

Abstract

Red fruit (*Pandanus conoideus* Lam.) is a native fruit from Papua, Indonesia, usually processed into oil due to its high lipid content. Multiple studies have encapsulated red fruit oil and observed its stability, but the shelf-life estimation of freeze-dried is yet to be determined. Accelerated shelf-life testing (ASLT) is utilized in this study with the Arrhenius modelling to observe the degradation kinetics of the critical parameters of freeze-dried RFO, including peroxide value, total carotenoid content, moisture content, and color. Freeze-dried RFO were stored at elevated temperatures of 55°C, 65°C, and 75°C for 21 days, where all the parameters except for PV degraded significantly. PV and TCC degradation follow the first-order kinetics, while color degradation follows the zero-order kinetics. Activation energy obtained for PV, TCC, and color are 19.308 kJ / mol K, 76.113 kJ / mol K, and 44.838 kJ / mol K. Shelf life of freeze-dried RFO is estimated to be 54.6 days at storage temperature of 20°C and 47.9 days at 25°C. The estimation of shelf-life is established by utilizing the most critical parameter, which is PV.

Keywords: red fruit oil, freeze-drying, physicochemical properties, accelerated shelf-life testing, Arrhenius modelling.