World production of tropical fruits is growing at a considerable pace and each day new markets are won. Mangaba is among the tropical fruits of greater economic impact in Sergipan market. The cooling and/or freezing of fruits and vegetables after harvesting is carried out in order to retain their organoleptic characteristics and prevent the growth of undesirable microorganisms. Generally, the experimental determination of thermal properties of foods is the major difficulty of the large dependence of these properties and their large deviations of low temperature characteristics of the freezing process. The mathematical correlations of the thermal properties of food as a function of its basic chemical composition and water content have been an alternative to experimental realization. Equations for estimation of thermo physical properties for systems with and without phase changes are easily found in the literature. The values of specific heat, density and thermal conductivity were estimated using Choi and Okos model from the composition of cashew. The lack of tabulated values of thermal properties of mangaba has restricted the use of equations in mathematical models for the calculation of thermal properties. In this work we used the hypothesis of heat transfer dynamics to estimate the coefficient of heat transfer using the Biot number relating to food thermal conductivity and the heat transfer coefficient. Through experiments, it was possible to determine the freezing time and the Fourier number. Afterwards, it was estimated the coefficient of heat transfer. The coefficient of heat transfer was estimated around 1300 Wm$^{-2}$K$^{-1}$. 