SYNLETT Spotlight 14

This feature focuses on a reagent chosen by a postgraduate, highlighting the uses and preparation of the reagent in current research

2-Iodoxybenzoic Acid (IBX) and Dess-Martin Periodinane (DMP)

Compiled by Sachin S. Chaudhari

Pharmaceuticals and Fine Chemicals Division, Department of Chemical Technology, University of Mumbai, Matunga, Mumbai-400 019, INDIA.

Sachin S. Chaudhari was born in Jalgaon, Maharashtra (India). He received B.Sc. in Chemistry, M.Sc. (Tech.) in Technology of Pharmaceuticals and Fine Chemicals, and he is currently doing Ph.D. (Tech.) under the tutelage of Prof. K. G. Akamanchi at Department of Chemical Technology, University of Mumbai, Matunga, Mumbai-400 019.

Recently, 2-iodoxybenzoic acid (IBX **1**)^{1a} [1-hydroxy-1,2-benziodoxol-3(1H)-one 1-oxide] and Dess-Martin Periodinane (DMP **2**)^{1b} [1,1,1-triacetoxy-1,1-dihydro-1,2-benziodoxol-3(1H)-one] as oxidants have added glory to a long tradition of hypervalent iodine chemistry. DMP has attracted particular attention as the reagent of choice for oxidation of alcohols to the carbonyl compounds.^{1b} Mildness, wide functional group tolerance, high yields without over-oxidation, and easy work-up procedure makes them versatile. IBX also oxidizes vic-diols without cleaving the glycol C-C bond,^{1a,3a} allows oxidative deoxygenation,^{3b} oxidative ring closure of amino alcohols to amins^{3c} and one pot selective 5'-oxidation/olefination of 2'-deoxynucleosides.^{3d} Popularity of DMP as a preferred chemose-

lective oxidant in the plan of total synthesis is reflected by its current use in antifungal polycyclopropane compounds,^{4a} immunosuppressant sanglifehrin A,^{4b} potent antitumor agents saponin OSW-1^{4c} and macrolide tedanolide.^{4d}

Preparation: These reagents can be readily prepared from 2-iodobenzoic acid^{1a,5} and used. Incidentally, IBX is a precursor of DMP.

Abstracts

A) Use of IBX in DMSO as a selective oxidant opens up new avenue for the conversion of 1,4-bisprimary or 1,4-primary-secondary diol to γ -lactol. This implies that the oxidation of the primary hydroxyl group in **3** is considerably faster than the secondary hydroxyl function of either **3** or **4**, which could not previously be accomplished in one step.⁶

B) The oxidation of an acetylenic diol, such as 2-butyne-1,4-diol **5** to the unstable dial, trapped in situ with phosphorous ylide, provides a convenient homologation method to prepare diyne **6**, which has potential use in the synthesis of polycyclopropane natural products.^{4a}

C) An expeditious oxidative deoxygenation using DMP proceeds selectively in the presence of alcohols, *O*-methyl oximes, tosylhydrazones, acid sensitive groups and moieties in very high yields, in short time and under mild reaction conditions.⁷

D) Remarkable tolerance of wide varieties of sensitive functional group during oxidation of alcohol **9** to aldehyde **10** highlights use of DMP as the reagent of choice in synthesis of complex multifunctional 18-membered antitumor macrolide, tedanolide.^{4d}

References

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