lymphs after its removal revealed that a concentration of 5 mg. per ml of streptomycin was necessary to destroy the staphylococcus group of organisms from the vaccine lymph. The staphylococcal population, about 252 millions per ml. of vaccine lymph before treatment, was reduced to a mere 240 per ml. within 24 hours contact in cold storage (-10°C) with streptomycin in 5 mg. concentration and to 40 per ml., in another week's time. A few of the *B. subtilis* group remained unaffected by streptomycin even in higher concentrations, possibly because of their existence as spores. In combination with 500 units of penicillin, as little as 500μ gm. of streptomycin per ml., of vaccine lymph gave almost the same result Bigger,⁴ Chain & Duthie,⁵ Himmelweit⁶ and Pulaski, *et. al.*⁷ find that certain antibiotics in combination with sulphanamides, bacteriophages or antibiotics produce such a synergistic action.

The potency of vaccine lymph is unaffected both by streptomycin and penicillin in contrast to chloroform which lowers the potency.