
SEPARATION AND IDENTIFICATION OF SUGARS FROM MIXTURES

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In the attempt to develop methods for the separation and identification of sugars in mixtures several derivatives have been studied. The indirect methylation procedure (1938) is suitable for analytical separation by vacuum distillation of mixtures of mono-, di-, and trisaccharides but has not been found capable of development for further separation within these groups. Study of procedures involving crystallization of osazones, triphenylmethyl ethers, acetyl derivatives, and others has not proven satisfactory. Crystallization of the derivatives made from carbohydrate mixtures does not result in a smooth separation of the components. Triphenylmethyl ethers of xylose, glucose, galactose, maltose, lactose, trehalose were prepared. All are crystalline solids but these derivatives also were ineffective in helping to separate mixtures.

Satisfactory separations have been achieved by means of completely propionylated derivatives of sugars, prepared by action of propionic anhydride and pyridine on the sugar. Several of these

propionates (maltose, gentiobiose, trehalose, sucrose, xylose, arabinose) are readily crystalline. All are distillable at low pressures (0.01 to 0.0001 mm.) in a special apparatus, even raffinose hendecapropionate. Since the propionyl group can be cleaved, after distillation, into appropriate fractions without rupture of the glycoside linkages, it is possible to convert non-crystalline propionates into other crystalline derivatives. Investigations of such mixtures as acid-hydrolysed corn sirup, hydrol, malt extract, etc., have already given fruitful results with this method. Gentiobiose has been isolated in ten percent yields as crystalline gentiobiose octapropionate from the disaccharide portion of hydrol. Maltose has been isolated similarly as crystalline maltose octapropionate from both non-diastatic malt extract and acid-hydrolyzed corn sirup. In addition, a convenient analysis of sugar mixtures has been developed, the essential features of which are propionylation and subsequent distillation of the sugar propionates at low pressures.