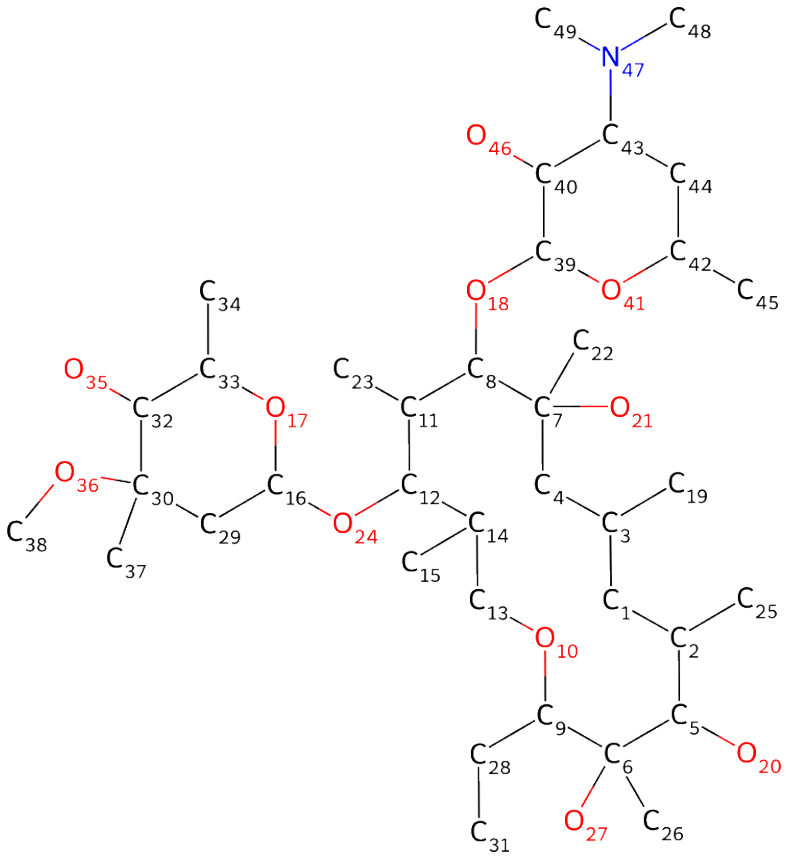
C-oxidation BDE Energy Report for: 130_erythromycin-out

This report covers the results for bond dissociation enthalpies (BDE) and solvent accessible surface area (SASA) calculations performed for 130_erythromycin-out. Oxidation propensity is established using C-H BDE. The lower the C-H BDE values the higher the propensity for C-oxidation. Details for the density functional theory (DFT) calculations and overall workflow are explained at the end of this document.

BDE and SASA



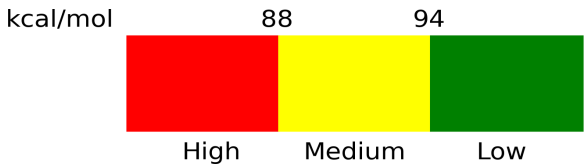
Atom	BDE (kcal/mol)	Propensity	SASA (Å²)
C1	94.79	Low	8.04
C2	93.6	Moderate	8.09
C3	87.6	High	0.61
C4	93.23	Moderate	9.46
C5	90.89	Moderate	3.96
C8	88.23	Moderate	0.00

C9	95.45	Low	3.21
C11	89.46	Moderate	1.36
C12	93.88	Moderate	0.20
C13	91.39	Moderate	5.20
C14	92.67	Moderate	7.01
C15	101.32	Low	11.27
C16	89.38	Moderate	2.77
C19	98.2	Low	16.29
C22	99.74	Low	12.34
C23	101.21	Low	7.56
C25	98.24	Low	14.46
C26	100.66	Low	13.55
C28	96.8	Low	12.37
C29	99.91	Low	12.00
C31	100.4	Low	20.14
C32	89.96	Moderate	10.79
C33	87.46	High	1.11
C34	99.2	Low	16.56
C37	99.7	Low	22.71
C38	96.42	Low	19.46
C39	93.42	Moderate	0.01
C40	91.66	Moderate	3.35
C42	92.93	Moderate	3.50
C43	92.07	Moderate	2.35
C44	99.57	Low	10.08
C45	102.88	Low	20.50
C48	92.8	Moderate	21.27
C49	92.81	Moderate	21.19

Missing Sites:

None

Risk Scale:



Calculation Details

Conformational search calculations were performed only for the base ground state molecule. The lowest energy conformer was selected to generate radicals and run optimization DFT calculations. DFT calculations were performed using Gaussian with B3LYP level of theory and 6-31G(d,p) basis set. The BDE protocol was adapted from: *Lienard, P., Gavartin, J., Boccardi, G., & Meunier, M. (2015). Predicting drug substances autoxidation. Pharmaceutical research, 32, 300-310.*