**Introduction**

Sodium triacetoxyborohydride [Na(OAc)$_3$BH, abbreviated as STAB-H] is a versatile reagent in organic synthesis. In addition to its superior ability in effecting reductive amination of aldehydes and ketones, it can reduce N-heterocycles (indoles, quinolines, and isoquinolines), imines, enamines, oximes, amides, aryl ketones, acetals, and other substrates.$^1$

STAB-H is a milder and more selective reducing agent than NaBH$_4$. The mild nature of STAB-H may be attributed both to the bulky nature of the reagent and to the inductive electron-withdrawing ability of the three acetoxy groups which stabilize the boron–hydrogen bond. $^2$ It has more advantages over Na(CN)BH$_3$ also due to the lack of toxicity.

The preparation of triacetoxyborohydride was first performed by Wartik and Pearson through the reaction of NaBH$_4$ and CO$_2$ (Scheme 1).$^3$ Furthermore, it can be also generated in situ from NaBH$_4$ and acetic acid. Aldehydes, but not ketones, are smoothly reduced to alcohols with STAB-H, prepared from sodium borohydride and acetic acid in benzene$^4$ or in N,N-dimethylacetamide.$^5$

**Abstracts**

(A) Boros et al. recently reported the synthesis of diazaindoline 3, where the key step involved rapid reductive amination of aldehyde 1 with aniline 2 by sodium triacetoxyborohydride (STAB-H) and TFA.$^6$

(B) A tandem reductive amination–lactamization strategy using STAB-H, 1-benzyl-4-piperidone (4) and γ- or δ-amino esters or acids resulted in lactam 5.$^7$

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(C) Dialdehyde 6 can be converted into amine 7 with STAB-H and benzylamine, whereas lactol 8 likewise affords lactam 9 under similar conditions.\(^6\)\(^,\)\(^9\)

(D) As mentioned already, STAB-H is a milder reducing agent than NaBH\(_4\) and hence selective. It can reduce vinylogous carbamate 10 selectively without affecting other functionalities.\(^10\)

(E) The reduction of an imine can be effected by STAB-H. The reduced form of the quarter pyrroles 13 can be obtained by using STAB-H from the stable oxidized form 12.\(^11\)

(F) It is shown that STAB-H effectively reduced amide 14 to 15 in the total synthesis of a selective D1 antagonist useful in the treatment of psychoses, depression, and D1-dependent neurological disorders.\(^12\)

(G) Cleavage of oxazolidines 16 can easily be carried out with STAB-\(^{H}\)\(^13\) to provide 17 and this tactic was featured in the first enantiospecific synthesis of salinosporamide A.\(^14\)

References