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A rare nitrene insertion followed by redox dimerization during the photolysis of 'azido-*meta*-meconine'

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Aryl azides are 'green' reagents and provide a fascinating area of chemistry and have many uses in industry as pharmaceutical agents. Azidothymidine (AZT) is used to treat HIV-AIDS and a 2-dimethylaminoethyl azide (DMAZ) is a powerful explosive. The 'click' reaction based on these has been awarded the coveted Nobel Prize in 2022. 'Click' reaction is a 'green' regiospecific reaction since atom efficiency is very high as no atom loss occurs. Reactions of azides involve many unusual and fascinating transition states and intermediates. In this paper, is discussed the photochemistry of 'Azido-*meta*-Meconine'. Photolysis at 5°C using wavelength of 254 nm for 6 h has been carried out. The reaction product is subjected to preparative Thin Layer Chromatography (TLC), two bands namely an 'Upper band' and a 'Lower band' have been separated, molecular weight values in LC-MS spectrum differs from each other by six atomic mass units (six hydrogens). One part of the reactive intermediate underwent addition of hydrogen (reduction) and other dehydrogenation (oxidation) which thus constitutes a rare example of dimerization of nitrene intermediate previously unknown in the literature. Detailed LC-MS studies have provided evidence for the formation of two products with yield around 94.99%, which is an unusually high yield for such photochemical reactions. Further, spectroscopic studies (UV-Visible, FT-IR, ^{1}H NMR, *etc.*) have also been carried out for corroborating the successful formation of these two products.

Keywords: Aryl azides, Photolysis, Nitrene insertion, Redox dimerization