The carbohydrates employed were: glucose, fructose galactose xylose, arabinose, lactose and maltose. The results recorded are the average of a large number of independent series. The purity of all the sugars was checked by means of the polaroscope.

It was found that the Hagedorn-Jensen method gives the best agreeing results. The values found by us in comparison with those of other investigators are summarized in the following table:

Studies were also made to determine some of the factors which might explain the anomolous behavior of galactose toward the Folin-Wu sugar reagents.

The conclusions reached from this study are as follows:

SUMMARY.

1. Our values except those for levulose agree with the data of previous investigators.

2. Levulose has a higher reduction value than glucose.

3. The difference in behavior of galactose and glucose toward Folin-Wu copper solution is not due to difference in velocity of reduction or differences in pH, but to structural differences in the two sugars.

4. Glucose picric acid standards used in the Benedict-Lewis methods are stable for a period of at least two years.

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A rapid method for determination of the free and hydrolyzable sugar content of foodstuff.

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One of the most important factors in the preparation of diabetic diets, as well as in the study of the relationships between diet and sugar metabolism, is the carbohydrate content of the injested foodstuffs. The most extensive data on this subject is

found in Bulletin No. 28 of the U. S. Department of Agriculture. Unfortunately the carbohydrates in the majority of cases have been determined by difference and hence do not differentiate between the free and hydrolyzable sugar content. Furthermore, since the carbohydrate content of fruits and vegetables varies between wide limits, it is often necessary to analyze the diet used, rather than depend upon figures gathered at random. Of the various procedures for the analysis of the carbohydrate content of foodstuffs the method of Dutcher and Thomas for reducing sugars in plants seemed to adapt itself most readily to the rapid analysis of food materials.

1. Dutcher and Thomas[1] method for analyzing the free sugar content of plant material has been adopted to the analysis of the free carbohydrates in general foods and fruits.

2. Lloyd's reagent may be substituted for mecururic nitrate as a clarifying agent and the Benedict-Osterburg or Lewis-Benedict methods are applicable in the presence of alcohol.

3. A four-hour extraction period with 75 per cent alcohol is sufficient to extract completely 2,000 mgs. of glucose, fructose, galactose, xylose, and arabinose.

4. Maltose, lactose, raffinose and sucrose are extracted by 75 per cent alcohol.

5. Sucrose is not appreciably hydrolyzed by a four-hour extraction with 75 per cent alcohol, nor as pointed out by Dutcher and Thomas, is it hydrolyzed by 15′ boiling with picric acid and $Na_2\ CO_3$.

6. The analysis of a few common food materials for free and hydrolyzable carbohydrates is presented.

[1] Thomas, W., and Dutcher, R. A., *J. Am. Chem. Soc.*, 1924, xlvi, 1662.

Free and Hydrolyzable Sugar in Some Common Foods.

Foodstuff	Per cent free sugar	Per cent hydrolyzable sugar	Per cent total sugar	Sugar by Bull. 28, U. S. Dept. of Agriculture
Grapefruit (fresh)	3.57	1.80	4.37	
	4.17	2.20	6.38	
Grapefruit (canned)				
Juice	13.0	6.5	19.5	
Pulp	5.0	3.0	8.0	
Banana, yellow				
Edible portion	17.2	9.2	26.4	21.0
Cantaloupe	1.90	0	1.90	
	2.31	0	2.31	
	1.68	0	1.68	
Watermelon	2.80	0	2.80	6.7
	3.01	0	3.01	
	4.69	0	4.69	
Melon (Catauba)	2.38			
Pineapple	2.50			9.7
	1.85			
Raspberries	1.92			
Seedless grapes	5.94	trace		
Tokay grapes	14.52	0.46	14.98	14.4
Sour cherries	6.52	trace		
Carrots (fresh)	4.30			
	4.50			
	4.40			
	4.80			
	2.58			
	2.50			
	1.60			
Carrots (boiled)	2.08	5.95		
(4.50 before cooking)	3.70	4.10		
Beets (boiled)	2.60			
Gluten bread	less than 0.2	37.0		49.8
Gluten bread Washburn-Crosby	trace	14.8		49.8
Krinkles (Diabetic) Cereal-Curdolac Food Co., Wankeska, Wis.	none	20.0		
Washed bran	none	6.0		
Baker's Premium Cracked Cocoa	none	0.52		
Maltose Chocolate Candy, Battle Creek Food Co.			35.6 40.0	
Swedish bread, Allon Bergmouir, Stockholm	0.5	56.6	57.1	
Swedish Bread, Holland Rusk Co., Holland, Mich.	trace	48.0	48.0	
Essential Bread Hendebert	Therapeutic Food Co., 24 Stone St., New York.		59.5	
Biscottes de Chatel Guyon			68.0	
Biscuits Croquettes Dr. Charasse			51.0	
Chocolate Pastells			27.0	
Kellogg's Bran Battle Creek, Mich.	none	39.0		
Bran crackers	trace	57.2		