Degreasing of the black soldier fly (Hermetia illucens L.) larve meal with supercritical CO2

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With the growth of the world population and the demand for food, edible insects are seen as an economic, nutritional and sustainable alternative. The black soldier fly (Hermetia illucens) has been highlighted for its nutritional composition, for its high content of proteins and lipids. Extraction with supercritical CO2 (scCO2), has been applied because it has many advantages, such as leaving no toxic residues in the flour and the extracted oil. In this research the pressure (P) and temperature (T) conditions in the extraction were studied, comparing the consumption, yield and solvent consumption in dynamic and intermittent processes. The extractions with scCO2 were performed at temperatures of 40, 45, 50, 55, 60 and 65°C and pressures of 20, 25 and 30 MPa. The best yields were obtained at pressures of 25 and 30 MPa at 60 °C and static time (St) of 30 min and 90 min continuous flow rate (20 mL/min) for all experiments. Intermittent process was performed at the optimized conditions (25 and 30 MPa at 60 °C) in 3 cycles. The first cycle (C), in which the flour and the solvent remained in contact for 30 min of static time (St), the pump was turned on and the outlet valve opened for oil collection until the determined CO2 mass was reached. After the collection, a new cycle was started with the same contact time and the same P and T. After the last cycle, the system was depressurized. The parameters analyzed were yield and CO2 consumption in each process. The dynamic and intermittent processes presented similar yields of 33.79 % representing the entire recovery of the oil present in the flour, which corresponds to 32.7 % of the oil contained in the flour, and did not differentiate between them. The intermittent process presented lower CO2 consumption, being half the volume of solvent spent in the dynamic. The intermittent extraction presented the same yield as the dynamic extraction. However, the extraction time and solvent consumption was considerably shorter. It is believed that this method of extraction in cycles (intermittent process) should be adopted, due to its important economic benefits.