

# 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)

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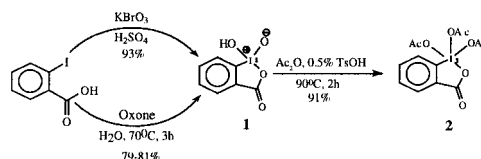
Sachin S. Chaudhari was born in Jalgaon, Maharashtra (India). He received B.Sc. in *Chemistry*, M.Sc. (Tech.) in *Technology of Pharmaceuticals and Fine Chemicals*, and he is currently doing Ph.D. (Tech.) under the tutelage of Prof. K. G. Akamanchi at Department of Chemical Technology, University of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



Recently, 2-iodoxybenzoic acid (IBX **1**)<sup>1a</sup> [1-hydroxy-1,2-benziodoxol-3(1*H*)-one 1-oxide] and Dess-Martin Periodinane (DMP **2**)<sup>1b</sup> [1,1,1-triacetoxy-1,1-dihydro-1,2-benziodoxol-3(1*H*)-one] {CAUTION!}<sup>2</sup> 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.<sup>1b</sup> 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,<sup>1a,3a</sup> allows oxidative deoxygenation,<sup>3b</sup> oxidative ring closure of amino alcohols to iminals<sup>3c</sup> and one pot selective 5'-oxidation/olefination of 2'-deoxynucleosides.<sup>3d</sup> Popularity of DMP as a preferred chemose-

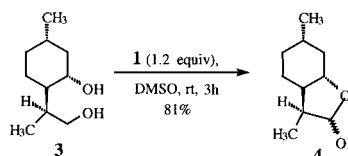
lective oxidant in the plan of total synthesis is reflected by its current use in antifungal polycyclopropane compounds,<sup>4a</sup> immunosuppressant sanglifehrin A,<sup>4b</sup> potent antitumor agents saponin OSW-1<sup>4c</sup> and macrolide tedanolide.<sup>4d</sup>

**Preparation:** These reagents can be readily prepared from 2-iodobenzoic acid<sup>1a,5</sup> and used. Incidentally, IBX is a precursor of DMP.

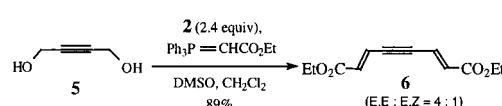


### Abstracts

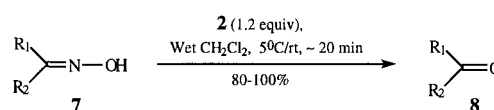
A) Use of IBX in DMSO as a selective oxidant opens up new avenue for the conversion of 1,4-bisprimary or 1,4-primary-secondary diol to  $\gamma$ -lactol. This implies that the oxidation of the primary hydroxyl group in **3** is considerably faster than the secondary hydroxyl function of either **3**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



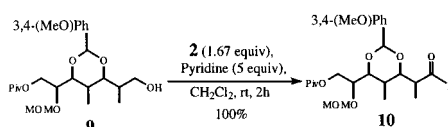
B) The oxidation of an acetylenic diol, such as 2-butyne-1,4-diol **5** to the unstable dial, trapped in situ with phosphorous ylide, provides a convenient homologation method to prepare diyne **6**, which has potential use in the synthesis of polycyclopropane natural products.<sup>4a</sup>



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.<sup>7</sup>



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.<sup>4d</sup>



### References

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