SPECIAL ARTICLES

CRYSTALLINE TURANOSE

THE trisaccharide melezitose can be hydrolyzed by weak acids to yield glucose and a disaccharide which was named turanose by its discoverer Alekhine. Turanose has in turn been hydrolyzed by G. Tanret, using stronger acids, to glucose and fructose. Turanose has never been obtained fully pure in the past because no one has succeeded in crystallizing it. In 1918 one of the authors (C. S. H.) found an abundant supply of the rare melezitose in a certain kind of honey and from it he prepared a small quantity of turanose in the hope of crystallizing it. Other samples of turanose sirup were prepared subsequently from this same stock of melezitose by other workers. Recently it was observed by Dr. D. H. Brauns that one of these sirups, the exact history of which is not now known, had crystallized after standing many years. By the use of these crystals to nucleate turanose sirups which we have lately prepared from melezitose it has been possible to obtain a rapid crystallization of turanose and the sugar has been recrystallized with ease from hot methyl alcohol in which it is moderately soluble. Crystalline turanose on solution in water shows a large and rapid mutarotation. At 20° the rotation of its freshly prepared aqueous solution three minutes after dissolving, was approximately $[\alpha]\frac{20}{D} = +43.5$ and the value became constant within 20 minutes at about $[\alpha]\frac{20}{D} = +75.6$. Crystalline turanose is thus a beta form of the sugar. The crystals are well-formed prisms with many faces developed. The sugar possesses a sweet flavor. Its melting point is 157°. A study of this interesting disaccharide, which can now be obtained in pure condition, has been undertaken.

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THE pH OF THE WHITE AS AN IMPORTANT FACTOR INFLUENCING THE KEEPING QUALITY OF HENS' EGGS[1]

HENS' eggs which are heavily infected with micro-organisms ordinarily have very poor keeping qualities. Several bacteriological investigations, the results of which appear in the literature, indicate that only a very small percentage of the freshly laid eggs contain bacteria. If a great number of eggs are shown to be heavily infected with bacteria after storage, improper treatment after the eggs were laid is indicated. However, eggs in the shell deteriorate in storage, but the presence of micro-organisms can not be demonstrated, therefore other factors besides micro-organisms must also be responsible for egg deterioration.

It is customary in grading eggs in the shell to consider the size of the air cell as one of the important factors indicating the quality of the egg, since the size of the air cell increases after the egg is stored, due to the evaporation of water from the egg. If the size of the air cell alone is used as the basis for estimating the interior quality of the egg, very erroneous conclusions may be drawn, since the size of the air cell is dependent upon the relative humidity of the atmosphere in which the egg is kept and upon the temperature. At the present time it is possible, by proper control of the temperature, circulation and humidity of the air in the storage room, to decrease the loss of water from the eggs to a very small amount.

Other changes take place in the eggs during storage which are more detrimental than the loss of water. Three of these changes which are probably the most important are: (1) The change of the thick jelly-like white which surrounds the yolk of the egg to a fluid condition, producing what is commonly called "watery whites." (2) The passage of water from the white to the yolk, producing a more fluid condition of the yolk contents. (3) The weakening of the yolk membrane, causing the yolk of the egg to flatten when the egg is broken, and, if this weakening has progressed far enough, to break.

Greenlee[2] has previously called attention to the passage of water from the white to the yolk as one of the changes taking place in eggs in storage.

[1] This is a preliminary note summarizing some of the results obtained in an investigation suggested by Dr. C. K. Powell, of the poultry department at Cornell University, and began with his cooperation. He was forced to drop out of the project about two years ago and since then the investigation has been continued. Drs. R. Whitaker, C. N. Stark and R. L. Bryant have helped with certain phases of the investigation, and valuable technical assistance has been rendered by Mr. A. E. Everhart, of the poultry department. Experimental evidence for the statements made will be published later.

This report will naturally raise the question as to the effect of the control of the pH of the white on the growth of the chicken embryo during incubation. Experimental work on this effect was begun in 1925 with the cooperation of Dr. C. K. Powell and is still being continued.

[2] A. D. Greenlee, "Deterioration of Eggs as Shown by Changes in Moisture Content," U. S. D. A. Bu. Chem. Circ. No. 83. 1911.