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## Performance analyses for evaporation process in ohmic heating assisted vacuum system

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Fruit juices are concentrated to reduce storage and transportation costs, and to ensure microbial safety in food industry. Although vacuum evaporation method is conventional method for concentration of fruit juices in industrial scale, alternative concentration methods are needed to minimize the quality losses and to overcome formation of undesired components during evaporation process. Some novel methods have high investment cost and comprise problems in reaching high final dry matter contents. Ohmic heating is an alternative electrical method which supplies fast heating and minimizes the changes in quality properties. Sour cherry juice having TSS content of 19.2% was evaporated until reached to TSS content of 65% by ohmic heating assisted evaporation (OVE) and conventional vacuum evaporation (VE). OVE was performed at 3 different voltage gradients (10, 12 and, 14 V/cm) under 25 kPa vacuums. VE was performed by using 1100 W heater under same vacuum condition. Energy and exergy evaluations of evaporation processes were performed by considering first and second laws of thermodynamics. Ohmic heating assisted vacuum evaporation was successfully applied sour cherry juice to obtain its concentrate. The performance evaluation of OVE system was conducted. Effects of voltage gradient applied during OVE on energy and exergy efficiencies of process were determined. Shortest process time was obtained at 14 V/cm (40 min) while the longest time was for VE (85 min). The energy consumption value of VE were higher than OVE process ( $p < 0.05$ ). OVE process applied at 14 V/cm had highest energy (48.63%) and exergy efficiencies (19.02%) ( $p < 0.05$ ). It was concluded that VE system need more improvement than OVE system since improvement potential (IP) value of VE process was highest. OVE process was recommended to be used as an alternative heating method for vacuum evaporation process of fruit juices.

### Biography

Serdal Sabanci has completed their Master studies at Gaziosmanpasa University, Turkey (2012). He is Research Assistant in Food Engineering Department, Munzur University, Turkey. He is currently pursuing PhD education in Ege University, Graduate School of Natural and Applied Sciences, Food Engineering Section, Izmir, Turkey. He is working on food technology, especially ohmic heating processes

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