

## Transformation of Common Dates of Low Market Value into Crystallized Sugar by Freeze-Drying Process

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### Abstract

The common dates can serve as an effective substitute for commercial white sugar, whether it is in the form of icing or crystallized sugar, and their utilization could represent a significant enhancement in terms of socio-economic benefits. The process of producing sugar from these dates begins with the cultivation of low-value date crops. The dates undergo a thorough washing process with water, effectively separating them from any grass, dirt, and other unwanted materials. Once cleaned, the dates are cut open to remove their pits. The extraction of sweet juice from the dates is achieved through a diffusion method. This technique facilitates the transfer of sugar from the date pulp into the water. Adding dates and distilled water in ratio (1/5) in a large flask to hot plate at temperature 65°C and turn slowly for 30 to 60 minutes. After this extraction phase, the sweet juice is filtered using a vacuum pump. The resulting juice contains not only the sugars derived from the dates but also various impurities that must be removed, including mineral salts and organic compounds. To achieve this purification, the filtration process employs lime milk treatment. This combination leads to the formation of insoluble salts and sediments that help stabilize and eliminate the impurities present in the juice. After this treatment, the mixture is passed through filters designed to capture the impurities while allowing the pure sweet juice to flow through. At this stage of processing, the filtered juice is composed of approximately 20% sugar and 80% water.

Using a rotavape, the juice is concentrated at 40°C until it becomes a syrup containing 65% to 70% sucrose, the syrup is then frozen, then sublimated, and finally desorption (lyophilization) by freeze-drying transforms it into crystallized sugar, ready for various applications.

**Key Words:** Common Dates, sugar, extraction, filtration, clarification, freeze-drying

