

## SIRUP FROM JERUSALEM ARTICHOKE

BY

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## ABSTRACT

Levulose, the finest and sweetest of all sugars, is available in polymerized form in the tubers of the Jerusalem artichoke (*Helianthus tuberosus*). The commercial development of levulose has been advocated both as a supplementary source of food and for the production of sugar in regions in which sucrose production is not permissible. The peculiar physical properties of levulose, its higher sweetening power and the distinct flavor will enable its use for purposes for which other sugar products are unfitted. The Jerusalem artichoke, being of a hardy nature, is adaptable to a wide variation of soil and climate and sometimes may serve as an important source of this sugar. This investigation had as its object the production of a palatable sirup from these tubers, the difficulties attendant to the crystallization procedure being reserved for future study.

The tubers, upon reaching maturity, are washed, sliced and dried, and the dried material is used for the preparation of the sirup. An extract is prepared by diffusion in the regular manner in a six cell diffusion battery. The principal scientific interest centers in the method of hydrolysis of the solution of the polysaccharide material. A study of various combinations of the reaction time, temperature, degree of acidity and concentration of solids in the extract was necessary before optimum conditions for the reaction could be established.

Following the experimental work in the laboratory, the process selected was adapted to a semi-plant scale. The operations are essentially as follows. The extract of 30-35 per cent total solids as obtained from the diffusion battery is filtered with the aid of Super Cel using a small Shriver filter press. It is then acidified with HCl to a pH of 4.2 and transferred to a copper converter having a capacity of about 40 gallons. Steam is introduced directly into the reaction mixture until a pressure of 25 lbs. is reached. This pressure is maintained for about 20 minutes after which the solution is blown off. The converted extract is transferred to a glass lined evaporating pan and concentrated under diminished pressure to 50-60 per cent solids. After withdrawal of the sirup from the pan, it is neutralized with sodium carbonate to a pH of 5.4 and then filtered through active char (carboraffin) to reduce the color. Finally it is evaporated in the vacuum pan to a solids content of about 82 per cent.

The resulting sirup has a color ranging from a light yellow to a dark reddish brown. The taste varies somewhat depending upon the character of the original dried material, the conditions of evaporation, and the extent of active char treatment. In the present form the product is recommended chiefly for table use and for cooking in which a colored sirup is permissible.