Geometric structures for all the possible isomers of fluorinated pyridines were optimized at the B3LYP/6-311??G(d,p) level of theory. Aromaticities of the considered molecules were investigated using different indices included geometry-based (HOMA and Bird [16]), magnetism-based (NICS(1) and diamagnetic susceptibility anisotropy [Dv]), p- and r-electron count-based (pEDA, sEDA), and recently introduced electronic-based (electric field gradient [EFG(0), EFG(0.5)] and Shannon aromaticity) indices. Moreover, we used also HOMO–LUMO gap, atomization energy (D0), and interaction energy for fluorinated pyridine complexes by water molecule as global descriptors, and the EFG values (EFG–F(0)) on the middle points of C–F bonds and r-electron population (Nr) of nitrogen atom as local descriptors. All studied indices except HOMA and EFG(0.5) are well correlated to each other and to global and local descriptors.