around pH 4 to pH 5; even at pH 1.5 and pH 7.5 the enzyme can be heated in a boiling water bath for five minutes with only little loss of activity. The rate of action upon yeast nucleic acid increases with temperature up to 75° C.; it then decreases sharply and no appreciable action can be detected at 85° C. When an enzyme-substrate mixture is maintained at 95° C. no enzymatic hydrolysis occurs; if, however, the same mixture is now brought back to a temperature compatible with enzymatic activity (60° C., for instance), the nucleic acid is rapidly decomposed, indicating that the inhibiting effect of high temperatures upon the enzyme-substrate mixtures is completely reversible.

The enzyme appears to be a protein; it is readily salted out in saturated sodium sulfate solutions; it is rapidly decomposed by pepsin, but is very resistant to trypsin and chymotrypsin.

After being acted upon by the polynucleotidase, the yeast nucleic acid becomes soluble in mineral acids and glacial acetic acid; the purified preparations of the enzyme, however, do not release any inorganic phosphorus from yeast nucleic acid or indeed from any phosphoric esters tested. In other words, the enzyme does not behave as a phosphatase. No action could be detected upon thymus nucleic acid.

In 1913 Jones[2] stated that he had observed in a preparation of digested pancreas the existence of a principle capable of breaking down yeast nucleic acid into dinucleotides. This observation does not seem to have been confirmed and the same author himself stated later that "it has been found difficult to repeat this experiment."[3] It appears, however, that the enzyme described in the present paper may be the same as that discovered by Jones.

As stated elsewhere, the same enzyme preparations which decompose yeast nucleic acid are also capable of rendering heat-killed pneumococci Gram negative.[4] It appears possible that the same agent is responsible for both types of actions, since the effect of temperature, of trypsin and of pepsin is common to both reactions. Furthermore, it has been possible to extract from pneumococcus cells a soluble fraction which reacts like nucleic acid and which is readily decomposed by the enzyme.

Finally, it may be stated that several samples of crystalline trypsin and chymotrypsin[5] have been found to contain small amounts of a heat-resistant principle which attacks both yeast nucleic acid and heat-killed pneumococci. Both types of action could be completely eliminated by repeated recrystallizations of the proteolytic enzymes.

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[3] W. Jones, *Monographs on Biochemistry*, 37, 1914.

[4] R. Dubos and C. M. MacLeod, *Proc. Soc. Exp. Biol. and Med.* In press.

[5] The author is indebted to Drs. J. H. Northrop and M. Kunitz for supplying him with several samples of crystalline trypsin and chymotrypsin.

THE PREPARATION OF CRYSTALLINE β-4-GLUCOSIDOSORBITOL AND ITS NONOMETHYL DERIVATIVE

RECENTLY Karrer and Büchi[1] reported on the reduction of cellobiose to β-4-glucosidosorbitol. They failed to obtain the substance in crystalline form or analytically pure. In view of the importance which this method of catalytic reduction is acquiring in the domain of sugar chemistry, we wish to report on the preparation of β-4-glucosidosorbitol in form of beautifully crystalline platelets, melting at 133° C. and having a specific rotation in water, $[\alpha]_G^{25} = -8.7°$.

The reduction of the cellobiose was carried out in aqueous solution under pressure of 100 atmospheres in the presence of Raney's catalyst, the temperature being 75° during 8 hours of each day, the remaining part of each day the temperature remaining at about 25°. The operation lasted 48 hours.

The composition of the substance was C 41.83, H 7.21. Calc. C 41.83, H 7.03.

A single methylation with dimethylsulfate under conditions of West and Holden gave an exhaustively methylated product, which distilled at 170° and 0.2 mm pressure. The specific rotation of the substance was $[\alpha]_D^{25} = -4.93°$ (absolute ethanol) and the composition of the substance was C 53.34, H 9.01, OCH_3 58.91. The theory required C 53.37, H 9.00, OCH_3 59.32.

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[1] P. Karrer and J. Büchi, *Helv. chim. Acta*, 20: 86, 1937.

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