

ABSTRACT

The results showed of volatile aromas on organoleptic evaluation. The rate of evaporation was found to be dependent on concentration of liquid foods and fruit juices using liquid desiccants. Evaporator pressure resulted in increased evaporation rate and the boiling point elevation approach theoretical values.

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This study examines the theory and application of desiccant technology to the concentration of liquid foods. Liquid foods have been conventionally concentrated by various methods such as evaporation, freeze concentration and by membrane processes. Since it has already been shown that desiccants can be used to concentrate aqueous solutions, this investigation studies the application of liquid desiccants to concentrate fruit juices and liquid foods.

A single tube liquid desiccant falling film evaporator was built of stainless steel. This was tested with 35%, 40% and 45% calcium chloride solutions to concentrate sucrose and fruit juice solutions. At reduced pressures, water vapour was evaporated from the falling liquid food film and transferred to the desiccant film where it was absorbed and liberated latent heat. The liquid desiccant temperature increased and provided the thermal energy to drive the evaporation process.

The results showed some loss of volatile aromas on organoleptic evaluation. The rate of evaporation was found to increase with desiccant concentration and flow rate and also food flow rate. Reducing evaporator pressure resulted in increased evaporation rate and the boiling point elevation was found to approach theoretical values.

This study demonstrated that liquid desiccants could provide enough energy, through heat of absorption, to concentrate a liquid food in a falling film evaporator with a vapour transfer line.

Firstly it is recommended that a multiple tube desiccant falling film evaporator be built and tested to determine optimal operating conditions of such a system. Secondly since no steam was used to drive the evaporator used in this project, the use of the energy stored in the concentrated liquid desiccant for potential heating applications in food processing should be investigated.