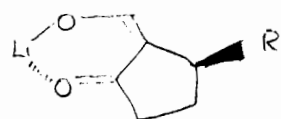
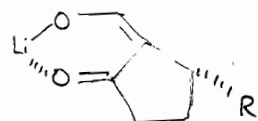


The reagents

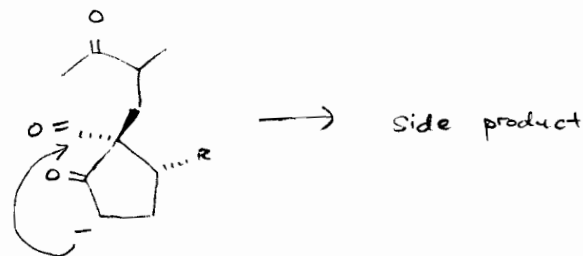


The top face is blocked by R, thus to avoid steric hindrance, Michael addition occurs on the bottom face.

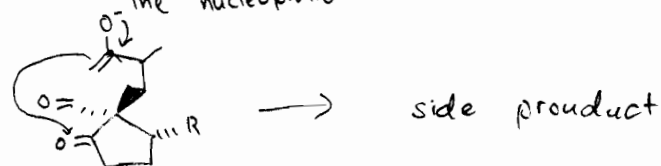


The bottom face is blocked by R, thus to avoid steric hindrance, Michael addition occurs on the top face.

The above two scenarios will lead to the formation of the stereochemistry of (9)



The enolate could remove a proton and cause such a reaction to occur. However, the possibility of the side product is low due to the strain caused by the 5 membered ring. This makes it difficult for the nucleophile to attack the carbonyl group.



The enolate might attack the Ketone in the 4 member ring to form the side product. The possibility of such side product is low as aldehyde group is more electrophilic compared to the ketone group in the 5 membered group.