The Standard Model (SM) of particle physics effectively describes fundamental particles and their interactions through various forces.The phenomenological implications of the BLSSM are examined, focusing on Higgs production and decay at the LHC, while new particles, such as a heavy Z, and neutrino mass generation via a seesaw mechanism are also predicted.The analysis includes the pp->H->bb signal, reviewing its luminosity-normalized yield against major backgrounds and evaluating kinematic distributions like invariant mass, transverse momentum, and angular separation for different Higgs hypotheses.