Thermal performance of solar air collector depends on many parameters as inlet air temperature, air velocity, collector slope and properties related to collector. In this study, the effect of the different parameters which affect the performance of the solar air collector are investigated. In order to maximize the thermal performance of a solar air collector genetic algorithm (GA) and artificial bee colony algorithm (ABC) have been used. The results obtained indicate that GA and ABC algorithms can be applied successfully for the optimization of the thermal performance of solar air collector.