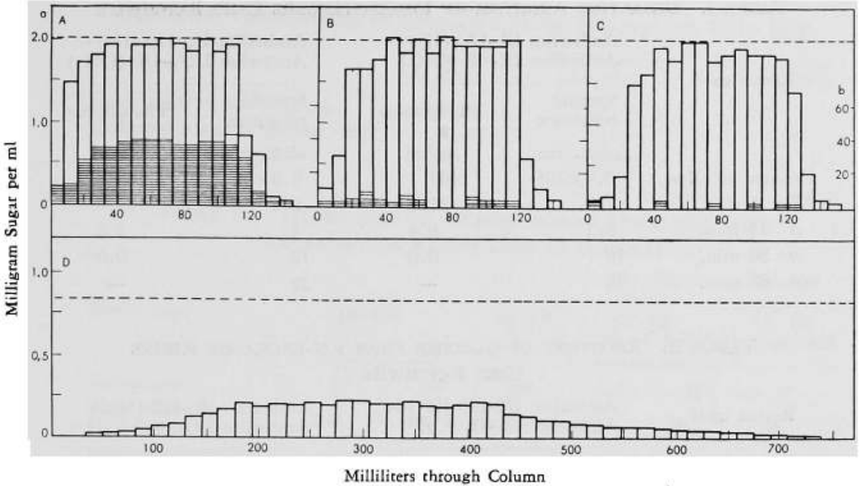

FIG. 1. Adsorption of Sugar by Strong-base Anion-exchangers and Hydrolysis of Sucrose by Strong-acid Cation-exchangers.

A broken line in the upper part of each diagram shows the original concentration of the sugar solution added to the column. The shadded area shows the amount of reducing sugars.

Ordinate: a. concentration of total sugar in mg./ml.
b. concentration of reducing sugar in μg./ml.
Abscissa: volume of effluent run out of column.
Flow rate: 2 ml./min.
A: Amberlite IR-120 (H^+), 2.5 sq.cm.×5 cm. Temperature: 28°. Recovery of sucrose, 102.9%; hydrolysis of sucrose, 2.0%.
B: Amberlite IR-4B (OH^-), 2.5 sq.cm.×6 cm. Temperature: 28°. Recovery of sucrose, 100.6%; hydrolysis of sucrose, 0.19%.
C: Vertically-connected columns of Amberlite IR-120 (H^+) (2.5 sq.cm.×5 cm.) and Amberlite IR-4B (OH^-) (2.5 sq.cm.×6 cm.). Temperature: 6°. Recovery of sucrose, 104.0%; hydrolysis of sucrose, 0.05%.
D: Amberlite IRA-410 (OH^-), 2.5 sq.cm.×6 cm. Temperature: 28°. Recovery of glucose, 100.1%.

and fructose always amounted to 98% or more of the sugar added to the columns, when these columns were washed with an equal volume of water after passage of the sugar solution.

In the batchwise method, it was at first necessary to know how long the sugar solution should be let to stand in contact with the resin to effect complete desalting. Williams et al.[12] allowed a suspension of 2 g. (dry wt.) each of anion and cation exchangers in 50 ml. of a sugar solution to stand for 2 hrs. with occasional shaking at every ten min., while Jones[13] agitated the same suspension for 15 min. Therefore, the time of contact of a solution with the resins necessary for complete desalting was determined by using a solution of mixed inorganic salts.

A mixture of 5 ml. each of IR-120 (H^+) and IR-4B (OH^-) resins was suspended in 50 ml. of a salt solution containing 100 mg. of potassium dihydrogen phosphate and 10 mg. each of calcium chloride dihydrate, magnesium chloride hexahydrate, and sodium chloride*. The suspension was cooled in an ice-water bath with occasional shaking. Before and after shaking for 5, 15, 30, and 60 min., aliquots were withdrawn and orthophosphate contents were determined by the method of Nakamura[14]. At the same time, specific resistance of the treated solution was

---

[12] K. T. Williams, A. Bevenue and B. Washauer, *J. Assoc. Offic. Agr. Chemists*, **33**, 980 (1950); cited by D. J. Bell, in K. Paech and M. V. Tracey (eds.), Modern Methods of Plant Analysis, Vol. II, p. 5. Springer Verlag (Berlin, 1955).

[13] N. R. Jones, *Biochem. J.*, **68**, 704 (1958).

* The solution contains the maximum amount of salts which would be extracted from potatoes by the method which will be given later in this paper.

[14] M. Nakamura, *Nippon Nôgei-kagaku Kaishi*, **24**, 1 (1950).