Vegetable oil and biodiesel industry is seeking to improve energy efficiency, as well as alternative processes towards improving oil quality. The development of new and feasible process technologies for the industrial oil sector is critical. The use of pressurized fluids as extracting agents for oils appears in a significant number of studies, indicating the feasibility of using these solvents by completely or partially replacing the n-hexane. This study is aimed at investigating the separation of miscellas of refined soybean oil/n-hexane, crude soybean oil/n-hexane (industrial miscella) and refined soybean oil/n-butane pressurized using membrane technology. Polymeric hollow fiber and ceramic membranes with MWCO’s between 5 and 50 kDa were investigated. Mass ratios for the synthetic miscella oil/solvent from 1:1 to 1:5 (w/w) were used. Oil rejections up to 100%, total permeate fluxes (oil + solvent) to 65.3 kg/m² h with oil permeated fluxes up to 1.4 kg/m² h were obtained for the membranes and miscellas investigated. The industrial miscella showed the same behavior obtained with the synthetic miscellas regarding oil rejections and permeate fluxes. In the separation step of oil/n-butane miscella oil rejections were greater compared to the system oil/n-hexane. Comparing the membrane types investigated, ceramic membranes provided higher oil rejections, regardless of the miscella investigated. Nevertheless, the hollow fiber membrane has shown higher total flux permeated. The present promising results indicate the technical applicability of a new technology comprising membrane separation together with compressed solvent in biodiesel and vegetable oils extraction and processing industries during the solvent recovery step.

Keywords: membrane separation; hollow fiber membrane; ceramic membrane; soybean oil; n-butane; n-hexane.