

## **Progressive Freeze Concentration of Fruit Juices and Yield Improvement by Partial Ice Melting**

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Progressive freeze concentration (PFC) is a novel freeze concentration method which replaces the conventional Suspension freeze concentration (SFC) which requires a higher capital cost. The applications of the PFC are limited since still it is a developing technology and has lower yield than SFC. The research study has been done to concentrate pineapple, watermelon and tomato juices by PFC after producing clear juices by blending the fruit and filtering the blended juice with a muslin cloth. The yield of the process was increased by performing partial ice melting process. During the formation of ice crystals in the PFC, the solute particles can be entrapped between the boundaries of the ice crystals. The initial melted fraction provides juice with higher brix value. The freezing point of samples were -0.5 °C, -0.6 °C and -0.9 °C respectively, for tomato, watermelon and pineapple. Pineapple, watermelon and tomatoes juices were concentrated up to brix values of 14.8°, 12.2° and 6.1° respectively without losing organoleptic characteristics of the original juices from initial brix values of 12.2°, 8.3° and 3.2°. The partial ice melting method was used to improve the yield of concentrated product. By recovering the initial melted ice fraction, the yield percentage of the PFC product could be increased. In this study, the yield was increased up to 80% for all fruit juice samples by recovering 20-30 ml of initial melted ice fractions.

*Keywords:* Progressive freeze concentration (PFC), Suspension Freeze concentration (SFC), Partial ice melting