THE OCCURRENCE OF A PECTIN MATERIAL IN ARTICHOKE SIRUP

BY

H. E. HARRISON WITH D. T. ENGLIS

University of Illinois, Urbana, Illinois

The preparation of a palatable sirup from Jerusalem artichokes has been previously described (*1*). In this connection it was pointed out that the manufacture of the sirup was in a sense a preliminary step in an attempt to produce pure levulose by a direct crystallization from the raw sirup. Further work toward the major objective has been concerned with the constituents of the extract which might cause inhibition of crystallization.

Since levulose is extremely soluble, a very high concentration is necessary to reach a saturation value. Nevertheless, the crystallization of the sugar from an aqueous solution of the pure compound can be accomplished with a fair degree of ease. The difficulties encountered with the raw sirup emphasize the great significance of the impurities.

It was believed that one of the factors contributing to inhibition of crystallization was the high viscosity of the sirup at the necessary percentage of solids. It appeared reasonable that pectic substances might be present and responsible for this condition. These substances are found widely distributed in plants. The deposit of jelly-like masses in cans of the artichoke sirup which had been allowed to stand for some time pointed to the existence of some material of pectic nature.

For the isolation of the material samples of sirup were diluted to a sirup of about 50 per cent solids and 95 per cent alcohol added until the concentration of alcohol in the mixture was about 70 per cent. The jelly-like precipitate was removed, redissolved in water and reprecipitated several times.

The purified material had a specific rotation of 105, which is in the lower range of values reported for pectic materials. A portion of the sample was hydrolyzed (*3*) and finally tested for galacturonic acid. The crystalline character of the compound, temperature at which it discolored, and melting point confirmed its presence.

The quantity of apparent uronic acid in the pectic substance was determined by measurement of CO_2 evolved under regulated conditions (*4*). Values obtained were of the same order as those obtained with a pure citrus pectin under identical circumstances.

Enzymes of the pectin system were prepared from *Rhizopus nigricans* and the artichoke material was subjected to their action. Reduction in amount of available pectic acid, as determined by the method of Carre and Haynes (*2*), was indicated. The rate of saccharification of the sample by the pectic enzymes was similar to that obtained with citrus pectin.

Through the kindness of Mr. R. R. Sterrett and Mr. R. A. Stegeman, X-ray diffraction photographs were made of the artichoke material and citrus pectin. These photographs showed some relationship between the artichoke material, citrus pectin and polygalacturonic acids, but the work has not yet progressed to the stage at which definite conclusions can be drawn.

Further work is in progress to furnish additional information concerning this interesting constituent of the artichoke sirup.

1. DYKINS and ENGLIS—Trans. Ill. Acad. Sci. (1933).
2. HAYNES and CARRE—Biochem. J. 16, 60 (1922).
3. LINK and DICKSON—J. Biol. Chem. 86, 491 (1930).
4. NANJI, PATON and LING—J. Soc. Chem. Ind. 44, 253 T (1925).