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Research Article

Theme- *New horizons in chemical sciences.*
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Oxidation of Unusual groups using Periodate in Homogeneous and Phase Transfer Condition.

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ABSTRACT
A highly efficient, eco-friendly, synthesis of substituted aldehyde and benzoic acid, by using TBAPI catalyst. Benefit of this method is short reaction time, easy handling, simplicity, efficiency, high yield, and recoverable catalyst.

KEYWORDS
TBAPI catalyst, aldehyde benzoic acid.

1. INTRODUCTION

Oxidation of sulphides, 2-hydroxyacids,2-bromoketones and arylacetic acid was not easily oxidized, for that we have used tetrabutyl ammonium periodates [TBAPI]. Earlier researcher for oxidation of benzylic halides used sodium chromate in HMPA or Potassium Dichromate in polyethylene glycols or bis[tetrabutyl ammonium chromate] but during this there is nucleophilic displacement of halides will forms chromate ester which further forms carbonyl compounds [1-3].

In this new approach when benzyl bromide reacts with TBAPI in 1:1 molar ratio refluxed in DMF for 2 hours will give benzaldehyde (85%). But our focus is on oxidation of Sulfides to Sulfoxides which is very successful in homogeneous condition with TBAPI in DCM reflux for 5 hours in PTC condition in cupric sulphate with yield [4-5].

TBAPI which is source of periodates soluble in organic solvents like DCM, Dioxane, THF used for decarboxylation of 2-hydroxyacids will form aldehydes. Also 2-bromo acids and malonic acid oxidative decarboxylation will forms aldehydes [6].

2. MATERIALS AND METHODS

Oxidation of Sulfoxide

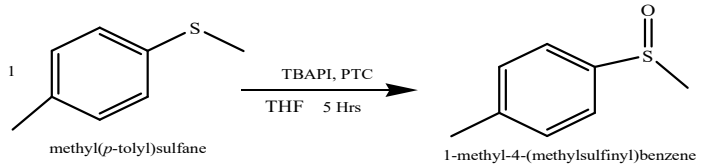
In the solution of Sodium meta-periodate (4molar,0.856gm) dissolved in water (18 ml) and PTC (0.406 gm, 0.8 Mol) and cupric sulphate added to a solution of sulfide (0.55gm,4 Molar) in 20 ml THF at room temperature with constant stirring and the whole mixture was refluxed for 10 hours and reaction progress was monitored by T.L.C.(Pet ether: EA). The reaction product is extracted with water and Ethyl acetate. Organic layer is dried on rotary evaporator and further product purified by column chromatography. The product is confirmed by GCMS and NMR spectroscopy.

Oxidation of 2-hydroxycarboxylic acid

Mendelic acid (0.467,3 Molar) in THF (10 Ml) added to a solution of Sodium periodate (0.655,3 Molar) and PTC (0.350,0.69Mol) in water (10 Ml), the solution is stirred during reflux in 3 hours, reaction workup was done with water and ethyl acetate, product was purified by column chromatography which gives 95% purity.

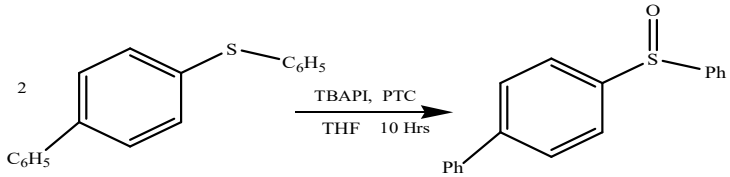
Oxidation of 2-bromoacids and 2-substituted malonic acid

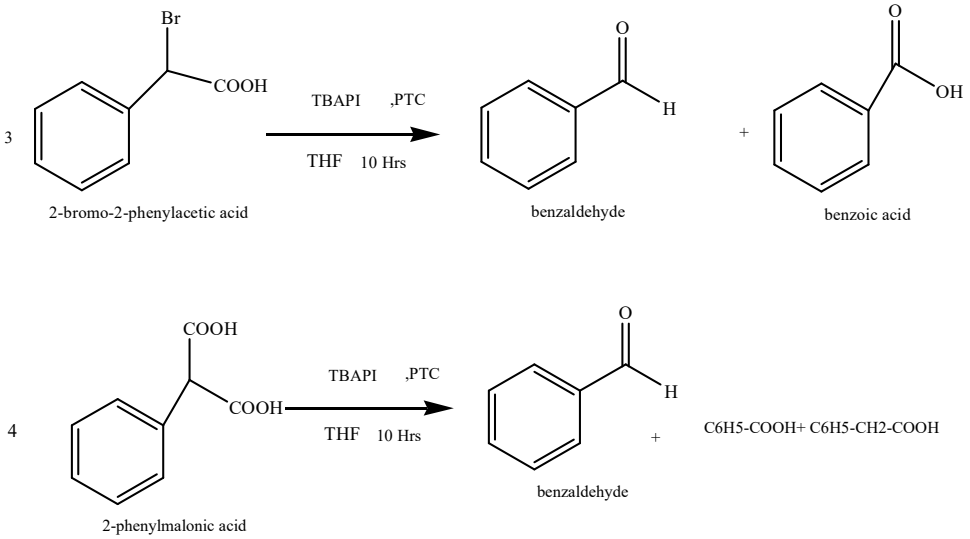
The experimental condition i.e. work-up, purification is same as earlier methods.



methyl(*p*-tolyl)sulfane

1-methyl-4-(methylsulfinyl)benzene





Scheme 1. Oxidation of sulphides, 2-hydroxyacids,2-bromoketones and arylacetic acid.

3. CONCLUSION

We are conclude, a highly efficient, synthesis substituted aldehyde via one pot reaction using heterogeneous TBAPI catalyst. Benefit of this method are short reaction time, one time chemical addition, easy handling, simplicity, efficiency, high yield.

4. ACKNOWLEDGMENTS

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