Use of tribromoisocyanuric acid to conversion of alkynes into α,α-dibromo ketones

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Keywords: tribromoisocyanuric acid, alkyne, α,α-dibromo ketones

INTRODUCTION

Tribromoisocyanuric acid (Figure 1) have been recently shown to be an efficient brominating agent, due to its ability of bromenium ('Br^{+}') ion transfer to unsaturated substrates. This reagent has been used in the bromination of 1,3-dicarbonyl compounds, aromatic rings, dibromination and cobromination[1] of alkenes, and also in diverse oxidation reactions[2]. TBCA is a stable solid that can be easily synthesized from isocyanuric acid, NaOH and KBr in the presence of oxone[1]. It has the advantage of high atom economy in comparison to similar systems such as N-bromosuccinimide (NBS) and N-bromosaccharin (NBSac). Furthermore, in the reactions involving TBCA, isocyanuric acid left at the end of the reaction as a by-product and can be recovered by filtration and reused to produce more TBCA.

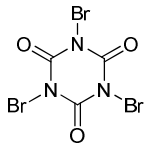


Figure 1: Tribromoisocyanuric acid

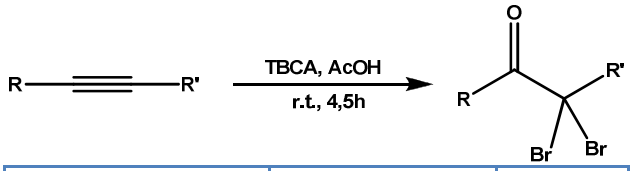
The trichloroisocyanuric acid (TCCA), analogues of TBCA also have been used in the chlorination of unsatured substrates. Hiegel and co-works demonstrated of TCCA is able to convert alkynes into α,α-dichloro ketones[3]. However, the bromination of alkynes using TBCA has not been reported yet.

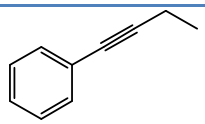
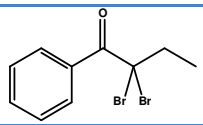
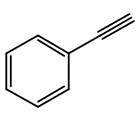
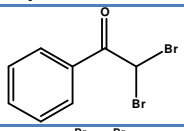
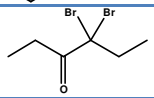
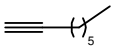
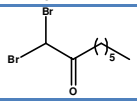
RESULTS AND DISCUSSION

In the present work, we here examined the conversion of 1-phenyl-1-butyne, phenylacetylene, 1-octyne and 3-hexyne into the corresponding α,α-dibromo ketones.

The alkynes reacted with 1 equivalent of TBCA in the presence of acetic acid. The reactions were followed for GC-MS and the products were characterized by ^{1}H and ^{13}C NMR. The products formed were Markovnikov type exclusively (Table 1).

Table 1. Conversion alkynes into α,α-dibromo ketones.



substrate	products	Crude Yield (%)
		60
		88
		92
		92

CONCLUSION

The present work describes the utilization of tribromoisocyanuric acids as an efficient bromination reagent for conversion of alkynes into α,α-dibromo ketones.

ACKNOWLEDGEMENTS

We thank CNPq, CAPES and FAPERJ for financial support.

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