BIOCHEMISTRY

Crystalline β-Nigerose

Since its isolation from the partial hydrolysate of nigeran by Barker *et al.*[1], nigerose (3-0-α-D-glucopyranosyl-D-glucose) has been obtained from various sources. In each case, octa-acetate of the sugar was readily obtained in crystalline form, but the free sugar was highly hygroscopic and had hitherto not been successfully crystallized. We were able to prepare this sugar with a fairly good yield by the acetolysis of dextran[2] and we have now crystallized the free sugar.

When 390 g of the dextran from *Leuconostoc mesenteroides* B[3] (in our earlier report[2] the name of the strain was incorrectly given as *L.m.* NRRL, *B*-421) was acetolysed, fractionation on a charcoal column yielded 41 g of crude nigerose. When this amorphous nigerose was dissolved in 80 per cent methanol and allowed to stand at room temperature for about ten months, during which the solvent was evaporated, a part of the syrup showed crystalline appearance. A small portion of the crystallized part was added, as a nucleus, to a solution of 10 g of nigerose in 80 per cent methanol. Crystallization occurred very slowly and, after a week, 3·5 g of fine crystalline product was obtained (Fig. 1). The yield of the crystal was not satisfactory as compared with other common sugars, and crystallization took at least several days and sometimes several months.

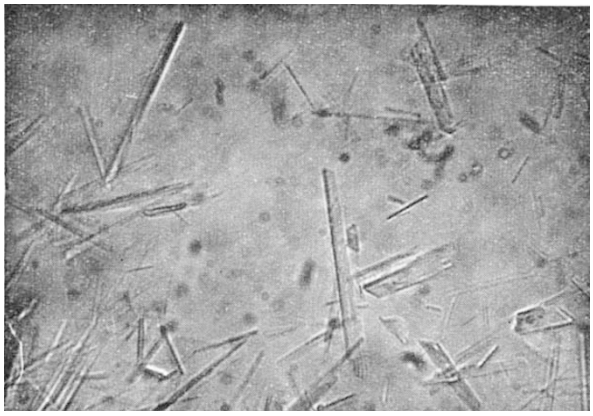

Fig. 1

On drying *in vacuo* at room temperature or at 100° C in atmospheric pressure, the crystal was less hygroscopic. Recrystallized nigerose had a melting point of 156° C (uncorrected) and $[\alpha]_D^{19} = +125° \rightarrow 138°$ (17 h) (approximately 2·0 in water). (Observed values were: C, 42·32; H, 6·43 per cent; values calculated for $C_{12}H_{22}O_{11}$: C, 42·11; H, 6·48 per cent). The upward mutarotation indicated that this crystalline nigerose was the β-anomer. Complete acid hydrolysis of this crystalline nigerose gave D-glucose equivalent to 99·8 per cent of the theoretical value. Acetylation with pyridine as a catalyst produced only β-nigerose octa-acetate, which showed no depression of melting point on admixture with the known specimen; m.p. 150° C, $[\alpha]_D^{12} = +83°$ (approximately 2·1 in chloroform). The infra-red spectrum (KBr disk) of this crystalline nigerose showed the absorption peak at 842 cm^{-1} (α-linkage)[4] and also at 892 cm^{-1} (β-anomer)[4]; the latter was not observed in amorphous nigerose[4,5]. Furthermore, no absorption peak around 1,650 cm^{-1} (free water or water of crystallization)[4] was observed in the above spectrum. The X-ray diffraction data (interplanar spacing (Å), CuK_α radiation: relative intensity as percentage of strongest line, estimated visually) were: 7·34 : 30, 7·08 : 20, 4·46 : 50, 4·29 : 20, 4·18 : 100, 3·81 : 20, 3·53 : 10, 3·34 : 10, 3·12 : 10.

From the above properties, it is now confirmed that this crystalline product is anhydrous β-nigerose.

We thank the Department of Pharmacology, of this University, for microanalysis, and Dr. J. Masui for X-ray diffraction measurements.

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Alpha-Amylase Activity of Varieties of English Wheat

One criticism of English wheat is its often very high and variable α-amylase activity. It is well known that as the wheat grain begins to germinate its α-amylase activity increases very rapidly. Conditions during a wet harvest are such that many samples of English wheat yield flours which are unsuitable for bread production by reason of this high activity.

In a recent examination of 109 flours milled from wheats supplied by the National Institute of Agricultural Botany grown at its headquarters and sub-stations, the α-amylase activity ranged from 1–141 Farrand units[1] with a mean of 7. Some samples of flour gave activities which one would normally associate with wheat containing weathered and prematurely sprouted grain, although based on their visual appearance they were bright and free from sprouted grain.

In particular, one variety of winter wheat, 'Professeur Marchal', gave flours the activity of which ranged from 15–141 units, with a mean of 72.

Flour from 'Cappelle Desprez', grown and harvested under the same conditions as the former variety, had activities ranging from 6 to 12 units, with a mean of 8.

Since much English wheat is bought and sold on its appearance, it is important to wheat buyers to know which varieties are likely to produce samples of unusually high α-amylase activity and yet appear to be bright and attractive. It would therefore be worth while to make a detailed examination of present and future varieties of wheat from this angle.

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Chemical Analysis of Proteins Low in Aromatic Amino-acids

Methods for protein estimation in common use such as ultra-violet absorption and the method of Lowry *et al.*[1] rely on the presence in the molecule of the aromatic amino-acids tyrosine and tryptophan, and if these are present in low concentrations, estimates of protein will be subject to error. Our *in vivo* investigations into blood coagulation[2] have revealed that the active moiety, serum thrombotic accelerator[3], which plays an important part in this mechanism, is low in aromatic groups. This deficiency was first indicated from the ultra-violet absorp-