CONCENTRATION OF GRAPE JUICE BY COUPLING REVERSE OSMOSIS AND OSMOTIC EVAPORATION

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Concentration is a common practice in juice industries, since it reduces the juice volume and consequently the transport, storage and packaging costs. The traditional methods usually employ high temperatures, which may cause undesirable changes in the product's characteristics. An alternative for thermal evaporation is the use of membrane processes, which operate at room temperature. The objective of this work was to evaluate the potential of coupling reverse osmosis (RO) and osmotic evaporation (OE) in order to concentrate grape juice. The juice was firstly concentrated by RO in a plate and frame reverse osmosis system composed by thin film composite membranes. OE was carried out in a system with two compartments (one for the juice and other for the brine), using a flat sheet polytetrafluoroethylene membrane. The processes were evaluated for permeate flux and volumetric concentration factor (VCF) and the juices were evaluated for total phenolics, anthocyanin content and antioxidant activity. The permeate flux in RO and OE processes ranged from 12 to 0.4 L/hm^{-2} and from 2.6 to 0.3 L/hm^2, reaching VCFs of 2.1 and 1.5, respectively. Total phenolics, anthocyanins and antioxidant activity were concentrated 3.4, 3.1 and 3.4 times in the final product, with respect to the feed juice. Total phenolics and anthocyanins were totally preserved during RO, while OE promoted losses around 5% and 12%, respectively. The coupling of RO and OE proved to be efficient for the concentration of grape juice, resulting in a final solid concentration of approximately 530 g/kg and slight losses of bioactive compounds.