Optimal temperatures to fractionate palm oil through centrifugation and critical concentration of fat from palm oil in soybean oil

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Palm oil (PO) is an important player in the food industry, it can be used as ingredient in foodstuffs, such as margarines, ice creams and spreads, and as heat transfer medium for frying. PO is a reddish vegetal oil obtained through pressing, rich in saturated fatty acids. At room temperature, it is possible to observe that PO presents two phases, a white precipitate (saturated fatty acids) and a reddish supernatant oil. At lower temperatures, PO presents a solid like behavior, which could indicate the capacity of saturated fatty acids from PO to structure oil. Vegetal oil structuration is due to fat crystallization, which can be induced by reducing the temperature. This work aimed to study the influence of storage and centrifugation temperature on the separation of oil from palm oil (OPO) and fat from palm oil (FPO), and to determine the minimal concentration needed of FPO to structure soybean oil. PO was heated at 90 ºC for 30 minutes. Samples of one gramme were transferred to previously weighted Eppendorf tubes of 1.5 mL. Eppendorf tubes were kept at controlled temperature for 24 hours and centrifuged at controlled temperature (10 000 rpm for 15 minutes). The supernatant oil was drained and the Eppendorfs were weighted to obtain the yield of fat and oil fractions from palm oil. Temperatures of 10 ºC, 15 ºC, 20 ºC and 25 ºC were chosen for the storage chamber and for the centrifugation. Response surface methodology pointed out that storage and centrifugation at 20 ºC is the best temperature to fractionate PO. The thermal behavior of PO, FPO and OPO were determined by differential scanning calorimetry during cooling from 90 ºC to -30 ºC. OPO presented no crystallization, corroborating to indicate the purity of the OPO. FPO was able to solidify soybean oil at concentration of 50 % (w/w). FPO and OPO presented significant thermal differences and are promising ingredients for industrial applications in food, cosmetics, and chemical products. Acknowledgement to FAPESP for the scholarships nº 2021/08305-1 and nº 2020/02734-5 and financial support n° 2020/05254-4.